

CDC A4N151

Surgical Service Journeyman

Volume 1. Introduction to the Surgical Service Career Field



**Air Force Career Development Academy
The Air University
Air Education and Training Command**

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SURGERY is a dynamic and challenging career field. In recent years, numerous changes in surgical technology and perioperative nursing have placed even greater demands on paraprofessional personnel such as the surgical technician. To meet these demands, today's technician must stay abreast of the latest developments in surgical techniques, instrumentation, and medical technology. To do this effectively, the technician must have a strong foundation in the basics, including a sound understanding of basic human sciences and the fundamentals of surgical nursing. This career development course is designed to build on the information you learned in technical school—to teach you not only how to perform a task but when and why to do so.

The 4N151A CDC contains five volumes. Faithful study of the material provided in this course and in the course that follows (4N151B), will help you become a more competent surgical team member and enable you to provide your patients the best surgical care possible.

This first volume contains five units. It opens with unit 1 by discussing the Air Force Medical Service; 4N1X1 Surgical Technician duties are explained, and it ends by discussing educational opportunities in the Air Force. Unit 2 contains a thorough discussion of professional relations by addressing standards of conduct and interpersonal relationships, medical ethics, and the legal aspects of perioperative care. Unit 3 looks at patient relations to include patient advocacy, patient needs, their fears, and anxiety. Unit 4 may well be the most important unit in the course; it focuses entirely on safety in the surgical environment including Air Force safety programs, general safety guidelines for surgical personnel, electrical safety in surgery, and additional operating room safety requirements. The volume concludes with unit 5, which provides an overview of medical terminology—the “language” you hear and use while performing your daily duties, specifically elements of medical terminology, surgical terminology, medical shorthand, and reference terms.

Volume 2 focuses on infection control. Unit 1 starts with a look into microbiology, the infectious process, and how this directly affects you within the surgical environment. Next, unit 2 highlights some of the infection control programs and functions that are in place at most Air Force medical facilities. Unit 3 explains methods used to clean, assemble, and package instrumentation prior to reprocessing. Sterilization and disinfection is covered thoroughly in Unit 4, to include monitoring and storing sterile items. The volume concludes with Unit 5, where various methods for “quality control” in regards to sterilization are discussed in great detail. Volume 3 focuses on the surgical patient. The volume opens by looking at the physical preparations involved before a patient is wheeled into the operating room, then unit 2 looks at how we prevent pain during the procedure (i.e., the methods of anesthesia). The volume ends with a discussion of the immediate postoperative care provided in the recovery room.

In volume 4, the emphasis shifts back to the surgical suite. The first unit looks at preparing for surgery—both staff preparation and room preparation. The second unit covers the various positions the patient is placed in to provide access to the surgical site. The volume continues with skin preparation of the surgical site, and draping materials and methods. The last unit focuses on basic surgical “routines”—the intraoperative and postoperative duties involved in every surgical procedure.

Finally, volume 5 begins with a look at surgical pharmacology: how we handle and use the various drugs, solutions, blood, and blood products. Methods of hemostasis and the use of various surgical stapling devices are covered next, and the volume—and the course ends appropriately—with wound closure.

After completing course 4N151A, students in upgrade training will be required to enroll in and complete course 4N151B before award of the 5-skill level.

Code numbers on figures are for preparing agency identification only.

A glossary of terms and abbreviations and acronyms is included in this volume.

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This volume is valued at 18 hours and 6 points.

NOTE:

In this volume, the subject matter is divided into self-contained units. A unit menu begins each unit, identifying the lesson headings and numbers. After reading the unit menu page and unit introduction, study the section, answer the self-test questions, and compare your answers with those given at the end of the unit. Then complete the unit review exercises.

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How we define ourselves as an organization—our shape, our size, our style—is determined by these four organizing concepts: our mission, our vision, our credo, and our strategic plan.

–Air Force News Agency

YOUR JOB AS A surgical technician is an extremely important one. You are now an integral part of one of the finest healthcare delivery teams in the world—the AF Medical Service (AFMS). To ensure this team continues to provide the highest quality patient care to all Air Force personnel and their dependents, you must put forth your best effort on a daily basis. Only through hard work and continual study can you remain a solid contributor to the accomplishment of the Medical Service mission.

The Air Force organizational design affects you. Knowing the Air Force structure, and exactly where you fit into this structure, is important so you understand how you fit into the “big picture.” This unit starts with a broad overview of the Medical Service, and then narrows the focus to the organization of a typical medical facility. We will look at the structure of the objective medical group, squadrons, flights, and units to bring the information home to where you work, live, and grow. After we look at the organizational structure, we will move on to other areas of knowledge vital to your growth as a surgical technician, information about your duties, career progression, and educational opportunities available to you as an enlisted Airman.

1–1. Air Force Medical Service

Since the surgical service specialty is a component of the AFMS, it is important that you understand the mission, organization, and function of the Medical Service. Once you understand the relationship of surgical services to the AFMS, you’ll have a better understanding of how your specialty fits into the overall Air Force healthcare delivery system.

001. Air Force Medical Service doctrine/mission, organization, and function

Air Force doctrine is a broad and complex subject. In order to understand Air Force Doctrine, it is important to understand what doctrine is first and where its guidance originates. Air Force Policy Directive (AFPD) 10–13, *Air Force Doctrine*, is established general guidance for the application of air and space forces in operations across the full range of military operations. Doctrine is extremely valuable as it combines the lessons of AF history, technology, and insight into the future.

To put it in basic terms, doctrine is a principle or teaching that governs certain operations. It is an accumulation of knowledge that is obtained from actual combat, contingency operations, and exercises. It is designed to give us a common understanding that we then use to make decisions. Doctrine is authoritative but not directive, meaning it is a document that holds an enormous amount of guidance and experience, but does not state what or how you must complete a task or mission. Air Force and Medical Doctrine applies to all Active Duty, Air Force Reserve, Air National Guard, and civilian Air Force personnel.

You may be wondering how the commander does this. The commander uses AF assets such as people, information, and support systems across the range of military operations, and AFMS doctrine provides the guidance for the commander to make decisions and appropriately use assets. There are 3 levels of doctrine: *Basic*, *Operational*, and *Tactical*.

In a nutshell, the overall doctrine of the Air Force is to “Fly, Fight and Win!” The structure of the Medical Treatment Facilities (MTF), squadrons, flights, and units affects your resources, tasking, methods to achieve the mission, and ultimately your career.

Doctrine/mission

The AFMS provides seamless health service support to the USAF, whether in-garrison or deployed. It directly supports USAF operations and joint and combined forces theater aeromedical evacuation (AE). The AFMS operates and manages a worldwide healthcare system capable of responding to a full spectrum of anticipated health requirements and provides an integrated healthcare system, from forward deployed locations through definitive care, with an emphasis on preventing illness and injury. It arranges for healthcare that it does not possess. It also promotes and advocates for optimizing human performance (sustainment and enhancement) for the warfighters, including the optimal integration of human capabilities with systems. Moreover, the AFMS assists in sustaining the performance, health, and fitness of every Airman—the most valuable USAF resource.

The education and training, experience, and physical and cognitive abilities makes every Airman unique and fundamentally irreplaceable. Each individual is intrinsically valuable to the function of the USAF as a whole. The AFMS is dedicated to optimizing the potential of each individual. To do so, the AFMS must promote human performance sustainment and enhancement technologies, provide preventive health maintenance, and ensure appropriate treatment/therapy for any health and performance deficits whether physical or mental.

The AFMS partners with individuals to accomplish healthcare maintenance activities. The AFMS works with commanders and weapons systems designers to optimize the interface between personnel and machines. AFMS expertise is integral for force protection, sustainment and mobility operations. In addition, the AFMS identifies, evaluates, designs, and recommends how to control health hazards to prevent illness and injuries. If prevention fails, the AFMS will rapidly restore each Airman to a combat ready status or arrange for the appropriate rehabilitative services.

There are essentially two main functions the AFMS employs to fulfill its mission and they are as follows:

1. Prevent disease and injury.
2. To treat and rehabilitate personnel who become sick or injured.

NOTE: All other Medical Service functions fall under these two broad classifications.

The Air Force Medical Service organization at headquarters

The AFMS is headed by the Surgeon General. The Surgeon General serves as the medical staff advisor to the Secretary of the Air Force and the Air Force Chief of Staff. The Surgeon General is advised by corps chiefs of the Medical, Dental, Nursing, Medical Service, and Biomedical Science Corps. Let’s look at the Surgeon General’s job a little more in-depth.

Surgeon General

The military head of the AFMS is the Surgeon General, USAF. Refer to figure 1-1 for the chain of command from the AF Chief of Staff to the medical group (MDG) commander. As a staff officer, the Surgeon General is responsible for the below:

- Supervises the AFMS.
- Advises the Secretary of the Air Force and the Chief of Staff USAF on medical matters.
- Reports directly to the Air Force Chief of Staff.
- Advises the Secretary of Defense (Health Affairs) on USAF medical matters.
- Assists Headquarters USAF with establishment of regulations equivalent to governing bylaws referred to by the Joint Commission (JC).
- Represents the Air Force in public and nongovernmental activities.

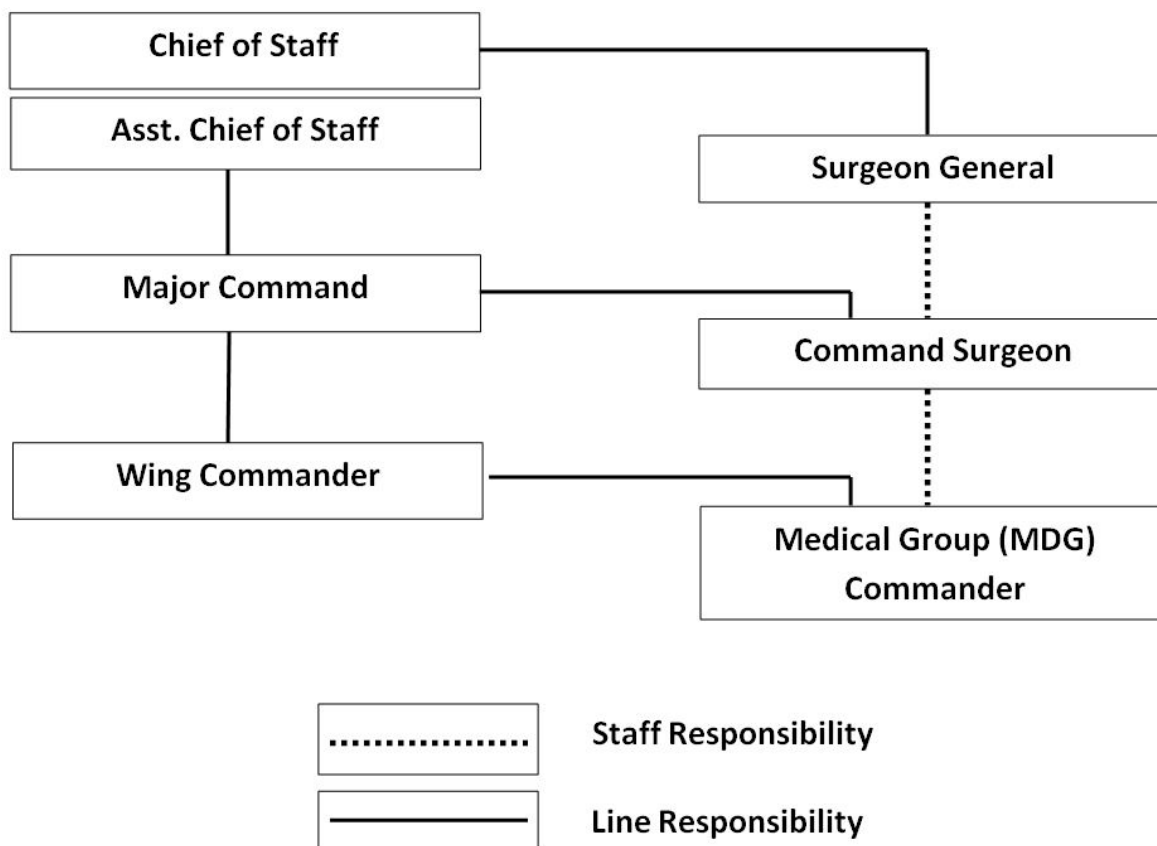


Figure 1-1. Chain of command from Air Force Chief of Staff to the MDG commander.

Command surgeon

Major command (MAJCOM) command surgeons report to the Surgeon General. These staff officers respond to and advise the MAJCOM line commanders as well as the Surgeon General on AFMS matters related to their specific commands. Look at figure 1-1 to see the relationship between the Surgeon General, MAJCOM surgeons, and Air Force wings. The command surgeons provide supervision of subordinate medical activities and function as medical managers for command medical resources.

002. The medical wing/group

We now get down a little further into the structure of the organization in which you as a surgical technician are involved. This is called the medical group/wing. The medical group is a service line

organization. The medical group organizational structure provides for greater integration of operation and support functions with a clearer chain of command. It focuses medical services on patient needs, and improves your ability to compete in a business case/managed care environment. In general, it provides a management framework for your MTF without adversely impacting your readiness mission.

Medical wing

The 59th Medical Wing, commonly known as Wilford Hall Ambulatory Surgical Center, at Joint Base San Antonio-Lackland, and the 79th Medical Wing at Joint Base Andrews, are the only Air Force medical wings (MDW). Most other medical facilities are known as medical groups (MDG).

Medical group

The standard organizational structure for the medical group is based on the mission and the size of the facility. Small medical groups with less than 300 personnel assigned have two squadrons (Medical Operations and Medical Support), with the option to have, based on a special or unique mission and Headquarters USAF approval, a third squadron (i.e., Aerospace Medicine, Dental, Aerospace-Dental, or Surgical Operations). Medical groups with more than 300 personnel assigned usually have four squadrons (i.e., Medical Operations, Medical Support, Aerospace Medicine, Aerospace Medicine, and Dental) depending on their mission (refer to fig. 1–2 for the typical four-squadron medical group organizational structure). Medical groups with more than 600 personnel assigned have the option to have, based on mission needs and Headquarters USAF approval, a fifth squadron. In addition to the fifth squadron option, medical groups with more than 1,000 personnel assigned have the option to add a sixth squadron.

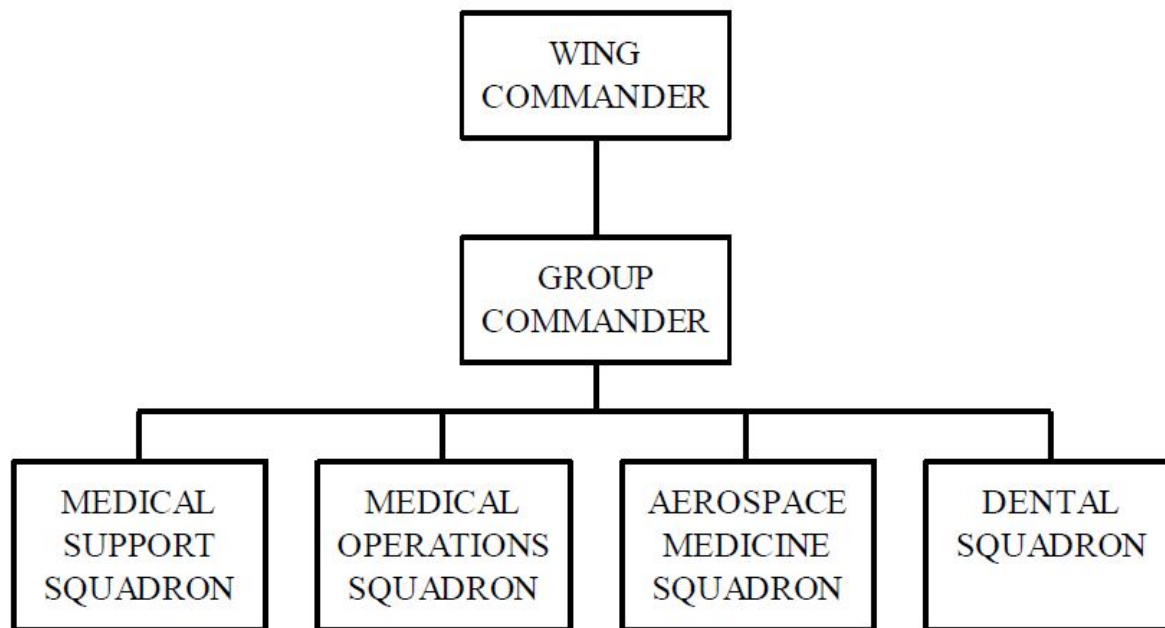


Figure 1–2. Medical group.

Regardless of the organizational structure you are in, a clear chain of command exists for all personnel, and the role of each squadron is clearly defined. Personnel from all disciplines (Air Force specialties {AFS}) and professional affiliations may be assigned to any medical squadron if the unit commander feels this will improve operations and support.

The information provided on the MDG structure and roles does not apply to Air Reserve component (ARC) units, air transportable hospitals, contingency hospitals, and aeromedical evacuation squadrons. If you work in any of these areas, review the current Air Force instructions (AFI) and local

guidance for your organization's structure. Since most surgical technicians are assigned to a four-squadron medical group, we will now look at some of the key personnel in this type of medical group. Many of these positions are also found in organizations designated as the medical wing, medical group with two squadrons, and medical squadrons with four flights.

Medical Group Commander

The medical command work center, consisting of the MDG commander, administrative/secretarial support, and the executive officer, if authorized (medical centers), performs command functions described in AFI 51-604, *Appointment to and Assumption of Command*. The MDG commander has the overall responsibility for all the medical unit's activities and is accountable for accomplishing all aspects of the MDG's mission. The medical command work center serves as the chief executive officer and local representation of the governing body for purposes of the Joint Commission (JC) and as the medical advisor to the wing/installation commander.

Group staff

The group staff consists of the administrator, chief of the medical staff, nurse executive, biomedical and dental advisors, along with each of the medical squadron commanders. They form the core of the medical facility's executive committee. The medical law consultant, when authorized, serves in an advisory capacity on the executive committee (nonvoting member). The group staff executes facility-wide responsibilities for:

- ensuring compliance with Department of Defense (DOD), Air Force, professional and accreditation standards;
- supporting the commander by providing strategic management, direction, planning, staffing, and coordination for the entire organization;
- exercising leadership in business strategies, staff education, and training;
- providing oversight for Quality Air Force, clinical quality management (quality assurance/improvement), clinical research, and medical readiness programs; and
- serving in an advisory capacity for assigned commanders.

Functional advisors

Staff members have direct access to the commander. They serve as advisors to all medical squadron commanders, assist the command element and oversee initiatives that affect the entire medical facility. Rather than dwelling on elements and day-to-day operations of the organization, they have broad strategic responsibilities affecting the entire unit. Let's look at each of their roles, responsibilities, and functions.

Administrator (SGA)

Administrators serve as chief operating officers. They possess "special staff authority" which essentially means that they are delegated specific operational authority to define resource and facility requirements, secure and manage medical resources, information, and facilities, limit institutional risk, and establish and maintain external organizational relationships.

Chief of the Medical Staff (SGH)

The Chief of the Medical Staff is responsible for overseeing all medical services, credentialing, privileging, and licensure. Credentialing responsibilities include all Medical, Biomedical Sciences, Nurse, and Dental Corps officers. This person oversees the quality and appropriateness of medical care provided. The SGH is also charged with ensuring compliance with Joint Commission (JC) and Accreditation Association for Ambulatory Health Care (AAAHC) guidelines.

Chief Nurse (SGN)

The nurse executive oversees nursing functions and nursing licensure. He or she defines nursing standards of practice, policy, resource requirements, and communication lines. The SGN also facilitates facility-wide partnerships and cooperation, and maintains external liaisons critical to the professional guild.

Biomedical Sciences Corps Executive (SGB)

The biomedical advisor oversees biomedical sciences and provides professional guidance on specialty matters.

Chief of Dental Services (SGD)

The dental advisor oversees all dental care and dental licensure.

Medical law consultant

When this position is authorized, usually at medical centers, the medical law consultant provides legal advice and support to the MTF commander and staff.

Subordinate functions

Personnel assigned group staff duties and tasks (e.g., quality assurance/improvement coordinator, education and training coordinator, infection control officer, etc.) will be subordinate directly to a selected member in the group staff (at the medical facility commander's discretion).

Staff appointment and chain of command

The group staff generally is comprised of the senior officer of each corps represented in the medical facility. Squadron commanders are responsible and accountable for their particular squadron, while the staff executive has overarching responsibilities covering all squadrons. Chain of command normally flows from the squadron commander to the group staff, then up to the group commander.

Education and training

The MDG staff oversees all group-level education and training requirements. It is a local command decision to determine the best method of ensuring all requirements are met. The group staff should delegate program management to a subordinate who works for one of the group staff members. Education and training should include, but not be limited to, the following:

- Buddy care.
- Basic and advanced life support (BLS/ALS).
- Staff orientation.
- Enlisted specialty training (EST).
- Career development.
- Phase II training.
- Graduate medical education (GME).
- Continuing medical education/continuing education (CME/CE).
- Clinical investigation.
- Staff development.
- Infection control.
- Safety/occupational safety and health.
- Hazard communication.

Medical enlisted representative

The MDG Commander can select a medical senior noncommissioned officer (SNCO) as the group superintendent. This SNCO serves as a member of the executive committee (and other committees) to provide expertise on medical enlisted matters. If the group commander elects to have a group superintendent, the commander tries to select the most qualified medical SNCO available, who may or may not be the most senior NCO in the facility. The MDG Commander usually consults with the executive committee and senior enlisted members of the group when selecting this senior NCO.

When this position is filled, the scope of responsibilities for the group superintendent often includes the following:

- Participates as a member of the group's executive committee.
- Interacts with wing units to support mission requirements.
- Interacts with medical squadrons to improve organizational performance and enlisted specialty training and utilization.
- Collaborates with medical squadrons and assists with the management of enlisted personnel and other resources.

First sergeant

The first sergeant advises and assists the MDG Commander in managing unit activities, as well as promoting the welfare, morale, and health of enlisted personnel. The first sergeant also helps the five commanders (one group and four squadrons) in maintaining discipline and standards, and supervises the care and upkeep of unit dormitories. The first sergeant is the vital link between the enlisted force and commanders, providing support to all squadron commanders and ensuring equity of disciplinary actions and the welfare of the enlisted force throughout the group. However, the SNCOs within each squadron are also called upon to assist the squadron commanders in managing their enlisted personnel. The first sergeant reports to the MDG Commander.

In a few instances, medical centers employ a second first sergeant due to the large number of military personnel. Additional first sergeants usually come from existing manpower resources within the medical group.

Squadron commanders

The squadron commander position is integral to the organizational structure. This position improves service-line operational command and control. It also supports senior leadership and professional development by providing an opportunity for more medical personnel to command. The squadron commander's scope of responsibilities includes, but is not limited to, the following:

- Is member of the MDG executive committee.
- Interacts with wing units to support mission requirements.
- Interacts with MDG Commander to optimize Medical Service mission.
- Interacts with other medical squadrons to improve organizational performance.
- Integrates effort among flights and elements with the squadron.
- Collaborates with other medical squadrons to manage personnel and other resources (e.g., matrixing).
- Oversees manpower utilization (e.g., matrixing) to maximize personnel resources in support of medical services-lines.
- Manages the squadron and its resources in accordance with applicable directives.

In some instances, squadron commanders may be "dual hatted"—as commanders and as group staff members. This decision is left to the discretion of the MDG Commander. Dual hatting should be

minimized due to the scope of responsibilities of both positions, to allow greater opportunities for leadership development, and to maximize the capabilities of assigned personnel.

Squadron superintendent

Squadron commanders may employ a squadron superintendent to assist in the daily operations of the squadron. The scope of responsibility for the squadron superintendent should include, but not limited to, the following:

- Interacts with medical group senior enlisted personnel to support mission requirements.
- Supports squadron commander in management of the squadron.
- Participates in strategic planning at the squadron level.
- Interacts with flight chiefs/SNCOs to improve organizational performance.
- Collaborates with other flights to manage personnel and resources.
- Responsible for the career progression of enlisted and enlisted-equivalent civilian personnel.
- Ensures training requirements for enlisted and enlisted-equivalent civilian personnel are met.
- Is responsible for the duty assignments of enlisted and enlisted-equivalent civilian personnel within the squadron.
- Performs duties and responsibilities in accordance with appropriate directives.
- Has leadership's option of being dual-hatted.

Medical flights

A flight may be either a numbered flight or a functional flight. A numbered flight is the lowest organized structure (level) in the Air Force. Most surgical technicians are assigned to the functional flight.

A functional flight is a part of a squadron; it is composed of elements performing specific missions. A functional flight is not a unit. Flights in the MDG are functional flights. The establishment of functional flights is aligned by product or services-lines. For example, all surgery-related elements, such as the surgical suite, anesthesia, surgical clinics, and surgical wards, are aligned under the Surgical Services Flight.

Squadron commanders appoint flight commanders based on the scope of responsibilities identified and outlined here. They will be the best-qualified individual. The flight commander scope of responsibility includes, but is not limited to, the following:

- Interacts with other flights to improve overall organizational performance.
- Supports squadron commander in managing and providing quality patient care or related services.
- Performs duties and responsibilities in accordance with applicable directives (e.g., Air Force Policy Directives {AFPD} 44-1, *Medical Operations* and 47-1, *Dental Services*, and AFIs 44-102, *Medical Care Management* and 47-101, *Managing Air Force Dental Services*, etc.).
- Determines the most appropriate supervisory chain for the flight.
- Works with flight SNCOs to ensure a cohesive team focused on patient care.
- Coordinates cross-functional manpower utilization with other flights.
- Ensures accomplishment of additional duties as assigned by the commander.

Flight commanders

Flight commanders report directly to the squadron commander. They are responsible for accomplishing the assigned mission through effective management of all assigned functions and

resources. Flight commanders are key members of the squadron management team, and (if used) they are the leaders of flight management teams.

Flight chief

The flight chief reports directly to the flight commander. This individual assists the flight commander in the enlisted aspects of coordinating, directing, and managing the execution of the flight's mission. They also advise the flight commander on all unit enlisted personnel, training, utilization and staff rotation, manpower, readiness, and career progression issues.

Individual elements of the flight usually include a section chief or NCOIC (or more than one, depending on the size of the element). You and your immediate supervisor will usually work directly for one of these individuals.

Technician

As a surgical technician, you may be assigned to work in the surgical suite, in Sterile Processing and Distribution (SPD), in a surgical clinic, or in any other element of the flight. Overall, the MDG Commander has the authority to assign a member to any area of the facility, regardless of Air Force specialty code (AFSC), if the commander believes it will best support the group's mission.

It is imperative that you know your *chain of command*. This chain is not only the source of all your duties and responsibilities but is also the path you should follow to resolve problems. You are the bottom link in the chain, and, theoretically, the president of the United States is the top link. The links in your specific chain of command might vary slightly from this text, but it should be very close.

The first link, after you, is your immediate supervisor. Try to resolve problems at the lowest level by starting with your supervisor. If your supervisor cannot help you, see your supervisor's supervisor; usually this is the NCOIC, though in large elements, it may be another midlevel NCO. If your NCOIC can't help you, in a large element you go to the NCOIC's supervisor, the element chief; if you do not have an element chief, you usually contact your flight chief at this point. From here, your chain of command usually flows up through the flight commander, the squadron commander, and upwards to the other individuals discussed in this unit. While you can bypass individual members in your chain, it is *not* a good idea; follow the chain unless you absolutely feel you cannot talk to one of the individuals in it. Prior to "jumping" the chain, it is a courtesy to notify those that are being bypassed. Your supervisor should have briefed you on your specific chain of command when you received your initial orientation.

Elements

Elements are the smallest, cohesive collection of personnel that performs a specific role or mission. For example, the surgical suite, general surgery clinic, otolaryngology (ear, nose, and throat {ENT}) clinic, ophthalmology clinic, urology clinic, anesthesia, and surgical wards are all elements of the surgical service flight.

Only elements that apply to the MTF operation are used. Alignment of elements under a particular squadron is a local option with the approval of the MDG commander.

003. Squadron organizations

Depending on your location, you will likely be assigned to the Medical Operations Squadron or the Surgical Operations Squadron. In this section, we will discuss the two squadrons in detail and briefly touch on some of the other squadrons in your group.

Medical Operations Squadron

This squadron plans, organizes, operates, evaluates, and continually improves a comprehensive system of healthcare, to include developing processes that provide seamless and accessible beneficiary-focused, diagnostic, preventive, and treatment related services. It also provides patient education and continuity of care for health maintenance, as well as for acute and chronic management

of disease and injuries. In addition, this squadron collaborates with the SGH to develop and establish programs that continuously analyze and/or improve system performance, patient satisfaction, and clinical outcomes while enhancing the efficiency and effectiveness of all key processes (refer to fig. 1-3 for the Medical Operations Squadron structure).

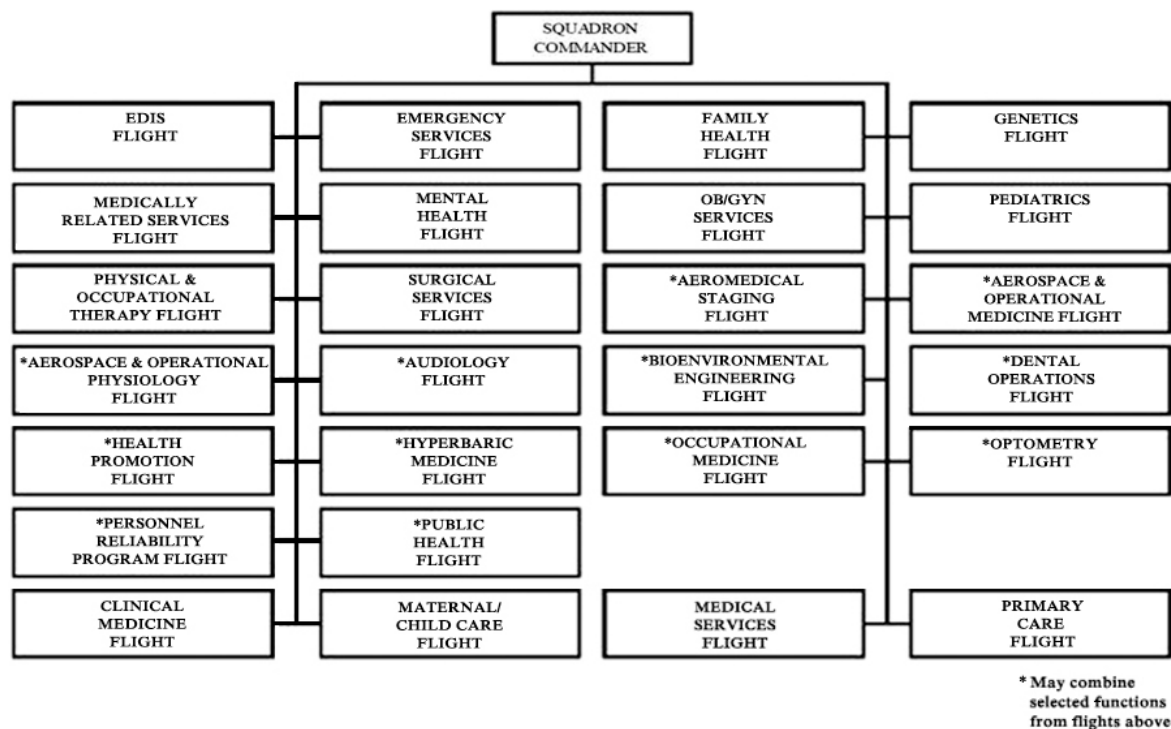


Figure 1-3. Medical Operations Squadron.

NOTE: Flights shown are *options* available. Composition of units will depend on the mission and clinical capability of the MTF. Individual units will not have all flights. Final alignment of services (elements) to the flights is a local decision and will generally be approved by the MDG Commander.

Listed in the table below are flights you could find within the Medical Operations Squadron.

Medical Operations Squadron Flights, Functions, and Elements		
Flight name	Functions	Elements
Medical Services Flight	Provides comprehensive, specialized, non-surgical care to patients.	Depending on mission and clinical capability of the facility, elements may include Family Health, Internal Medicine, Emergency Services, Acute Care, Pediatrics, Mental Health, Dermatology, Neurology, Cardiology, Oncology, Gastroenterology, and Immunizations.
Surgical Services Flight	Is aligned under a Medical Operations Squadron in facilities offering surgical services that do not have a dedicated Surgical Operations Squadron. This flight provides comprehensive, specialized, surgical care to patients.	Depending on mission and clinical capability of the facility, elements may include General Surgery, Orthopedics, Physical and Occupational Therapy, Brace Shop, Otolaryngology, Ophthalmology, Urology, Neurosurgery, Cardio-Thoracic Surgery, Vascular Surgery, Podiatry, and surgical subspecialties. NOTE: As a surgical technician, you will most likely be assigned to work in the surgical services flight.

Medical Operations Squadron Flights, Functions, and Elements		
Flight name	Functions	Elements
Pediatrics Flight	Provides comprehensive, specialized, non-surgical care to children and young adults.	Elements may include pediatrics services and adolescent medicine.
Mental Health Flight	<p>The Family Advocacy (FA) Element provides preventive and treatment related services aimed at eliminating the maltreatment of family members, children, spouses or significant others.</p> <p>The Alcohol and Drug Abuse Prevention and Treatment (ADAPT) element includes substance abuse prevention and treatment and drug demand reduction services.</p> <p>The Mental Health Element provides specialized individual, marital, and family counseling.</p>	It has at least three elements: FA, ADAPT, and Mental Health.
OB/GYN Services Flight	Provides routine and specialized OB and GYN services.	Elements may be required depending on mission and clinical capability of facility.
Primary Care Flight	Provides for the delivery of basic and/or comprehensive primary care services to eligible beneficiaries of all ages. Clinical services include the management of acute and chronic health problems, disease prevention, screening, counseling, patient education, health risk assessments, as well as facilitating the continuity and coordination of clinical care.	Depending on the mission and clinical capability of the facility, elements may include Patient Centered Medical Home, Family Medicine, Internal Medicine, Pediatrics, Mental Health, Physical and Occupational Therapy, OB/GYN, Acute Care Clinic, and/or Ambulance Services. However, a primary care flight must include family health clinic plus one other specialty.
Family Health Flight	Provides comprehensive examination, diagnosis, and treatment of patients of all ages. Clinical services include the monitoring and maintenance of patients' state of health, clinical counseling, health education, rehabilitation, and disease prevention.	May include a Patient Centered Medical Home Element.
Physical and Occupational Therapy Flight	Provides for the evaluation and management of acute and chronic conditions with the goal of alleviating pain and restoring functions.	<p>Depending on the mission and clinical capability of the facility, elements may include services such as Occupational Therapy, Physical Therapy, Orthotics, and Rehabilitation Medicine.</p> <p>NOTE: If Occupational Therapy is not available in the MTF, this flight becomes the "Physical Therapy Flight."</p>
Emergency Services Flight	Provides medical care to patients with emergent and urgent problems, along with an emergency medical response.	Depending on mission and the clinical capability of a given facility, elements may include Emergency Room, Acute Care Clinic, and/or Ambulance Services.
Clinical Medicine Flight	This flight option is used primarily in Medical Groups that choose to combine all clinical functions into one flight.	Elements may include Family Health, Internal Medicine, Pediatrics, OB/GYN Services, Mental Health, and Physical and Occupational Therapy.

Medical Operations Squadron Flights, Functions, and Elements		
Flight name	Functions	Elements
Maternal/Child Care Flight	Includes the elements found in the Pediatric and OB/GYN Services' Flights.	Use of this flight precludes the use of separate Pediatric and OB/GYN Services flights.
Health Promotion Flight	This flight supports commanders in cultivating a fit and healthy force, with the target areas of: tobacco-free living, healthy weight, nutritional fitness, and physical activity. Goals include increasing the health of Airmen and the AF community, increasing workforce productivity, and increasing community resiliency.	Staff at the Health and Wellness Center collaborate, coordinate, and implement a variety of intervention strategies with the primary focus being on methods that achieve high reach or are targeted to high risk worksites related to the target areas.
Dental Operations Flight	This flight option is used when a MDG with squadrons does not have a Dental Squadron or an AMDS, then the Dental Flight falls under MDOS.	
Aerospace and Operational Medicine Flight	This flight option may be used when a Medical Group does not have an Aerospace Medicine Squadron. If there is no AMDS, the Aerospace Medicine functions fall under MDOS.	

Surgical Operations Squadron

The mission of this squadron is to provide primarily episodic care to the patient population. It provides specialized treatment to patients, which is generally a singular occurrence. Many of these patients may be referred from other MTFs. (Refer to fig. 1-4 for the Surgical Operations Squadron structure).

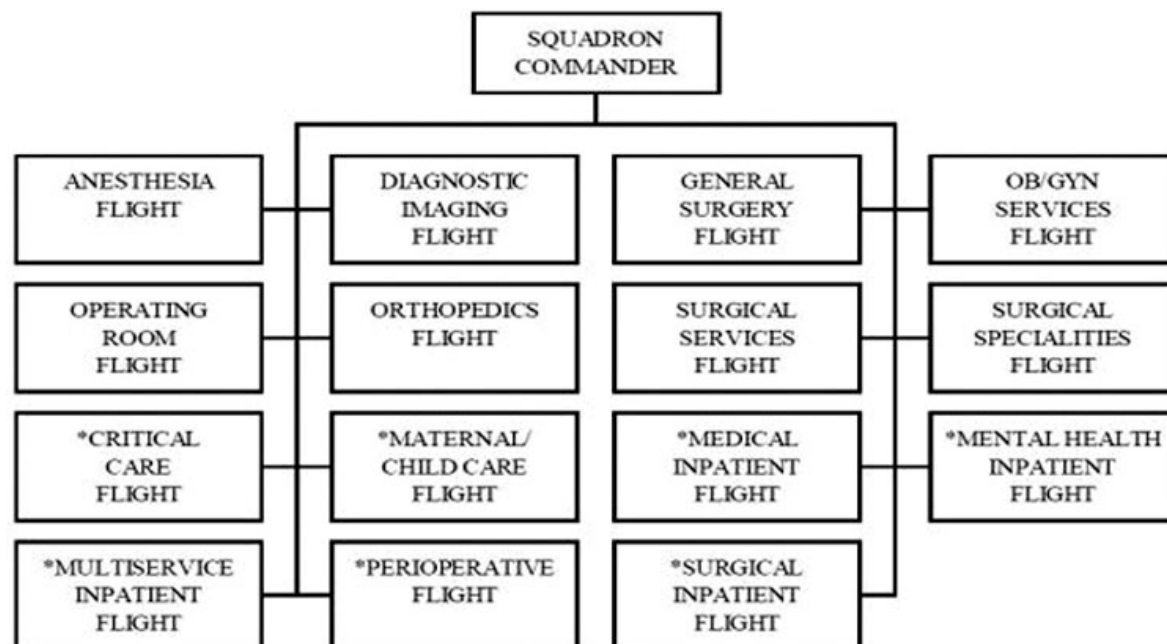


Figure 1-4. Surgical Operations Squadron.

NOTE: Flights shown are *options* available. Composition of units will depend on the mission and clinical capability of the MTF. Individual units will not have all flights. Final alignment of services (elements) to the flights is a local decision and will generally be approved by the MDG Commander.

Listed below are flights, their functions, and elements that you could find within the Surgical Operations Squadron:

Surgical Operations Squadron Flights, Functions, and Elements		
Flight name	Function(s)	Elements
Surgical Services Flight	Provides comprehensive, specialized, surgical care to patients.	Depending on mission and clinical facility capability, elements may include services such as anesthesia, surgery suite, general surgery, ambulatory surgery, orthopedics, brace shop, otolaryngology, speech pathology, ophthalmology, urology, neurosurgery, cardio-thoracic surgery, vascular surgery, other surgical subspecialties, podiatry and SPD.
Operating Room (OR) Flight		This flight may include the OR, Post-anesthesia Care Unit (PACU), SPD, Anesthesia and Same Day Surgery.
OB/GYN Services Flight	Provides routine and specialized OB and GYN services.	This flight may only be required in Medical Center facilities.
Anesthesia Flight		Elements may include Pre-operative Services, Recovery Room/PACUs, and Pain Management Clinics.
Orthopedics		Elements may include Orthopedic Clinic, Brace Shop, and Podiatry.
General Surgery Flight	Examines, diagnoses, and treats diseases, injuries, and disorders by surgical means.	
Surgical Specialties Flight		Elements may include Ophthalmology, Orthopedics, Neurosurgery, Thoracic Surgery, Cardiac Surgery, Urology, Vascular Surgery, and Plastic Surgery.
Diagnostic Imaging Flight	Accomplishes records, interprets, and stores radiographs, scans fluoroscopy, and ultrasounds. May perform angiograms, guided biopsies, and myelograms. Ensures quality control while minimizing radiation exposure to patients and staff.	Elements may include Nuclear Medicine, Ultrasound, Computed Tomography (CT) Magnetic Resonance Imaging (MRI), Interventional Radiology, Radiation Oncology, and Mammography.

Medical Support Squadron

This squadron provides diagnostic and therapeutic services, resource management (financial and manpower), TRICARE (managed care), medical logistics, medical information systems management, and personnel and administration in support of the MDG.

The following are approved flights in the medical support squadron: Resource Management, Medical Logistics, Medical Information Services, Personnel and Administration, TRICARE Operations and Patient Administration (TOPA), Readiness, Pharmacy, Clinical Laboratory, Nutritional Medicine, Diagnostics and Therapeutics, Histopathology, Readiness, and Diagnostic Imaging (without an assigned radiologist).

One of the flights of this group is one you will interact with daily, the Diagnostic and Therapeutics flight. This flight is responsible for diagnostic, preventive, therapeutic, education and food services for patients, providers, and other customers. Key functions in this flight include the following:

Medical Support Squadron Flights and Descriptions	
Flight name	Description
Clinical laboratory/histopathology/cytology/tumor registry	Provides clinical and anatomic pathology services or other examinations of biological materials for the purpose of providing information for the diagnosis, prevention, or treatment of any disease, impairment, or the assessment of health.
Pharmacy	Provides pharmaceutical care, which is the direct responsible provision of all medication-related care for achieving definite outcomes that improve a patient's quality of life. Coordinates with other healthcare providers to ensure appropriate prescribing, distributing, administering, and monitoring medication use. Provides medical education services for patients and healthcare personnel.
Radiology	Provides the clinical diagnostic radiology support for patients, providers, and other customers. At larger MTFs, this also includes the management of treatment and therapeutics.
Nutritional medicine service	Provides nutritional screening, assessment, preventive and therapeutic education, and consultative and food services to patients, healthcare practitioners, and the DOD community.

Another flight of this squadron with which you will interact frequently is the Medical Logistics Flight; you may even be assigned to work in this flight if your facility's organization places SPD under this flight. We don't cover it in this unit because it is covered in-depth in course 4N151B, volume 4.

Aerospace Medicine Squadron

The Aerospace Medicine Squadron supports the operational Air Force by enhancing the health of its people: ensuring a fit force, preventing disease and injury, protecting the environment, and anticipating and responding to medical contingencies in all environments and workplaces. Some of the aerospace flights' functions are listed in the following table:

Aerospace Medicine Squadron Flights and Descriptions	
Flight name	Functions
Flight/Missile Medicine Flight	Provides medical care to members on "flying status" and their families. They also conduct flying and nonflying physicals.
Health Promotion Flight	Provides programs to encourage people to live healthy lifestyles and avoid unsafe practices. They promote programs such as tobacco use cessation, stress management, and substance abuse education.
Public Health Flight	Recommends preventive measures to reduce disease, disability, and death. They also conduct programs dealing with medical intelligence, occupational health, food safety, and epidemiology.
Readiness Flight	Conducts the medical readiness training and planning to support the base and unit's readiness missions. They also ensure the medical group is ready to meet all deployment standards.
Bioenvironmental Engineering Flight	Promotes and maintains the health and well-being of the base, community, and workplace environments. They perform functions such as industrial hygiene evaluations, environmental monitoring, and health risk assessment. They also respond to contingency situations affecting the environment (such as chemical spills).

Dental Squadron

The Dental Squadron implements and maintains comprehensive programs for the prevention and treatment of dental disease to ensure maximum individual readiness and optimal oral health. In addition, it provides a dental healthcare delivery system that integrates quality, cost effectiveness, and access, and may include administration of a private sector care referral program. Some of the dental flights are listed in the table that follows:

Dental Squadron Flights and Descriptions	
Flight name	Functions
Clinical Dentistry Flight	Maintains oral health of active duty personnel in support of worldwide missions. Provides diagnostic and preventive services, delivers comprehensive dental treatment, and assures professional oversight of the delivery of patient care.
Dental Laboratory Flight	Makes dental prostheses (false teeth) and other dental devices or appliances, which includes orthodontics.
Dental Support Flight	Provides support services such as records management, personnel management, reports, correspondence, resource management, and other supporting services.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

001. Air Force Medical Service doctrine/mission, organization, and function

1. How does Air Force Doctrine aid AFMS commanders in accomplishing the mission?
2. Who holds the top position in the AFMS?
3. Who does the Surgeon General directly report to?
4. Who provides advice to the Surgeon General on AFMS matters related to their specific commands?

002. The medical wing/group

1. What is the focus of the MDG?
2. List the four squadrons found in a MDG with 300 or more personnel assigned.
3. What is the responsibility of the MDG commander?
4. Who in the group advises and assists the MDG Commander in managing unit activities, promoting the welfare, morale, and health of enlisted personnel, and helping to maintain discipline and standards?

003. Squadron organizations

1. To which squadrons are most surgical technicians assigned?
2. What are three of the elements within the Mental Health Flight?
3. List four flights found in the Surgical Operations Squadron.
4. Match the MDG squadron in column A with the description in column B. Column B items may be used more than once.

_____ (1) *Column A*

_____ (1) Ensures maximum individual readiness and optimal oral health.

_____ (2) Provides personnel and administrative support to the MDG.

_____ (3) Plans, organizes, operates, evaluates, and continually improves a comprehensive system of healthcare.

_____ (4) Supports the operational Air Force by enhancing the health of its people.

_____ (5) Provides specialized treatment to patients, which is generally a singular occurrence.

Column B

a. Medical Support Squadron.

b. Aerospace Medicine Squadron.

c. Dental Squadron.

d. Surgical Operations Squadron.

e. Medical Operations Squadron.

1-2. 4N1X1 Surgical Technician Duties

The 4N1XX career field includes the 4N131 Apprentice, 4N151 Journeyman, 4N171 Craftsman, and 4N191 Superintendent. Despite the official duty titles associated with your skill level, you'll find that most of the time you are referred to as a surgery technician, "OR tech", or "scrub" tech. Your duties, as an Air Force surgical technician, vary somewhat from your civilian counterparts. In the civilian sector, technicians (referred to as surgical technologists) primarily perform sterile scrub functions. In the Air Force, you not only scrub but also assist the circulating nurse, process instruments and supplies, perform housekeeping duties, provide nursing care in the recovery room, and work in SPD.

All of these duties are performed by different groups of people in a civilian hospital. A highly trained, experienced Air Force surgical technician is a "Jack of all trades" and an extremely valuable member of the surgical team. It is important to note that you can only perform those tasks listed in your specialty training standard (STS). Your STS is the legal document used to show what you can do when it comes to patient care. If a patient care task is not in the STS, then you cannot do it.

By now, your supervisor has probably explained what your duties and responsibilities are as a 5-level upgrade trainee in the OR. However, you may not be aware of how these various duties and responsibilities will change as you progress in both skill-level and rank in the surgical service specialty. A general description of the duties, responsibilities, and qualifications for each skill level in the surgical service technician career ladder are found in your career field education and training plan (CFETP). Rather than duplicating all the information found in the regulation, we attempt to summarize the relevant information and focus on the differences in duties and responsibilities you can expect as you move up the career ladder.

004. 4N131/4N151, Surgical Service Apprentice/Journeyman duties

If you refer to your CFETP, you will find the 3- and 5-skill level surgical technicians have the same job description. The difference between the two skill levels lies in the depth of knowledge, the level of job proficiency, and scope of responsibility. There are basic functions performed by both 4N131 and 4N151 technicians.

4N131, Surgical Services Apprentice

The 4N131's duty title is a Surgical Service Apprentice until completing all requirements for 5-level upgrade. By completing this career development course (CDC) and all on-the-job training (OJT) requirements identified by your supervisor, you complete the two major requirements for upgrade. You are probably already familiar with many of the duties and responsibilities you have during this period, but since every facility is different, and many duties are not identical, we look at some of the more common ones here:

- Performing sterile functions as a “scrub” technician, which includes any activity done to assist the surgeon and other sterile surgical team members in performing an operation. Initially, you scrub with an experienced technician who serves as your trainer. As you become more proficient, you “scrub” surgical procedures by yourself.
- Performing nonsterile duties as a circulating technician under the direct supervision of an OR nurse. This includes such tasks as positioning patients, opening sterile supplies, and assisting anesthesia personnel.
- Transporting patients to and from the OR and acting as a “runner” outside the controlled environment of the surgical suite. When performing in this capacity, you may be required to “run” to nearly every area within the hospital.
- Performing routine housekeeping activities in the surgical suite and SPD. Even though most Air Force hospitals hire civilian housekeepers to do most of the cleaning, it is a team effort, and everyone pitches in to clean.
- Processing surgical instruments and supplies. This includes decontaminating, cleaning, sorting, inspecting, wrapping, and sterilizing or disinfecting a variety of surgical and medical instruments and supplies.
- Assisting with basic nursing care in the recovery room. Once again, you are always under the watchful eye of an experienced registered nurse (RN).
- Assisting with maintaining and storing surgical supplies and equipment. This includes checking for outdates, rotating stock, inventorying surgical supplies, and performing basic operator preventive maintenance on surgical equipment.
- Performing surgical on-call duties to provide OR staffing for emergency surgery after normal duty hours. While you will not be expected to “pull call” by yourself when you first start your training, as you progress and are trained in the majority of basic tasks, you will perform this duty.

There are numerous other duties and responsibilities you will perform as a 4N131. As you perform each duty for the first, or first few times, you will be closely supervised by another technician or an OR nurse. As you become proficient, knowledgeable, and self-confident, you will be “signed-off” on a task and require less supervision. Once you have completed all training requirements and have demonstrated that you are fully competent, you will be upgraded to the 5-skill level. You will no longer be considered an apprentice and more will be expected of you.

4N151, Surgical Services Journeyman

The 4N151 Surgical Service Journeyman performs many of the same functions as the 4N131. However, as a 5-skill level you are often assigned additional duties, including some management and supervisory tasks. Two of the most common duties you will perform as a 5-skill level are as follows:

1. Become an OJT trainer for newly assigned 3-skill level trainees. If you're assigned to be someone's trainer, take it very seriously. Your ability to pass along the knowledge and experience you've gained will have a direct impact on the quality of surgical patient care provided in your hospital.
2. You may also perform duties as the OR medical supply custodian. This is a very important additional duty that takes a great deal of special training. This job also allows you to gain valuable experience that you'll need later as a supervisor.

If you are given additional duties, such as the ones just discussed, don't complain! They are learning experiences and a way to prepare you for promotion and advancement to the next skill level. Supervisors generally do not give additional responsibilities to poor performers; so if you are given more to do, you must be doing your job right!

Besides the functions of the basic or "slick" 4N1X1, the CFETP also outlines the duties and responsibilities of "shred" technicians within the surgical career field.

Specialty shredouts

Shredouts are alphabetical (alpha) indicators that appear as an AFSC suffix. In the surgical career field, the shredouts are identified with alpha suffixes that indicate special qualification for positions and equipment associated with particular surgical specialties. There are three shredouts in the surgical service career field:

1. 4N1X1B—Urology.
2. 4N1X1C—Orthopedics.
3. 4N1X1D—Otolaryngology.

The specific duties of each AFSC shredout are unique to the respective surgical specialty. In addition, shred personnel are considered proficient in the basic AFSC (4N1 "slick") and are required to maintain proficiency in surgical cases outside of their specialty. The shred technicians are expected to perform daily clinic duties and accompany their surgeons when they have surgical cases in the OR. Now we will discuss some of the duties associated with each shredout.

4N1X1B, Urology

Surgical technicians designated as "B" shredouts attend the Urology program at the Medical Education and Training Campus (METC), Joint Base San Antonio-Fort Sam Houston Texas. After this 16-week course, they are assigned to work in a Urology clinic.

Most of the 4N1X1B's duties involve direct patient care activities performed in the Urology clinic, but they also must come to the operating room to assist urologists with special procedures such as those commonly done in the cystoscopy room. In addition, the Urology technicians are the primary scrub on both minor and major Urological procedures performed in any operating room. Specific duties performed by the Urology technician include, but are not limited to the following:

- Scheduling and preparing patients for Urological diagnostic and surgical procedures.
- Assembling and maintaining special diagnostic and therapeutic instruments such as cystoscopes and resectoscopes.
- Taking and developing x-rays for special radiographic studies of the urinary system.
- Setting up instruments and equipment for Urological procedures, such as catheterization, bladder irrigations, cystoscopies, and urethral dilatations.

4N1X1C, Orthopedics

Individuals designated as "C" shredouts attend the Orthopedic program at the METC. After six weeks of training there, they are assigned to an Orthopedic clinic at their permanent duty station.

The duties routinely performed by Orthopedic technicians are radically different than those performed by basic surgical technicians assigned to the OR. Most of the “C” shredout’s duties center around patient care activities performed in the Orthopedic clinic or on the Orthopedic patient care unit. Most times, the Orthopedic technicians are required to act as primary scrub on Orthopedic cases in the OR and pull call with their surgeons. They may also be called to the OR to assist with postsurgical cast/splint applications or to aid in setting up traction beds for Orthopedic surgical patients. The following list should give you a general idea of the duties and amount of special training required to do their jobs properly:

- Preparing patients for injections of joints, bursae, and other musculoskeletal areas.
- Assisting in the reduction of fractures and positioning for casting.
- Applying casts and splints. The more difficult types of casts and splints usually require the assistance and supervision of an experienced technician or doctor.
- Instructing patients in the use of crutches, canes, and other Orthopedic devices.
- Operating cast removers and other orthopedic appliances.
- Applying Orthopedic traction devices under supervision.
- Ordering standard x-ray procedures without supervision.

4N1X1D, Otolaryngology

Otolaryngology technicians, more commonly referred to as ear, nose, and throat (ENT) technicians, attend the Otolaryngology program at the METC. After 16 weeks of intensive, surgery-oriented training, they are assigned to a hospital ENT clinic.

ENT technicians perform many highly specialized and technical duties that focus on patient care activities in the ENT clinic. They also spend a great deal of time in the OR performing as primary scrubs for the ENT surgeons. Usually, the ENT technician solo scrubs on most ENT surgical procedures. The list of special duties is lengthy, so we only list some of the more common ones performed by the ENT technicians:

- Prepares patients for examination procedures.
- Screens patient records, takes histories, and assists in the diagnosis and treatment of common ENT disorders.
- Applies dressings and packs for nasal reconstructions, mastoidectomies, closed reductions of nasal fractures, and radical neck dissections.
- Administers local anesthetics to patients under a physician’s supervision.
- Performs diagnostic hearing evaluation tests.
- Performs hearing aid evaluations, fits hearing aids, and makes ear mold impressions.
- Performs facial nerve stimulations under a physician’s supervision.
- Periodically checks, calibrates, and performs operator maintenance on special ENT clinical and surgical equipment.

You can see that, in addition to the duties they perform in the operating room, ENT technicians are very busy when working in their clinic.

By now, you should have a better understanding of the duties performed by not only basic surgical service technicians, but the technicians in the other specialty shredouts as well. As mentioned before, the duties provided in this text represent only a partial list. Your supervisor will inform you of the specific duties and responsibilities associated with your particular duty position.

005. 4N171, Surgical Service Craftsman duties

The next progressive step in your career involves promotions, not only in rank, but in level of responsibility.

Upgrade requirements

Upgrade to the 7-skill level comes after you are promoted to SSgt, and requires completion of a 7-skill level CDC, as well as complete training in all STS core tasks for the assigned duty position. Your duty title changes to “craftsman” when you are awarded your 7-skill level. As a craftsman in the Surgical Service career field, you will find much of your time will be devoted to supervisory and administrative duties, and less time to performing basic surgical duties. Also, after getting your 7-skill level, your official duty title will normally change from Surgical Service Journeyman to Surgical Service Craftsman.

Responsibilities

Some of the new duties you can expect to perform as a 4N171 craftsman include but are not limited to:

- planning and scheduling subordinates’ workloads and duty assignments. This includes such tasks as making daily operating room and section work assignments and developing call rosters.
- establishing work methods and standards. You may have to write or revise operating room, SPD, or clinic operating instructions, policies, and procedures.
- evaluating subordinates’ job performance. This means you’ll become the immediate supervisor, or rather, of a lower ranking surgical technician, conduct periodic performance counseling, and write enlisted performance reports (EPR).
- interpreting policies and regulations. You will be responsible for reading, understanding, and advising subordinates on the content of various directives that pertain to your job and other facets of military duty.
- analyzing requirements and supervising the requisition, storage, maintenance, and issue of supplies and equipment. You may be assigned additional duties as the operating room or central supply property custodian or supply representative. As such, you will be directly responsible for thousands, possibly millions, of dollars’ worth of government supplies and equipment.
- planning, conducting, and evaluating OJT. This includes monitoring CDC progress of 5-skill level trainees, developing task breakdowns, and recording training progress in an official training record.

Again, the list just presented by no means includes all the duties performed. It is intended to give you a basic idea of some of the basic administrative duties you can expect to encounter as a 7-skill level technician. Because 5-skill level technicians are often called-upon to assist in many of these duties, you will be introduced to them in the last volume of CDC 4N151B.

At this point in your climb up the career field ladder, you may become the NCOIC or assistant NCOIC of your duty section. You’ll be required to demonstrate not only a high degree of technical proficiency regarding basic surgical skills but also show that you can perform effectively as a mid-level supervisor. Shredout personnel generally perform the same duties at the 7-skill level that they performed at the 5-skill level. But, just like the basic surgical technicians working in the operating room, the shredout technicians are assigned additional duties and responsibilities commensurate with their grade and new skill level. As you progress up the career ladder, the distinctions between the “slick” and the “shred” 4N1X1 technicians begin to diminish as they both take on more administrative duties and prepare themselves for the next step—the 9-skill level.

006. 4N191, Surgical Service Superintendent and 4N000, (CEM) Medical Service Manager duties

After receiving your 7-skill level and gaining management experience, the next goal you can shoot for is the 9-skill level, Surgical Service Superintendent position. One of the prerequisites for award of this skill level is holding the rank of Senior Master Sergeant (SMSgt).

First, your primary AFSC (PAFSC) changes from 4N171 to 4N191. Second, your duty title changes from Surgical Service Craftsman to Surgical Service Superintendent. REMEMBER, according to AFI 36-2618, *The Enlisted Force Structure*, you won't officially hold this title until you're actually assigned to a superintendent position. For example, if a SMSgt is in charge of a surgical flight, they hold the duty title of "Flight Chief" not "Flight Superintendent." In some cases, 4N191s perform duties outside the realm of surgical services, such as superintendent of a medical operations squadron. Usually this occurs in MTFs that do not have the manager-supervisor tier in the enlisted force organization, and you no longer perform technical functions related to surgery. All your duties will be administrative in nature; you essentially promote yourself out of a job as a surgery technician and become a full-time manager.

4N191, Surgical Service Superintendent

The Surgical Service Superintendent manages surgical service personnel in planning, providing, and evaluating patient care activities, and related training programs, and organizes and directs administrative duties. The duties and responsibilities include the following:

- Manages patient care activities in medical treatment facilities.
- Coordinates with executive management team and participates in managing surgical services.
- Assists in establishing and maintaining optimum patient care standards.
- Maintains functional control of enlisted surgical service personnel.
- Ensures effective use of manpower, materiel, and money.
- Ensures controls for maintaining equipment and complying with safety regulations.
- Inspects activities and procedures, interprets findings, and recommends corrective action.
- Advises the medical treatment facility staff of technical and administrative training needs.
- Directs, performs, and coordinates administrative functions.
- Establishes administrative policies, in coordination with the executive management team, for surgical functions.
- Supervises correspondence and records preparation and maintenance, and determines methods and sources of obtaining data for routine or special reports.
- Directs, coordinates, and validates budget requirements.
- Evaluates supply and equipment needs.
- Serves as consultant to MAJCOM surgical service manager.
- Participates or assists in developing and implementing command programs, staff assistance visits, and consultant visits.
- Assists the executive management team with developing, interpreting, and evaluating regulations, policies, and procedures.
- Assists with developing, implementing, and evaluating medical readiness plans and programs.

The Surgical Service and the Medical Service career fields are parallel until they reach the rank of Chief Master Sergeant. At this point, the two career fields merge into the Medical Service Manager, which is Chief Enlisted Manager (CEM) code 4N000. This designation and duty title are reserved for medical and surgical service superintendents selected for promotion to Chief Master Sergeant, or

those who already hold the rank. Once you become a Medical Service superintendent, you have reached the manager-supervisor tier in the enlisted force organization, and you no longer perform technical functions related to surgery. All your duties will be administrative in nature and you will become a full-time manager. By virtue of your extensive supervisory experience and knowledge at that point in a career, you will be expected to perform effectively in any senior enlisted management position within the Medical Service career field.

4N000, Medical Service Manager

The medical service manager oversees Medical Service personnel in the planning, providing, and evaluating patient care activities, and related training programs. Organizes and directs administrative duties. Other duties and responsibilities include the following:

- Manages patient care activities in major medical treatment facilities.
- Coordinates with executive management team and participates in managing medical services.
- Assists in establishing and maintaining optimum patient care standards.
- Maintains functional control of enlisted Medical Service specialty personnel.
- Ensures effective use of manpower, materiel, and money.
- Coordinates clinical activities with medical and base agencies.
- Plans, directs, and implements aeromedical evacuation procedures.
- Ensures controls for maintaining equipment and complying with safety regulations.
- Inspects activities and procedures, interprets findings, and recommends corrective action.
- Directs, performs, and coordinates administrative functions.
- Establishes administrative policies for medical and nursing functions in coordination with executive management team.
- Supervises correspondence and records preparation and maintenance, and determines methods and sources of obtaining data for routine or special reports.
- Directs, coordinates, and validates budget requirements.
- Serves as command Medical Service manager or consultant.
- Participates or assists in developing and implementing command programs, staff assistance visits, and consultant visits.
- Assists the executive management team with developing, interpreting, and evaluating regulations, policies, and procedures.
- Oversees and participates in implementation of continual quality improvement plans and programs.

You'll find 4N000s assigned to only top-level enlisted management positions in the Medical Service career field. Typically, the Medical Service manager is assigned as the MDG medical enlisted manager as discussed under organization of the MDG. In addition, there are many other management duty positions in the Medical Service that 4N000s can fill.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

004. 4N131/4N151, Surgical Service Apprentice/Journeyman duties

1. What is the official duty title of a 4N131?
2. Identify two general duties performed by surgical service technicians under a *nurse's* direct supervision.
3. List two duties performed by a 4N151 that are not normally performed by a 4N131.
4. Identify the three shredouts of the surgical service career field by alpha suffix and name.
5. Match each surgical service shredout in column B to the duties in column A. Column B items may be used more than once.

<p>____ (2) Column A</p> <p>____ (1) Takes and develops x-rays for studies of the urinary system.</p> <p>____ (2) Instructs patients in the use of crutches and canes.</p> <p>____ (3) Applies traction devices under supervision.</p> <p>____ (4) Performs facial nerve stimulations under a doctor's supervision.</p> <p>____ (5) Performs diagnostic hearing evaluation tests.</p>	<p><i>Column B</i></p> <p>a. 4N1X1B.</p> <p>b. 4N1X1C.</p> <p>c. 4N1X1D.</p>
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005. 4N171, Surgical Service Craftsman duties

1. When does your official duty title normally change from Surgical Service Journeyman to Surgical Service Craftsman?
2. If you are assigned to be an individual's rater, what report are you required to write?
3. List four administrative duties commonly performed by 7-level Surgical Service technicians.

006. 4N191, Surgical Service Superintendent and 4N000, (CEM) Medical Service Manager duties

1. Describe how your AFSC and duty title changes on award of the 9-skill level.

2. Identify the *broad* managerial duties performed by the 4N191, Surgical Service Superintendent.
3. What career field parallels the Surgical Service career path and at what point do they merge?
4. What duty position occupies the top layer of the enlisted Medical Service?
5. Who is typically assigned as the MDG enlisted manager?

1-3. Educational Opportunities in the Air Force

If you want to succeed in today's Air Force, you have to desire and continually strive for self-improvement. One of the best ways you can do this is through education.

007. Education

One of the opportunities you have while in the Air Force is to obtain your associate degree through the Community College of the Air Force (CCAF).

CCAF

From the time you join the Air Force, you accumulate credits from CCAF, which is a fully accredited member of the Southern Association of Colleges and Schools Commission on Colleges. No matter what career field you are in, the CCAF has a degree for you! For the surgical services career field, CCAF offers a program leading to the award of an associate degree in Applied Sciences for Surgical Services Technology. To attain an associate degree, a minimum of 64 semester hours of credit is required. Your CFETP outlines the specific requirements for an Associate in Surgical Services Technology degree. These hours are accumulated from basic training, technical training courses/skill level attainment, and professional military education. Hours are also achieved from civilian college courses and credit by examination (CLEP/DANTES). If you plan to take a civilian course, visit your local Education Service Center for information regarding tuition assistance.

In addition to the formal training and hands-on training you have received, there are many other means available to enhance your qualifications as a surgical technician. One way is to pursue a degree through the CCAF. CCAF offers degree programs tailor-made to each Air Force enlisted specialty. If you have any questions regarding CCAF programs, see your base education officer.

Tuition assistance

The tuition assistance (TA) program is provided as a benefit to active duty Airmen to help pay the cost for off-duty education. By using TA, the Air Force will pay up to 100 percent of your college tuition for classes taken during off-duty hours. Of course, you must pay the costs for books.

Airman Education and Commissioning Program

A great way to become an Air Force officer is by way of the Airman Education and Commissioning Program (AECPP). It allows you to attend college full time and continue to receive full pay and allowances. When you graduate, you enter either the officer training school (OTS) or commissioned officer training school (COTS).

008. Certification

In addition to the formal and hands-on training you have received, there are many other means available to enhance your qualifications as a surgical technician and/or a sterile processing technician. Because certification is voluntary, the choice to become certified exhibits pride in the profession, the desire to be recognized for mastery of scientific principles, as well as an ongoing commitment to quality patient care. Certification is a means for upward mobility, a condition for employment, a route to higher pay, and a source of recognition nationwide.

Surgical technician certification

If you wish to become nationally certified, you should contact the National Center for Competency Testing (NCCT) at <http://www.ncctinc.com>. This organization offers a certification examination to all graduates of accredited surgical technology schools. The Surgical Services Apprentice Course, conducted at the METC, Fort Sam Houston TX, is recognized as an accredited course when combined with 5-skill level upgrade training. Upon award of the 5-skill level, you are eligible to challenge the certification examination. Testing can be arranged through your base education office under the Defense Activity for Nontraditional Education Support (DANTES) program. If you take and pass a test, you become a Tech in Surgery-Certified (TS-C {NCCT}). This certification remains in effect for five years.

Sterile Processing certification

As a surgical technician, you also have an opportunity to become nationally certified with the Certification Board for Sterile Processing and Distribution (CBSPD). This organization administers competency-based certification examinations for personnel who perform cleaning, disinfecting, sterilizing, and inventory management activities. The CBSPD offers four levels of certification: Technician, Ambulatory Surgery Technician, Supervisor, and Manager. Each level of certification has different eligibility requirements. Testing is also offered under the DANTES program. Upon successful completion of the examination, your certification remains valid for five years. Recertification can be accomplished through reexamination or a combination of work. For more information, technicians with six months' experience in SPD should contact CBSPD at <http://www.sterileprocessing.org>.

The Certified Registered Central Service Technician

The Certified Registered Central Service Technician (CRCST) certification program is designed to recognize individuals who have demonstrated the experience, knowledge, and skills necessary to provide competent services as a central service technician. CRCSTs are integral members of the healthcare team who are responsible for decontaminating, inspecting, assembling, disassembling, packaging, and sterilizing reusable surgical instruments or devices in a health care facility that are essential for patient safety. To earn CRCST certification, candidates are required to demonstrate skills successfully by completing hands-on work experience as well as successful completion of an examination developed to measure the understanding of general central services and infection prevention topics. CRCST certificants are required to recertify annually through completion of continuing education requirements. For more information on this certification, visit <http://iahesmm.org>.

In addition to becoming nationally certified with the NCCT, CBSPD, or the CRCST, there is an opportunity for the shred technicians—Orthopedics, Urology, and ENT to receive national certifications in their areas of expertise.

National Board for Certification of Orthopedic Technologists

If you are an Orthopedic technician and meet eligibility requirements, you can apply to take a certification examination through the National Board for Certification of Orthopedic Technologists. You must have attended an orthopedic technologist school/program and have six months of full-time experience in orthopedics, or you must have at least two years of full-time work experience in

orthopedics. If you pass the test, you become an orthopedic technologist certified (OTC). Once you become a certified OTC, there is another level of certification you can apply for—orthopedic technologist-surgery certified. To apply for this certification, you must be a certified OTC and have at least one year of experience in the surgical setting. For information on testing, visit the National Association of Orthopaedic Technologists at <http://www.naot.org>. Testing for these certifications is not offered under the DANTES program.

Certified Urology Associate

Urology technicians can apply for certification as a Certified Urology Associate (CUA) through the Society of Urologic Nurses and Associates (SUNA). To apply, you must have at least three years on-the-job training under the supervision of a practicing urologist. Individuals successfully completing the certification process may use their credentials for a period of three years. For more information, visit the Society of Urologic Nurse and Associates at <http://www.suna.org>.

Certifications for Otolaryngology Technicians

Otolaryngology technicians can become Certified Occupational Hearing Conservationists (COHC) after completing a 20-hour certification course and receiving a passing score on the exam. There are no prerequisites for this course or the exam, but certifications must be renewed after five years. For more information, visit <http://www.caohc.org/occupational-hearing-conservationist/ohc-training-and-certification>. Additionally, Otolaryngology technicians can enroll in the Certificate Program for Otolaryngology Personnel (CPOP)—a three-phase program offered by the American Academy of Otolaryngology–Head and Neck Surgery designed to teach basic hearing testing under the direct supervision of an otolaryngologist. This program may warrant approval from your leadership as it requires a clinical internship to obtain the certification. Visit <http://entnet.org/content/certificate-program-otolaryngology-personnel-cpop> for more information.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

007. Education

1. What program does the CCAF offer that leads to the award of an associate degree after all mandatory requirements are completed?
2. How many semester hours of credit are required for an associate degree from the CCAF?
3. What is tuition assistance?

008. Certification

1. If you are interested in becoming a nationally certified surgical technician, what organization should you contact?
2. What is the minimal amount of time a technician needs to have in SPD before attempting to become certified with the CBSPD?

3. What requirements must a technician complete in order to earn a CRCST certification?

Answers to Self-Test Questions

001

1. It provides them guidance determining how to use its assets appropriately based on people, information, and support systems across military operations.
2. The Surgeon General.
3. The Air Force Chief of Staff.
4. MAJCOM command surgeons.

002

1. Provides medical services on patient needs and improves our ability to compete in a business case/managed care environment.
2. Medical Operations, Medical Support, Aerospace Medicine, and Dental.
3. Is responsible for all activities of the medical unit and is accountable for all aspects of the mission.
4. First sergeant.

003

1. The Medical Operations or Surgical Operations Squadron.
2. FA, ADAPT, and Mental Health.
3. Any four of the following:
 - (a). Surgical Services.
 - (b). Operating Room.
 - (c). OB/GYN Services.
 - (d). Anesthesia.
 - (e). Orthopedics.
 - (f). General Surgery.
 - (g). Surgical Specialties.
 - (h). Diagnostic Imaging.
4. (1) c.
(2) a.
(3) e.
(4) b.
(5) d.

004

1. Surgical Service Apprentice.
2. Circulating and assisting with basic nursing care in the recovery room.
3. OJT trainer for newly assigned 3-skill level technicians and performing as the OR medical supply NCO or equipment custodian.
4. 4N1X1B—Urology; 4N1X1C—Orthopedics; and 4N1X1D—Otolaryngology.
5. (1) a.
(2) b.
(3) b.
(4) c.
(5) c.

005

1. When you are awarded your 7-skill level.
2. EPR.
3. Any four of the following:
 - (1) Planning and scheduling workloads and duty assignments of subordinates.
 - (2) Establishing work methods and standards.
 - (3) Evaluating job performance of subordinates.
 - (4) Interpreting policies and regulations.
 - (5) Analyzing requirements and supervising the requisition, storage, maintenance, and issue of supplies and equipment.
 - (6) Planning, conducting, and evaluating on-the-job training (OJT).

006

1. PAFSC changes from 4N171 to 4N191 after becoming a SMSgt and duty title changes from Surgical Service Craftsman to Surgical Service Superintendent.
2. Manages personnel in planning, providing and evaluating patient care activities and related training programs, and organizes and directs administrative functions.
3. The Medical Service career field; they merge at the rank of CMSgt.
4. The 4N000 (CEM), Medical Service Manager.
5. A Medical Service Manager.

007

1. Applied Sciences for Surgical Services Technology.
2. 64.
3. It is a benefit to active duty members where the Air Force will pay up to 100 percent of your college tuition for classes taken during off-duty hours.

008

1. The NCCT.
2. Six months.
3. Demonstrate skills successfully by completing hands-on work experience as well as successful completion of an examination developed to measure the understanding of general central services and infection prevention topics.

Complete the unit review exercises before going on to next unit.

Unit Review Exercises

Note to Student: Consider all choices carefully, select the *best* answer to each question, and *circle* the corresponding letter. When you have completed all unit review exercises, transfer your answers to the Field-Scoring Answer Sheet.

Do not return your answer sheet to the Air Force Career Development Academy (AFCDA).

1. (001) Which *best* summarizes how the USAF Medical Service fulfills its mission?
 - a. Manages and trains medical personnel.
 - b. Establishes and operates medical treatment facilities.
 - c. Treats and rehabilitates personnel who become sick or injured.
 - d. Maintains the health of USAF personnel to ensure maximum readiness.
2. (001) Within the USAF chain of command, the *USAF* Surgeon General reports directly to the
 - a. Air Force Chief of Staff.
 - b. Secretary of the Air Force.
 - c. Chairman of the Joint Chiefs of Staff.
 - d. Surgeon General of the United States.
3. (002) What is the *correct* chain of command sequence for enlisted personnel in a medical group?
 - a. Immediate supervisor, noncommissioned officer in charge (NCOIC), flight noncommissioned officer (NCO) in large elements, squadron commander.
 - b. Immediate supervisor, squadron commander, flight chief, group commander.
 - c. NCOIC, first sergeant, immediate supervisor, squadron commander.
 - d. NCOIC, immediate supervisor, flight chief, squadron commander.
4. (003) Besides the Surgical Operations Squadron, a surgical technician can also be assigned to this squadron.
 - a. Dental.
 - b. Medical Support.
 - c. Medical Operations.
 - d. Aerospace Medicine.
5. (003) The mission of the Surgical Operations Squadron is to
 - a. provide surgical care to the civilian community.
 - b. provide primarily episodic care to the patient population.
 - c. collaborate with medical teams to develop and establish programs.
 - d. provide diagnostic and therapeutic services, and resource management.
6. (004) A Surgical Service Apprentice becomes a Surgical Service Journeyman
 - a. after completing all requirements for 5-skill level upgrade.
 - b. one year after graduating from technical school.
 - c. upon promotion to senior airman.
 - d. upon promotion to staff sergeant.
7. (004) Which of the following duties does a surgical technician with a “C” shredout perform?
 - a. Performing diagnostic hearing evaluation tests.
 - b. Assisting in reducing fractures and positioning for casting.
 - c. Performing facial nerve stimulations under a physician’s supervision.
 - d. Taking and developing X-rays for special urinary system radiographic studies.

8. (005) The normal, official duty title of a 4N171 is Surgical Service
 - a. Manager.
 - b. Craftsman.
 - c. Journeyman.
 - d. Superintendent.
9. (005) The assistant noncommissioned officer in charge (NCOIC) or NCOIC of surgery is *usually* a
 - a. 4N151, Surgical Services Journeyman.
 - b. 4N171, Surgical Services Craftsman.
 - c. 4N191, Surgical Service Superintendent.
 - d. 4N000, Medical Service Manager.
10. (006) Once 7-skill level Surgical Service technicians are upgraded to the 9-skill level, which duty position will they *most likely* be assigned?
 - a. Noncommissioned officer in charge (NCOIC) of the Operating Room.
 - b. Assistant NCOIC of Surgical Services.
 - c. Superintendent of Surgical Services.
 - d. NCOIC of Surgical Services.
11. (006) The Surgical Service and the Medical Service career fields are parallel until they reach the rank of
 - a. senior master sergeant.
 - b. chief master sergeant.
 - c. technical sergeant.
 - d. master sergeant.
12. (007) What college degree are 4N1X1 technicians able to attain through the Community College of the Air Force?
 - a. Bachelor's in Allied Health Sciences.
 - b. Associate's in Allied Health Sciences.
 - c. Bachelor's in Surgical Services Technology.
 - d. Associate's in Surgical Services Technology.
13. (007) The *minimum* number of semester hours required to attain an Associate Degree in Surgical Technology is
 - a. 75.
 - b. 64.
 - c. 30.
 - d. 24.
14. (008) How many years is a certification from the National Center for Competency Testing (NCCT) valid?
 - a. 5.
 - b. 2.
 - c. 3.
 - d. 1.

Unit 2. Professional Relations

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THE MAKEUP of the surgical team and how you can go about establishing and maintaining good relationships with patients and fellow workers is the thrust of this unit. Much of the information relates to the moral, ethical, and legal aspects of your job as a surgical technician.

Today, patients are better educated and informed about healthcare matters than ever before. They are very much aware of their rights and don't hesitate to sue when they feel these rights have been violated. The federal government pays millions of dollars in damages and settlements each year resulting from malpractice suits filed against military healthcare providers. As a surgical service specialist or technician, this affects you in the following three ways:

1. Part of the money paid out for these lawsuits comes out of *your* pocket as a federal taxpayer.
2. As a member of the military, you are subject to charges, if the care you provide is substandard. Your duties and responsibilities are clearly outlined in many areas, and many of the areas you have been trained on are specifically documented. You usually initial, in your STS, to agree that you have been trained on these duties and know how to do them properly, and a supervisor certifies you in them. If you improperly perform a duty, or perform one you shouldn't, and the result is poor patient care (or worse), you can be held accountable.
3. The most important reason is that you are a human being, and so are your patients. When you do something or fail to do something that causes harm to another person, you also hurt yourself. Remember, your job is to help provide patient *care*, not patient *harm*. Knowing and understanding your role and responsibilities on the surgical team, and the codes of conduct that govern your job will help you provide the best patient care possible.

2–1. Standards of Conduct and Interpersonal Relationships

We will now look at standards of conduct that apply to you as a member of the surgical profession and outline some guidelines to help you maintain good rapport with patients and coworkers.

When we talk about standards of conduct, we're not referring to the ones you learned in basic training. Those standards address basic issues that govern the conduct of all Air Force members. The standards of conduct we discuss are the ones that evolved into a code of ethical conduct for nurses and other medical personnel. Once you're familiar with the elements in this code of conduct, we will look at measures for developing good staff and patient relations.

009. Standards of conduct related to patient care

Several organizations have established codes of conduct for each class of medical personnel. Although these codes differ in their wording, the basic concepts or standards underlying the different codes are the same. The elements essential to our code of conduct are discussed in this section.

Human dignity

Respect for the patient's dignity is either stated or implied in all nursing codes, and is included in the codes of other medical professionals. This respect should be given to all patients regardless of rank, financial status, or any other considerations.

Respect for dignity includes greeting and talking to patients in a respectful manner. You should always avoid undue familiarity. "Good morning, Captain Smith" or "Hello, Mrs. Jones" are much more appropriate than "What's happening, man?" Respect for dignity also includes not making any crude or inappropriate remarks about patients undergoing surgery, or unnecessarily exposing a patient's body before, during, or after surgery. Any member of the surgical team who conducts himself or herself in anything less than a professional manner is guilty of blatant disrespect for human dignity. The old saying "familiarity breeds contempt" has a lot of truth to it. If you find you are unable to treat your patients with the respect and compassion that they deserve, you need to look for a new line of work.

Individual care

This ethical standard is closely related to respecting the patient's dignity. Treating each patient as an individual means you should avoid stereotyping patients. "All old people are senile" is an example of the type of attitude you should avoid. After all, how many elderly people that you know are actually senile? As much as possible, you should try to get to know the patients you are treating. Learn their basic likes and dislikes, talk to them, and show that you are interested in their welfare.

Granted, as a surgical technician, your contact with conscious, alert patients is limited, but you should always attempt to provide that "personal touch" whenever you're involved in direct patient care. You also may find yourself working in a clinic, so you need to practice this guideline. Avoid thinking or talking about the "hip replacement in OR 2"—it depersonalizes the patient.

Treating the patient as an individual also involves respecting that individual's customs and beliefs. The Air Force operates medical facilities throughout the world. You may be exposed to many customs and beliefs that are foreign to you. Give each patient's beliefs the same respect that you want to be given for your own.

Privacy

There are two types of privacy we need to discuss. The first is personal privacy and is covered by the Health Insurance Portability and Accountability Act (HIPAA) of 1996. In many areas, the Air Force operates on a strict need-to-know basis. Under HIPAA, by law, you must apply this same principle to surgical patient care; the only people you are to discuss anything about the patient's condition and treatment with are the ones helping you provide that treatment. This means that you shouldn't reveal anything about the patient or their care to anyone not directly involved with providing that care. This even includes a fellow surgical specialist working in sterile processing or one of the clinics. Information that seems trivial to you may be very important to the patient. Never discuss the patient in a joking or casual manner.

If the patient overhears what you are saying, you will not only lose the rapport you worked to establish but you may be subject to disciplinary and legal action if the patient files a formal complaint. Gossiping is very unprofessional and should be avoided, even if the patient cannot hear you. *Anyone, this includes supervisors, commanders, first sergeants, and family members who have a question about a patient should be referred to the patient's doctor or provider.* Mandatory HIPAA training will be provided to you at your first duty station. Another aspect of this ethical standard is ensuring the patient's physical privacy.

The second type of privacy is physical privacy. This goes hand-in-hand with what was said about respecting human dignity. You should never expose a patient unnecessarily. This holds true whether they are conscious, and aware of what you are doing, or unconscious and totally at your mercy. The

surgical patient puts a great deal of trust in the competence and professionalism of the various members of the surgical team. ***Never violate this trust!***

Remember that you are a stranger to the patient and he or she does not understand everything you are doing. You should always keep the room door shut or the privacy screen around a patient's bed closed when exposing a patient. When you move patients from their beds to a transport gurney, make sure a cover sheet is placed over them before they move. When positioning your patients for surgery, uncover them only to the minimum extent necessary. The same holds true when performing preoperative skin preparation. Always explain what you are going to do to the patient before you start. Never leave a patient that is partially or completely exposed. If you are working with a patient of the opposite sex, always have a chaperone of the same sex as the patient in the room with you.

Professional competence

Protect the patient from incompetent, unethical, and illegal care. There was a time when nursing personnel were expected to do whatever the doctor told them to do, regardless of the circumstances. This is no longer true. You are expected to know the consequences of the care you render and to avoid doing anything that might harm the patient. Also, you should never attempt to do anything that you are not adequately trained to do or that you are not permitted to do by local policy. If, for example, an anesthetist asks you to start an intravenous line on a patient, do not try it unless you have been trained to do it properly and local policy allows technicians to do so.

Performing, or attempting to perform, a task that you are not trained or not allowed to do is known as exceeding your *scope of practice*. If a nurse or doctor asks you to do something you are not qualified to do, simply inform that individual that you are not able to or not allowed to perform the task. If they insist that you do it anyway, inform your NCOIC or OR supervisor immediately.

You must correct any condition that threatens the patient's health or safety. This may be as simple as pulling up the side rails on a transport gurney or reporting a coworker who constantly performs in an unsafe or incompetent manner. The patient's health is more important than possible loss of friendships.

Accountability

Be accountable for your actions, which simply means being responsible for what you do or fail to do. Act within your scope of practice, and ensure that every action you take will benefit, not harm, the patient. If something goes wrong and you make a mistake, accept responsibility for it. This is particularly important for surgical technicians, and we emphasize accountability when we look at surgical conscience later in this unit.

Self-improvement

You should continually seek to improve both your own skills and the care provided in your facility. With the rapid advances in medical and surgical technology, if you do not keep up with changes and strive to improve your skills and knowledge, you will soon be unable to use the state-of-the-art equipment, and be unable to meet the most current standards of care. Self-improvement is important because your patients deserve the best care available. If you fail to keep up with current developments in your career field, the care you give your patients will be substandard.

If you have some ideas on how work methods could be improved in your duty section, talk to your NCOIC or OR supervisor. Your suggestions *do* make a difference. Many times, a person with a fresh outlook can see changes more clearly than someone who has been performing the same job for years. This doesn't mean all your suggestions will be adopted; sometimes national standards and regulations make a process a little harder, but safer. But, if you see a way to improve something, say so! It may just be that nobody else looked at it from your perspective.

You should always work to improve your profession. This means you should always keep an open mind and be willing to accept changes. It also means you should suggest changes that could benefit

your career field. For example, if you read something you think is wrong as you are studying this CDC or that completely contradicts the way your hospital does things, contact the author! Even if you just have a suggestion to make the course easier to read or understand, send a letter, e-mail, or make a phone call and you can find the numbers listed in the front of each volume. Every surgical technician in the Air Force has to study this course, not only for upgrade training but also when studying for promotion; if what you see or suggest improves it, you improve it for the entire career field.

Loyalty

You should always be loyal to your coworkers and to your profession. This is not always an easy job. Surgical personnel frequently become discouraged, depressed, and frustrated because of the demands of the job and the high stress these demands create. Try to give encouragement and praise to your coworkers whenever possible. You will be amazed at the beneficial effects this type of positive behavior will have on the surgical team.

Another step you can take to build teamwork and loyalty is to help your coworkers do their job. If you finish with your work ahead of someone else, pitch in and give him or her a hand. A little cooperation and teamwork will definitely help the morale in your section. Besides, you never know when you need some help doing your job!

Loyalty also means that you never publicly criticize your coworkers. We said earlier that you should not tolerate an incompetent coworker; this is still true. However, you should avoid making comments about that individual's work performance in public. Before you become overly critical, attempt to find out why your coworker's work isn't up to par. Maybe the person was never trained properly in the first place, or they possibly forgot the correct procedure.

All that may be required to correct the problem is a little remedial training. Attempt to talk to the person in private and offer your help. If your efforts fail, talk to your supervisor or NCOIC and let them handle the problem. Above all, never criticize a surgical team member in front of patients!

Another aspect of loyalty involves supporting the medical profession whenever possible. Activities such as teaching cardiopulmonary resuscitation (CPR) or first aid to the civilian population in your area do much to increase public knowledge and support of Air Force medicine. As a military member, you should also be willing to explain your job and talk about the services your hospital offers to increase public awareness and confidence (both military and civilian) in the healthcare services that your base offers.

Personal conduct

As a member of the military, as well as the surgical team, you have dual responsibility for maintaining high grooming and conduct standards. You should always present a clean, neat appearance, and be courteous to patients and coworkers. First impressions are lasting impressions. If you look like a slob at work, you create a poor impression of yourself, the surgical profession, and the Air Force. The same holds true for your conduct. If you're discourteous to patients, constantly show up to work late, or act in a generally unprofessional manner, you will definitely create a poor impression.

Cooperation

The last ethical standard we discuss is cooperation. Cooperation is important at all levels. You need cooperation from your patients to prepare them for surgery adequately. Your patients need cooperation from you in terms of reassurance, information, and providing good care. If you fail to cooperate with other members of the surgical team, the quality of patient care will suffer. Cooperation includes such things as effective communication, courtesy, and respect for others.

The basic ethical standards of conduct just discussed were presented as guidelines for you to follow in the course of performing your daily duties as a surgical technician. Ethical behavior is the cornerstone of medicine. Use the standards presented here to help develop your own personal code of conduct—

then live by that code. If you do, you'll find that your work relationships, quality of patient care you provide, and life in general, will improve dramatically.

010. Guidelines for developing good interpersonal relationships

In addition to the ethical standards of conduct, there are several other guidelines you can follow to help you develop and maintain good interpersonal relationships. Study the following guidelines and examples and try to apply them to your work situation.

Appearance

As mentioned earlier, you should present a clean, neat appearance at all times. You should wear a clean, pressed uniform each day, and your shoes should be clean and polished. Avoid wearing excessive amounts of jewelry or cosmetics—these are totally unacceptable in the operating room. Patients and supervisors usually form a first impression of you based on the way you look. If your hair, clothes, and fingernails are dirty and you have an offensive body odor, what kind of impression do you think you will make? If you look sharp, generally you act sharp—leaving a favorable impression of you with others.

Attitude

You should maintain a positive attitude toward your patients and coworkers. Be cheerful, respectful, and professional, it's contagious. Remember, the reason you are there is to care for the patients. Show concern for all patients; make each patient feel that his or her welfare is important to you. Do not let your personal feelings toward a patient interfere with the care you provide. Always act in a professional manner.

Most surgical patients are frightened and somewhat confused. A friendly smile and reassuring word works wonders in allaying their fears. Never neglect or ignore a patient. This is particularly important when patients are waiting in the hallway outside the operating room where they become subjected to all sorts of strange sights and foreign sounds. Pause a moment to check on these patients. Ask them how they are feeling, and offer a warm blanket. Stop and entertain a scared child or pick up and hold a crying infant. Keep in mind that these are human beings you're dealing with—not surgical procedures!

Personal touches, such as the ones just described, go a long way towards building a good rapport with patients. Showing that you care makes you feel better and may actually improve the patient's response to surgical treatment. Patients who are calm and comfortable before surgery generally recover better from an operation. As we said before, treat your patients as individuals, not just another body to be cut on. Avoid making statements like "the gallbladder in room two is ready to be prepped," or "I'm going to pick up the hernia now." Develop the habit of referring to your patients by their proper names or titles. If you personalize your care and give identity to your patients, your job performance is likely to improve and the quality of care you provide will improve.

Everybody has personal problems, but you must learn to leave yours at home when you go to work. It is all right to talk to your friends about your problems, but never burden the patients with them! Sick or injured patients have enough problems of their own, and certainly do not need to know about your problems. Never take out your frustrations on the patients or your coworkers. If you are having difficulty dealing with personal problems, talk to your supervisor. If your supervisor cannot help, he or she should be able to refer you to someone who can. If not, continue up your chain of command until you find someone who can.

Earlier, we mentioned loyalty and cooperation. Another word closely related to loyalty and cooperation is "teamwork." Surgical staff members must work together effectively to render quality surgical care. The surgeon depends on you and the surgical nurses to anticipate his or her actions. When you are scrubbed-in, you depend on the circulating nurse to anticipate your needs so you can have everything the surgeon needs, when it is needed. A patient's life may depend on how well you

and other members of the team work together. Always treat your coworkers with respect and courtesy. Be professional. Avoid horseplay and idle conversation.

Address surgical team members, especially officers, by their rank or title and last name and avoid using first names. Although you may be friends, being overly familiar with coworkers in front of patients detracts from your image of professionalism. As we stated before, never belittle a coworker in front of patients or other personnel. If you want to discuss a problem area with someone, do it discreetly and in private. If an individual is performing in a substandard manner, you owe it to your patients to try to correct the situation. Never forget that the patient's welfare is more important than someone's hurt feelings or the possible loss of friendship.

Communication

Communicating is a difficult task. It is the act of giving or exchanging information. Although this is a simple definition, communication takes place only if the message being sent is received accurately. Here are some principles to remember:

1. Communication requires a sender, a message, and a receiver. The sender puts thoughts into words, and then transmits these ideas in the form of a message to the receiver who tries to understand the thoughts.
2. Channels of communication are verbal, nonverbal, or written.
3. The goal is to obtain information, inform, explore problems, or release tension.
4. The degree of effectiveness is determined by the setting and attitudes of those involved in the communication process. Our emotional state affects listening.
5. Know what you're going to say and say what you mean. Speaking correctly and actively listening are also important. Remember to do the following:
 - a. Look people in the eye.
 - b. Concentrate on what is being said—listen patiently.
 - c. Think of the feelings behind the words.
 - d. Look for a hidden message.
 - e. Do not interrupt people in the middle of a thought.
 - f. Occasionally repeat what is being said.
 - g. Ask questions if you do not understand the message.
 - h. Be conscious of nonverbal signs—a smile, frown, blank look or fidgeting, toe tapping, and so forth.

One unique thing about working in surgery is that it is possible to perform an entire surgical procedure without a single word spoken; all communication can be done by using hand signals. This is sometimes done during surgical procedures when a very sensitive patient is undergoing local or spinal anesthesia. Whether spoken or unspoken, always communicate in a friendly, respectful manner. If you are overly familiar with your patients, they may think that you have a casual attitude about their care. Do not address adult patients by their first names unless they ask you to do so.

Military members, both active and retired, should be addressed by their titles and last names. Failure to show proper respect for military members, particularly those who outrank you, is a breach of military courtesy and discipline, and may get you into "hot water." Young adults and teenagers may be more cooperative if you address them in the same way you address adults. Children usually respond better if you address them by their first name or nickname. When dealing with children and infants, get the parents involved whenever possible. In your job, this will probably only apply to situations where you're assigned to pick up and transport a child or infant to surgery.

A high percentage of a patient's perception of quality healthcare comes from personal contact with members of the healthcare team. Remember, good communication is the key to improving this perception.

We have discussed several ways for you to establish good interpersonal relationships and to communicate with your coworkers and patients. If you think about these guidelines and the ethical standards we previously discussed, they are nothing more than good common courtesy and decency. By following the guidelines outlined in this text and treating people the way you would want to be treated, you should have few problems establishing and maintaining good relationships with your patients and coworkers.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

009. Standards of conduct related to patient care

1. Name two instances where respect for dignity is sometimes overlooked or treated with blatant disrespect in the operating room.
2. When you avoid stereotyping patients, which ethical standard are you following?
3. Who has the need-to-know about the care you provide for a patient?
4. What action should you take if a doctor asks you to do something that you are not adequately trained to do?
5. Define accountability.
6. What ethical standard are you violating when you publicly criticize a coworker?

010. Guidelines for developing good interpersonal relationships

1. Why is it important for you to maintain a neat, clean appearance at work?
2. Why is your behavior and attitude important in developing good patient relationships?
3. What are some "personal touches" you can use to help establish good rapport and allay surgical patients' fears?

4. What rule should you always follow when addressing nurses and doctors?
5. List three principles of communication.
6. List four things you should remember when listening to a speaker.
7. How should you address patients who are active duty or retired military members?

2-2. Medical Ethics

We briefly discussed ethical standards when we talked about standards of conduct for patient care, but the subject is so important that it warrants in-depth study. Think about your duties for a moment. You take care of sick and injured people, who are unable to take care of themselves, and are they forced to rely on you. These patients know little or nothing about your job. They base their opinion of the quality of care they receive on how they look and feel after surgery, and not on your specific duty performance.

Most patients expect to undergo strange and sometimes painful experiences during their hospital stay. Frequently, they have no idea they are receiving poor care until something goes wrong or they experience something totally unexpected. Good patient care results from good medical ethics. If your ethical standards are high, the quality of care you provide will also be high. If your standards are low, you become careless, take shortcuts, and generally provide substandard care.

In this section, we'll discuss the historical development of ethics and familiarize you with terms related to ethics. We'll also discuss ethical behavior applied to the operating room, especially the "surgical conscience."

011. Concept and origin of ethics

Ethics is a code of conduct that describes actions as being either right or wrong. The "Golden Rule" is frequently used as a basic ethical standard. To "treat others as you would have them treat you" has always been wise advice to follow. Ethics, however, is a bit more complicated than that. For instance, what do you do when your responsibility to the patient conflicts with your personal beliefs? Because of the complex nature of medical care, each of the medical professions developed a code of ethics to guide its behavior.

Historical background

The concept of ethics dates back to primitive times when humans adapted certain behaviors that allowed them to live in harmony with their fellow man. These behaviors were accepted by the group as "right" or "moral." The people who failed to follow this code of conduct were ostracized by the group. As the groups grew larger, the codes of conduct became more complex. It was from these original codes of behavior that civilization developed its practices, beliefs, and theories that make up our present-day ethical standards.

The medical professions went through the same basic developmental process. The members of the professions adopted practices that were acceptable to themselves and their patients. These practices and beliefs evolved into the standards that the medical profession follows today. These standards are

constantly changing. As medical technology and knowledge increases, practices and beliefs that are presently acceptable become unacceptable. The care of terminally ill patients is one example of the changes in medical ethics; in the 1970s, the accepted practice was to save lives at all costs. Today it is accepted practice to terminate life support measures when there is no hope of returning the patient to a meaningful existence.

Hippocratic Oath

Some of the ethical standards developed by the early members of the medical profession are still with us today. The medical profession in the 4th century BC first used the Hippocratic Oath. Many parts of this oath are as applicable now as they were then. One concept that came from the oath was that the physician should be accountable for his or her work. Another was that the physician should have a good moral character. A third concept that is of great significance to us is keeping the patient's problems and treatments confidential.

Florence Nightingale

Florence Nightingale is an *individual* who had significant influence on the development of medical ethics. She believed that nurses should devote themselves to their profession and never knowingly harm a patient. She also believed in keeping the patient's care confidential and doing everything possible to elevate the standards of the nursing profession. You can find these concepts in codes of conduct used by nurses and other medical professionals.

012. Terms related to ethical conduct

Along with changes in medical ethics came a change in the language used to describe ethical behavior. Since present codes of conduct are written in this language, you must become familiar with certain terms to understand the meaning of the codes.

Moral character

Moral character refers to the personality or character traits that an individual possesses; moral character is usually defined in terms of desirable traits. Some traits considered desirable in medical professions are temperance, courage, wisdom, fortitude, faith, hope, charity, industriousness, honesty, and compassion. If you were ever a Boy Scout or Girl Scout, you should see the similarity between these traits and those mentioned in the pledges and oaths of these two organizations. Before you scoff at this list of desirable traits, ask yourself if there are any traits listed here that you wouldn't want someone working on you to have. If you have difficulty thinking of yourself in terms of all of these adjectives, boil them down to simple terms. As long as your conduct is above reproach, you have the attributes listed.

Moral obligation

Moral obligation is an urge that compels you to behave in a certain way and is a result of moral character. To illustrate this, consider the act of performing a surgical hand and arm scrub. This procedure is one that you will do over and over several times each day. Without the trait of honesty, you might decide to cut the scrub time short so you can get an early start at setting up your sterile field. Generally, if you have a good moral character, your sense of moral obligation is also good and the resultant behavior will be ethically acceptable to your peers. There are a number of different moral obligations or duties that refer to specific ethical behavior. The following paragraphs discuss these obligations.

Fidelity

Fidelity is the act of keeping a promise. This promise may be clearly defined or implied. Regardless of its nature, it should be upheld. Patient confidentiality is an implied promise that represents fidelity.

Nonmaleficence

This means to refrain from harming yourself or others. Many of the tasks you perform routinely are capable of harming the patient. One of your primary duties is to avoid bringing harm to yourself, your patients, and your coworkers.

Beneficence

Beneficence is the act of bringing about good, or to act in the best interest of (as an advocate for) someone else. This should be easy for you, now that you're a member of the surgical team. The entire surgical profession is dedicated to acting in the patient's best interest through surgical treatment of their disease or injury.

Reparation

Reparation is the act of compensating or making amends for a wrong that has been previously committed. The wrong could have been an injustice, loss, or actual physical injury done to someone. The reparation varies with the degree of wrong that has been done. The reparation could range from a simple "I'm sorry" to legal restitution. An example of restitution applied to the medical profession occurs when a patient is awarded damages in a medical malpractice lawsuit.

Justice

Justice is the obligation to distribute benefits or burdens among persons or groups. In a medical context, this can refer to the distribution of medication or treatments among patients. Theoretically, care should be distributed equally among all patients; realistically, this is seldom possible. Medical resources are too limited to provide for everyone's needs. In addition, some patients may not be able to pay for the care they need.

This inability to satisfy the medical needs of all creates a conflict with another moral obligation we previously discussed, beneficence. Conflicts like this between different ethical standards are unavoidable, and there is no easy solution to resolve these conflicts when they do occur. There are many types of moral obligations. You will discover that it is as difficult to fulfill all these obligations, as it is to satisfy all members of a particular group.

Ethical behavior requires a delicate balance of judgment, maturity, acceptance, and understanding. Frustrations are frequent, but as long as you behave and perform your duties with high standards of conduct and to the best of your abilities, you fulfill your ethical obligations.

Moral responsibility

It's not enough to act ethically; you must also be willing to accept full responsibility for your actions. Accepting responsibility implies that you had a choice and that you voluntarily performed the duty. Also implied is that you had the necessary skills, knowledge, and authority to perform the duty in question. If you don't have them, then you can't be held responsible for the duty. Ethical responsibility hinges on two factors. First, you have the ability to perform the task, and second, you freely choose to perform the task. Moral responsibility is one of the traits that keep you from exceeding your scope of practice.

Moral policy

The concepts of moral character, behavior, duties, and responsibilities are at best confusing and contradictory. There are no absolutes when confronted with ethical conflicts. Each case must be weighed and judged on its own merits. Just as civil laws are subject to interpretation, so are moral laws and ethical practices. There are, however, moral policies that outline general areas of agreement regarding actions or the interpretation of moral situations. The need for moral policy arises when a group of people with different moral beliefs becomes involved in a moral conflict. The difficulty in formulating moral policy occurs when agreement between the fundamental moral beliefs of all parties involved cannot be resolved.

Moral policies can be made at the federal level, within individual healthcare facilities, or at the department level in a medical facility. If you look at the policies and procedural books or operating instructions in your duty section, you will probably find overtones of moral policy. The decision not to perform abortions (except in certain emergencies) in Air Force medical facilities is one example of a moral policy that you will most likely encounter. Instructions such as “do not resuscitate” orders on terminally ill patients are based on moral policies. In many cases, moral policy is formulated to relieve individuals of the responsibility of making difficult ethical decisions; the policy of the hospital is followed rather than the belief of the individual.

013. Surgical conscience

Up to now, we’ve discussed the subject of ethics as it relates to the medical profession in general. Now we make it more specific, and look at ethical behavior as it relates to you in your job as a surgical technician. No doubt, you’re already familiar with the term “surgical conscience,” but have you really thought about what it means and how it actually relates to your daily duties in the operating room?

Concept of surgical conscience

Surgical conscience is the application of ethical standards to surgical patient care. It means following proper procedures and doing what you know is right every minute of every day that you work in surgery. It means following standards of aseptic technique to the letter. It means promptly reporting incidents such as breaks in technique, medication errors, incorrect sponge, needle, and instrument counts. It means performing every duty and task to the best of your trained ability to ensure your patients receive the best possible care. Developing a sound surgical conscience is a matter of self-discipline and dedication to a high level of moral conduct.

Hopefully, the concept of a good surgical conscience was instilled in you in tech school. It is up to you to apply it to your daily duty performance. People who are new to the surgical environment often copy the example set by more experienced members of the surgical staff. If your surgical conscience is poor, your work will be poor and you are setting the worst possible example for a new technician. Have you ever seen someone drop a sterile, peel-packed item on the floor, then open that item and project it onto the sterile field? You should NEVER see this. Chances are a serious break in aseptic technique such as this would have been avoided if someone with a good surgical conscience had set a proper example for that person to follow. Surgical personnel who demonstrate a substandard surgical conscience put the safety and health of their patients and coworkers in serious jeopardy. There is no room in the operating room for people who lack self-discipline and have deficient moral characters. Think about it—would you want that dropped instrument used on you?

Factors that degrade surgical conscience

Many factors can degrade surgical conscience. Even the most conscientious, well-meaning members of the surgical team can become apathetic about their job and develop poor work habits. It is important for you to be constantly on guard for signs of deteriorating surgical conscience and take corrective action before the quality of patient care in your operating room declines. You must be alert for these signs in your coworkers and in yourself as well. Some of the factors that can destroy good surgical conscience are discussed below.

Apathy

Apathy is a widespread lack of interest or concern—an “I don’t care” or “whatever” attitude. Have you ever noticed the chain reaction that occurs in the operating room when one person starts “goofing off” and begins to take shortcuts when performing his or her duties? Soon, it seems as though everyone’s job is being approached with a more casual attitude. As a result, careless mistakes are made more frequently and the quality of patient care begins to suffer.

The spread of apathy is like a highly contagious disease. It strikes silently, spreads rapidly, and can be deadly. The “disease” becomes even more serious if it infects the senior people on the surgical staff.

New trainees in the surgical suite are often “fired-up” and ready to learn more about their jobs. When the more experienced specialists and technicians demonstrate a poor surgical conscience and apathetic attitude towards their jobs, the trainees’ “fires” are extinguished. They follow the lead provided by the senior people and become just as apathetic as they are.

You may have already heard someone say, “Forget all that stuff they taught you in tech school. We do things differently here.” Sound familiar? Comments like this serve only to confuse and discourage new surgical specialists. They may become uncertain of what the right way and wrong way to do things. Because they want to be accepted by their peers, they do as the experienced people do, even if it means adopting bad habits that they know are wrong.

Once someone has been bitten by the apathy “bug,” his or her surgical conscience begins to waste away. At this stage, people become defensive if you try to correct a break in aseptic technique or point out some other deficiency. They take the corrective effort as a personal criticism rather than an attempt to preserve the quality of care. The apathetic person may feel guilty when confronted with a careless mistake because he or she knows acceptable standards of ethical behavior have been violated. You may see these people trying to shift the blame for a mistake to someone else, or they may get into a personality clash with other surgical personnel. If this continues unabated, the whole concept of surgical teamwork is undermined.

This “disease” can be stopped, but only if supervisors take the lead and begin investigating the source of the problems. Surgical conscience can be preserved if all staff members take a good look at themselves and reassess their reasons for working in the operating room. Once they admit to themselves that they were wrong, re-apply the “Golden Rule,” and rededicate themselves to providing good patient care, the apathy “bug” is eradicated. The best way you can prevent apathy from infecting you is to resist the temptation to “follow the crowd.” Keep your personal standards high and do what you know is right. Keep that all-important surgical patient in mind, and you’ll keep your surgical conscience intact.

Surgical team relationships

You’ll probably notice, as time goes on, that there are some doctors and nurses that nearly everyone wants to work with. On the other hand, there are a few demanding surgeons or nurses who make your workdays miserable. You probably perform better when you work with the team members you like; this is human nature. But, you must constantly guard against letting your personal feelings towards certain coworkers adversely affect your duty performance. Just because you do not like someone on the surgical team does not mean that you are free from the ethical duty to provide the best patient care possible.

Personal problems

If you experience unresolved problems and turmoil in your off-duty life, they will eventually begin to have a negative effect on your work. You owe it to your patients to try to settle your problems before coming to work (we talked about this earlier when we talked about standards of conduct). If you don’t resolve these problems, you could make a serious mistake and may harm a patient.

Talk to a friend or supervisor. Take leave and relax. Whatever you do, do not put off dealing with personal problems; like weeds, unresolved problems grow bigger and more numerous over time. There are many referral agencies in the Air Force whose sole purpose is to help people with their problems. Take advantage of them. You are no good to your patients if you can’t concentrate on your duties.

Poor health

Obviously, if you do not feel well, you do not function at peak proficiency. There are many things that can make you feel ill, but the most common cause of illness in surgical personnel is stress. You work in a demanding, high-pressure environment. Your body’s response to this constant physical and emotional strain can lead to all types of ailments from stomach upset to “stress” headaches. Long duty

hours and frequent call duty can lead to chronic fatigue. Once you become rundown, your body's immune system slows, and you become subject to numerous problems and diseases.

If you feel sick or exhausted, let your NCOIC know. Medical care is essentially free-of-charge for active duty members; take advantage of it when needed. If you feel "stressed out," there are many ways you can learn to cope with the pressures of your job. Stress management classes, biofeedback, and stress counseling are usually readily available in most hospitals. Take advantage of them before the stress takes its toll on you.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

011. Concept and origin of ethics

1. Briefly describe ethics.
2. Name the three ethical concepts that came from the Hippocratic Oath.
3. What are two ethical concepts that Florence Nightingale advocated?

012. Terms related to ethical conduct

1. List some of the moral character traits considered desirable in medical professionals.
2. What is meant by the term moral obligation?
3. How does nonmaleficence differ from beneficence?
4. Name four elements that ethical behavior requires.
5. What two factors does moral responsibility hinge on?

013. Surgical conscience

1. Define surgical conscience.
2. What two qualities are needed to develop a sound surgical conscience?

3. If your surgical conscience is poor, how might this affect a new technician?
4. Name three factors that can degrade surgical conscience.

2-3. Legal Aspects of Perioperative Care

A subject closely paralleling ethics and patient rights is the law. It can be said that the law is an outgrowth of ethics. Ethics is a code of conduct developed by people that allows us to live together peacefully. The law consists of principles and guidelines established by a government to regulate people's lives. Ethics is an informal, moral statement of conduct enforced by peer pressure. The law is a formal statement of conduct enforced by a government.

As members of the Air Force, we are concerned with the law in two ways. First, as citizens of the United States, we are obligated to obey the laws established and enforced by local, state, and federal governments. Second, we are required to abide by the regulations established and enforced by the Department of Defense and the Air Force. In the armed forces, patient rights such as privacy and safety are equally protected by civil law and military regulations.

If you fail to maintain a prescribed standard of patient care or fail to perform your duties to the best of your abilities, you may be breaking the law. As a surgical specialist or technician, you work in a hazardous, high-risk, high-pressure environment. The opportunities for inadvertently violating patient rights and established law abound. Therefore, it is essential that you have a basic understanding of the law as it applies to surgical patient care. In this section, we'll introduce you to basic legal terminology and discuss your legal responsibilities as a surgical team member.

014. Legal terminology

The law has its own unique language. For you to understand the law and legal actions, you need to become familiar with certain terms. There is a multitude of terms commonly used in our legal system, but we restrict our discussion to those that most directly relate to the medical profession and your job.

Tort

A tort is an intentional or unintentional wrongful act committed against a person or property. A person who commits a tort is liable for damages in a civil action. In contrast, a crime is any wrongful act that violates established laws and is punishable by the state. In extreme cases, a wrong committed against a patient may be considered a crime that would be prosecuted in a criminal court. Most of the wrongful acts committed by medical personnel are torts rather than crimes. We'll now discuss some of the more common torts and give examples of how they could occur in a patient care setting.

Negligence and malpractice

Negligence is defined as the failure to do something that a reasonable individual with the same training and experience and in similar circumstances *would do*, or the performance of an act that a reasonable individual with the same training and experience in similar circumstances *would not do*. Malpractice is any improper, negligent act, or misconduct committed by a *professional* person. In medicine, a professional person is someone legally licensed to provide care and treatment, such as a doctor or nurse. Since you are not licensed to perform your medical duties, you are considered to be a *paraprofessional*. Medical malpractice is usually associated with negligent acts committed by physicians or other medical professionals and the paraprofessional personnel they supervise.

There are many ways negligence can occur in a patient care setting. In the operating room, certain areas have proven to be common sources of lawsuits. For example, if you transport a patient to

surgery and fail to pull up the side rails on the gurney, you have failed to exercise the care that a prudent surgical specialist would exercise in the same situation. Therefore, you would be considered negligent. You would also be negligent if you failed to position the ground pad of an electrosurgical unit properly on a patient and the patient was burned. You can avoid these types of errors by remaining alert, being conscientious, and always acting within the scope of your training. Remember your scope of practice, and never attempt to do anything that you are not fully qualified or legally allowed to do.

Assault

Assault is the act of threatening or attempting to touch a person without that person's consent. A patient's consent may be oral or written but, to be legal, it must be informed. Informed consent means that the *patient fully understands and agrees to the procedure*. A patient who is mentally disturbed, unconscious, or on certain medications is not considered capable of informed consent. In those situations, a relative or other legally responsible individual may consent for the patient. Written consent is desired and must always be obtained before a patient is administered anesthesia or undergoes surgery. Consent for some routine nursing procedures could be simply a verbal "OK" or even a nod of the head—again, for surgery, *it is written*.

If you *threaten to* hit or restrain a patient, you have committed assault. Assault in the patient care environment happens most often when medical personnel are trying to work with an uncooperative patient. Remember that a patient does have the right to refuse treatment. If you encounter a patient that refuses to undergo surgery, inform your OR supervisor or any available nurse so that he or she can discuss the consequences of refusal with the patient. Never carry out a threat to hit or physically restrain a patient.

Battery

Battery is the actual touching of a person without the person's consent. Two examples of battery are: (1) giving a patient a shot, or (2) performing surgery *without first obtaining proper consent*. Battery can also occur between medical professionals, such as between a doctor and technician. To avoid being accused of assault and/or battery, always explain procedures to the patients and ensure the patient consents to the treatment or care before you proceed. This protects you and the Air Force, reassures the patient, and improves patient-staff relationships.

Defamation

Defamation is making false statements about another person. If the statements are made in writing, it is called *libel*. When they are made *orally*, it is called *slander*. An example of a defamatory statement is if you tell a friend that one of your patients has herpes and it isn't true. Since this is an oral statement, you would be guilty of slander. Another example of a slanderous defamatory statement is if you verbally comment on a surgeon's competency in front of patients or in a public place. The best way to avoid being accused of defamation is to not gossip and to keep your thoughts to yourself unless you are officially ordered to make a statement.

False imprisonment

False imprisonment is unlawfully restraining another person. If you tie down a patient that you were threatening to restrain, you not only have committed assault and battery, but false imprisonment as well. There are times when patients have to be restrained against their will, but there must be a sound medical reason and a doctor's order is required.

Invasion of privacy

Unauthorized exposure of a patient's body or unauthorized release of information relating to the patient constitutes invasion of privacy. You are guilty of an invasion of privacy if you carelessly expose a patient during a procedure or gossip about a patient's surgery with your friends. If you show

respect for your patients and follow the guidelines we discussed in the section on ethics, you should have no problems with this or other torts.

Wills and dying declarations

A written will is a legal document that stipulates the wishes of a person on the occasion of his or her death. In certain states, oral (nuncupative) wills are legally recognized if death is imminent and a written will cannot be drafted. The individual who makes the will is called the *testator* and the person or persons who receive property or money from the will are called *beneficiaries*. A dying declaration is simply any statement a dying person makes before he or she dies.

Your chances of being present when a patient makes a dying declaration or oral will are very remote. Most of the patients you encounter in the operating room are either unconscious or semiconscious because of the anesthetic and preoperative medications they receive, and they are usually in no shape to make a coherent statement. However, if you are present when a dying patient attempts to make a dying declaration or an oral (nuncupative) will, you should do the following:

1. Take the statement seriously—do not ignore the patient.
2. Try to write the statement down immediately, before you forget it. It helps if you have another person present who can verify that the statement you wrote down is accurate. Record the statement exactly the way the patient made it.
3. Notify your supervisor and contact security forces as soon as possible if the statement relates to a crime.
4. If the statement is a will, make sure the next of kin are notified and given a copy of the statement. Also, make sure the patient does not make you a beneficiary in the will.
5. Contact your supervisor and the base legal office as soon as possible for further guidance and assistance.

015. Legal responsibilities

We've discussed some common legal terms, and related them to your job as a surgical technician. Now we'll look at lawsuits against the federal government and some of the legal liabilities and responsibilities you have as a surgical team member.

Lawsuits

There was a time when suing the federal government was unheard of. That is no longer the case. The Federal Tort Claims Act (FTCA) gives certain individuals the right to sue the government for the negligent acts of its employees. Civilians, dependents, and retired military personnel are entitled to sue. Active duty military members are *not* entitled to sue.

A lawsuit against the government is justified, if a federal employee commits an act of negligence while on duty and acting within the scope of his or her employment. In other words, if you are performing your duties as a surgical service specialist in an Air Force hospital, and you commit a negligent act, the Air Force can be sued. Some key procedural requirements for the suit are as follows:

1. If the claim cannot be settled administratively (out of court), then it is filed with the government.
2. The suit can be filed in a US federal district court.
3. If the judgment goes against the government, the United States pays the damages awarded.

What could you do that might result in a lawsuit against the federal government? Basically, any negligent act could result in a lawsuit. In our previous discussion of legal terms, two examples of

negligent acts were given. Some other common negligent acts that could occur in the operating room include:

- Improper identification of the patient and failure to confirm the exact area to be operated on.
- Lose items in a surgical wound due to improper counting procedures (e.g., lost sponge, needle, instrument, etc.)
- Improper identification and use of medications and solutions.
- Improper handling of oxygen tanks, valves, or supply lines that cause an explosion or fire those results in patient injury.
- Abandon patients, particularly pediatric patients and those under the influence of drugs.
- Fail to properly identify and preserve surgical specimens.
- Fail to obtain legal consent for surgery, anesthesia administration, or other procedures.
- Failure to inspect equipment properly for defects prior to use, resulting in equipment malfunction and injury to a patient.
- Fail to use proper aseptic technique, resulting in a postoperative wound infection or other complications.

This list is only a partial one, but you should get the idea. Every aspect of your job is under scrutiny. Failure to perform your duties in a proper manner may result in a lawsuit against the government.

There are some exceptions to the FTCA liability. The first includes injuries occurring in a foreign country. These injuries are covered by the Military Claims Act, which, unlike the FTCA, does not permit lawsuits. Two other exceptions to the FTCA are injuries resulting from intentional acts of misconduct and acts committed outside the scope of employment.

The fourth exception is the *Feres Doctrine*—*Feres v. United States* (US Supreme court, 1950). Under this doctrine, active duty military personnel may not sue for injuries received arising out of or incident to their military service. It also bars derivative claims of the family members of injured or killed active duty personnel. Injuries to active duty military personnel in military treatment facilities are considered incident to the service; therefore, Feres bars recovery under FTCA.

Liabilities

Although the government protects you from being sued directly, you do have certain liabilities (legal responsibilities) that you can be held accountable for. These responsibilities are outlined in your job description, as well as specified, and documented, as we mentioned earlier, in your STS. When you initial an item in your STS, you are stating that you are trained in that area; thereby, you become liable for tasks relating to that area. This goes back to the STS being your legal scope of practice for patient care. You should become thoroughly familiar with your duties and responsibilities as well as the limitations that are imposed on you. Some specific responsibilities and liabilities you incur as a surgical technician are as follows:

1. Ensuring patient safety at all times.
2. Acting within the limits of your training.
3. Ensuring (1) that personnel under your supervision are not assigned duties for which they have not been properly trained and (2) that they fully understand all assigned duties.
4. Ensuring personnel under your supervision follow all safety standards applicable to their duties.
5. Ensuring that patient privacy is protected at all times, to include using chaperones when necessary.
6. Ensuring that all documentation related to patient care and treatment is factual and accurate.

7. Notifying a doctor or nurse, immediately, if a patient's condition deteriorates for any reason.

Legal aspects of medical records

The most important evidence we have of the quality of medical care rendered are medical records. They must be accurate, complete, and legible. Medical records are owned by the agency that created the record. For example, medical records created by the Air Force belong to the Air Force. Patients however, have a privacy interest in the contents of their records. They also have the right to review and copy their records.

Medical records or contents in the records are released only to persons who have an official need to know. The records or contents of the records may also be released when the patient authorizes the release or the law authorizes or directs the release.

Even though medical records are considered hearsay, they are admissible in court under the *business records exception* to the Hearsay Rule providing certain requirements are met. The record must be one made in the regular course of business. It must also be made at or near the time of occurrence of the event documented. The records must be made by persons whose duty is to record such information and the normal procedure is to record such information. There are some basic rules, which must be followed, regarding record documentation and they are:

- it must be legible;
- it must be accurate;
- have a single line drawn through errors and annotated with initials, date, and time;
- a record of just the facts;
- to avoid put-downs/defamatory statements; and
- not to have any blank spaces.

The personnel reliability program

The personnel reliability program (PRP) applies to all people who work with nuclear weapons. The program is designed to help commanders and other officials certify that people who work with nuclear weapons can be relied on to do so safely. The program also provides for permanent or temporary decertification for people who may not be reliable, such as those on medication or physically incapable of performing their duties. Many surgical patients in the PRP program are temporarily decertified from these duties while they are receiving preoperative treatment and during the postoperative recovery.

Your primary role in this program is safeguarding the patient's medical records as a surgical technician. A PRP patient's records fall under the sensitive duties program record identifier, and require special handling. These records are clearly marked, usually with a big "PRP" stamp. When PRP patients are awake, they usually hand-carry their records; when in surgery, the records must be safeguarded. If you find a record marked "PRP" mixed in with the routine records, do not return it to the records department; give the record to your supervisor. Most medical facilities have specific policies for handling and disposing of PRP patients and their records.

Your basic legal responsibility is to use sound judgment in the care and management of patients at all times, specifically in the areas of surgical nursing procedures, patient supervision, recording and reporting patient and patient care information, and supervising personnel. Failure to meet any part of your responsibilities is negligence. If this negligence results in a lawsuit and the judgment is against the government, you may have to pay for the judgment. Although you may not be required to pay a large monetary damage settlement ("Uncle Sam" pays the big bills), you can be held accountable to the Air Force for any substandard patient care. You may only be reprimanded, but if you're found guilty of blatant negligence, you could be court-martialed for dereliction of duty and be sentenced to serve time in a federal prison.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

014. Legal terminology

1. Briefly explain a “tort”.
2. Define negligence.
3. How does assault differ from battery?
4. What is the term used to describe defamatory written statements?
5. What tort have you committed if you unnecessarily expose a patient during a surgical skin prep?
6. What is a nuncupative will?
7. What should you do if a dying patient makes a statement to you that pertains to a criminal act?

015. Legal responsibilities

1. What law prevents active duty military personnel from suing the federal government?
2. For a lawsuit against the federal government to be justified, what two conditions must be met?
3. List three negligent acts that could occur in surgery that could result in a lawsuit against the federal government.
4. Where are your liabilities as a surgical technician outlined?
5. Cite three consequences you could suffer for committing a negligent act.

Answers to Self-Test Questions

009

1. Making crude or inappropriate remarks about patients undergoing surgery and unnecessarily exposing a patient's body.
2. Individual care.
3. The people who are helping you provide that care.
4. Inform the doctor that you're unable to perform the task and if the doctor insists you do it anyway, inform your NCOIC or OR supervisor.
5. Being responsible for what you do or fail to do.
6. Loyalty.

010

1. To make a good, first impression with supervisors and patients.
2. Patients will feel that you are genuinely interested in their welfare.
3. Pause a moment to check on patients awaiting surgery and ask how they're doing; offer a warm blanket; and pick up and hold crying infants.
4. Address them by rank and last name and avoid using first names.
5. Any three of the following:
 - (1) Communication requires a sender, a message, and a receiver.
 - (2) Channels of communication are verbal, nonverbal, or written.
 - (3) The goal of communication is to obtain information, inform, explore problems, or release tension.
 - (4) The degree of effectiveness is determined by the setting and attitudes of those involved in the communication.
 - (5) Know what you are going to say and say what you mean.
6. Any four of the following:
 - (1) Look people in the eye.
 - (2) Concentrate on what is being said.
 - (3) Think of the feelings behind the words.
 - (4) Look for a hidden message.
 - (5) Do not interrupt people in the middle of a thought.
 - (6) Occasionally repeat what is being said.
 - (7) Ask questions if you do not understand the message.
 - (8) Be conscious of nonverbal signs.
7. By their titles and last names.

011

1. A code of conduct that describes actions as being either right or wrong.
2. Physicians should be accountable for their work; physicians should have a good moral character; and patients' problems and treatments should be kept confidential.
3. Nurses should never knowingly harm a patient and a patient's care should be kept confidential.

012

1. Temperance, courage, wisdom, fortitude, faith, hope, charity, industriousness, honesty, and compassion.
2. A feeling or urge that compels us to behave in a certain way.
3. Nonmaleficence means to refrain from harming yourself or others while beneficence is the act of bringing good or acting in someone else's best interest.
4. Judgment, maturity, acceptance, and understanding.
5. You have the ability to perform the task, and you freely choose to perform the task.

013

1. Applying ethical standards to surgical patient care.
2. Self-discipline and dedicating oneself to a high level of moral conduct.
3. You would set a bad example for the new technician and the person's surgical conscience might end up being substandard.
4. Any three of the following: apathy, surgical team relations, personal problems, and poor health.

014

1. An intentional or unintentional wrongful act committed against a person or property.
2. The failure to do something that a reasonable individual with the same training and experience in a similar circumstance would do or refrain from doing.
3. Assault is the act of threatening or attempting to touch a person without the person's consent and battery is actually touching of a person without consent.
4. Libel.
5. Invasion of privacy.
6. An oral will.
7. Notify your supervisor and security forces as soon as possible.

015

1. The FTCA.
2. A federal employee committed a negligent act while on duty and was acting in the scope of his or her employment.
3. List any three of the following:
 - (1) Improper identification of patient and fail to confirm operating location.
 - (2) Losing an item in a surgical wound.
 - (3) Improper identification and use of medications/solutions.
 - (4) Improper handling of oxygen tanks, valves, or supply lines causing an explosion or fire that results in patient injury.
 - (5) Abandon patients, particularly pediatric patients and those under the influence of drugs.
 - (6) Fail to properly identify and preserve surgical specimens.
 - (7) Fail to obtain legal consent for surgery, anesthesia administration, or other procedures.
 - (8) Fail to inspect equipment properly for defects prior to use, resulting in equipment malfunction and injury to a patient.
 - (9) Fail to use proper aseptic technique, resulting in a postoperative wound infection or other complication.
4. In the job description and STS.
5. You can be held accountable and have to pay for the judgment, and may be reprimanded, or even serve time in a federal prison if found guilty of dereliction of duty as a result of blatant negligence.

Complete the unit review questions before going to the next unit.

Unit Review Exercises

Note to Student: Consider all choices carefully, select the *best* answer to each question, and *circle* the corresponding letter.

15. (009) By law, who needs to know information regarding a patient's condition and treatment?
 - a. All hospital personnel who provide patient care.
 - b. Any doctor who is curious about the patient's condition.
 - c. Only personnel directly involved with that patient's care.
 - d. Only the patient's personal physician and close relatives.
16. (009) Which two ethical standards have been directly violated when a member of the surgical team unnecessarily exposes a patient's body?
 - a. Respecting human dignity and treating each patient as an individual.
 - b. Respecting human dignity and ensuring the patient's physical privacy.
 - c. Being accountable for personal actions and treating each patient as an individual.
 - d. Being accountable for personal actions and ensuring the patient's physical privacy.
17. (009) What is the *best* way to handle a coworker's mistake or substandard duty performance?
 - a. Avoid public criticism and try to talk to the person in private.
 - b. Overlook the discrepancy and encourage the person to do better next time.
 - c. Correct and rebuke the individual openly to prevent him or her from repeating the error.
 - d. Bring the discrepancy immediately to the attention of other team members and inform the noncommissioned officer in charge (NCOIC).
18. (010) You should *always* address other surgical team members by their rank and last name to
 - a. let the patient know who they are.
 - b. enhance your image of professionalism.
 - c. protect the privacy of surgical team members.
 - d. avoid a bad rating on your enlisted performance report.
19. (010) When is it appropriate to address nonmilitary adult patients by their first name?
 - a. Anytime you talk to them.
 - b. Only when they ask you to do so.
 - c. Anytime their relatives are present.
 - d. Only when you are alone with them.
20. (011) Which *basic* concept relating to ethical behavior is *not* found in the Hippocratic Oath?
 - a. Treat others as you would have them treat you.
 - b. A physician should have a good moral character.
 - c. A physician should be accountable for his or her work.
 - d. The patients' problems and treatment should be kept confidential.
21. (011) Which famous person had a *significant* impact on developing a code of conduct for the nursing profession?
 - a. Marie Curie.
 - b. Clara Barton.
 - c. Susan B. Anthony.
 - d. Florence Nightingale.

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22. (012) What is meant by the term “moral character” that you must practice daily?
- a. The obligation to keep a promise once made.
 - b. A personality or traits that are considered desirable.
 - c. The willingness to accept full responsibility for your actions.
 - d. A feeling or urge that compels people to behave in a certain way.
23. (012) What is meant by the term fidelity?
- a. Making amends.
 - b. Keeping a promise.
 - c. Bringing about good.
 - d. Accepting responsibility.
24. (012) Which term describes a person’s moral duty to refrain from harming himself/herself or others?
- a. Justice.
 - b. Reparation.
 - c. Beneficence.
 - d. Nonmaleficence.
25. (013) What does it mean to have apathy in surgical patient care?
- a. Deliberate wrongdoing.
 - b. Accidental wrongdoing.
 - c. Widespread lack of concern.
 - d. Shifting blame to another person.
26. (013) What is the *most* common cause of illness in surgical personnel?
- a. An infection caused by microbes from the patient’s wound.
 - b. By breathing residual anesthetic gases that escape into the air.
 - c. The body’s response to constant physical and emotional strain.
 - d. An exposure to toxic chemicals used to clean environmental surfaces.
27. (014) If a patient is injured because a 5-skill level surgical technician failed to raise the side rails on a gurney, the technician is guilty of
- a. libel.
 - b. assault.
 - c. battery.
 - d. negligence.
28. (014) What *tort* have you committed if you threaten or attempt to hit a patient?
- a. Libel.
 - b. Assault.
 - c. Battery.
 - d. Slander.
29. (014) What is the legal term used to describe false *oral* statements made about another person?
- a. Libel.
 - b. Gossip.
 - c. Slander.
 - d. Subpoena.

30. (015) Which law or legal doctrine gives certain people the right to sue the federal government for the negligent acts of its employees?
- a. The Feres Doctrine.
 - b. The Federal Tort Claims Act.
 - c. The Civil Rights Act of 1964.
 - d. The Soldiers and Sailors Relief Act.
31. (015) Your *specific* legal duty responsibilities and liabilities are documented in
- a. the specialty training standard.
 - b. the Code of Federal Regulations.
 - c. each enlisted performance report.
 - d. the 5-skill level career development course.
32. (015) Which type patients fall under the personnel reliability program?
- a. Cryptography personnel.
 - b. Security forces members.
 - c. Nuclear weapons personnel.
 - d. Office of Special Investigations (OSI) agents.

Unit 3. Patient Relations

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AS A SURGICAL technician, you contact and interact with patients every day. Many of the hospital patients are incapacitated to some degree. Pain, injury, drugs, fear, and disorientation all put patients at a disadvantage. Surgical patients are especially vulnerable—they place all physical control, much mental control, and even their life-sustaining functions in the hands of the surgical team. A patient under general anesthesia is completely helpless and relies on the members of the surgical team to act on their behalf.

3–1. Patient Advocacy

Webster defines an advocate as “a person who pleads the cause of another; a defender or intercessor,” so a basic definition of a patient advocate is *a person who defends, intercedes on behalf of, or pleads the cause of a patient*. There is a duty section in most medical facilities known as “Patient Advocacy.” This section is designed to handle all unresolved patient issues or complaints.

In a sense, all medical personnel should be patient advocates; the patient should be the center, or focus, of all our activities. A simple guiding principle to follow is “How would I want my healthcare providers to behave?” Professional conduct, as discussed in the last unit, is a vital part of patient advocacy, but is not enough. To be a true patient advocate, you must consider and treat each patient as an individual, one with rights and feelings.

016. Patients’ bill of rights and responsibilities

Ethics and good surgical conscience provide the moral guidelines for carrying out your duties as a surgical technician. You should see by now that it is not enough just to “do your job.” To be considered a professional member of the surgical team, you must always respect the patient’s human dignity along with the other ethical standards discussed. These standards are so important that not only have they been translated into various professional codes of conduct, but have led the American Hospital Association (AHA) to develop the original “bill of rights” for patients. This bill of rights has been revised, amended, added to, and otherwise modified over the years. The most widely used “rights” include the following:

- Reasonable access to care.
- Considerate care that respects the patient’s personal values and beliefs.
- Patient’s participate in making informed decisions regarding his or her care.
- Patient’s participation in the consideration of ethical issues that arise in the provision of his or her care, including resolution of conflict, withholding of resuscitative services, forgoing or withdrawal of life-sustaining treatment, and participation in investigational studies and/or clinical trials.

- Patient is entitled to personal privacy and confidentiality of information.
- Designate a representative decision maker in the event that the patient is incapable of understanding a proposed treatment or procedure or is unable to communicate his or her wishes regarding care.
- A method must be determined to informing the patient of these issues.

Not all the rights listed here are legal rights—that is, they are not enforceable under the law. However, all of these rights evolved from and fall under the ethical Codes of Conduct that all medical personnel should follow. Without these ethics and patients' rights, patient care is depersonalized and mechanical. Your patients become the victims of care rather than the object of care.

Patients' rights

These considerations are so important that they are described as the *rights* of each patient. All Department of Defense (DOD) medical treatment facilities (MTF) and dental treatment facilities (DTF) must post the DOD Instruction 6000.14, *DOD Patient Bill of Rights and Responsibilities in the Military Health System* (MHS) in highly visible areas within the facility. Let's look at what the patient bill of rights and responsibilities includes.

Quality medical and dental care

Each patient has the right to quality care and treatment consistent with available resources and generally accepted standards. The patient has the right also to refuse treatment to the extent permitted by law and government regulations, and to be informed of the consequences of his or her refusal.

Respectful treatment

All patients have the right to considerate and respectful care, with recognition of their personal dignity.

Privacy and confidentiality

As we discussed in an earlier unit, each patient has the right to privacy and confidentiality concerning their medical care, within law (HIPAA) and military regulations. It is important to note here that the military has made an exception to this right. Physicians and other healthcare providers have a duty to disclose a patient's UCMJ violation. In the ruling *US v. Medley* (1991), NCOs and officers who do not report drug use are derelict in duties. In another ruling, *US v. Heyward* (1986), military members have a duty to report the drug use of another service member.

Identity

Patients have the right to know, at all times, the identity, professional status, and professional credentials of healthcare personnel, as well as the name of the healthcare provider primarily responsible for their care.

Explanation of care

All patients have the right to an explanation concerning their diagnosis, treatment, procedures, and prognosis of illness in terms the patients can be expected to understand. When it is not medically advisable to give such information to a patient, the information should be provided to appropriate family members or, in their absence, another appropriate person.

Informed consent

Each patient has the right to be advised, using terms they understand, of information needed to make knowledgeable decisions on consent or refusal for treatments. Such information should include significant complications, risks, benefits, and alternative treatments available.

Research projects

Patients have the right to be advised if the facility proposes to engage in or perform research associated with their care or treatment. Patients have the right to refuse to participate in any research projects.

Safe environment

Patients have the right to care and treatment in a safe environment. They can expect that adequate safety precautions will be taken. For example, you must take steps to protect patients from injury to eyes or any part of the body, from swallowing or aspirating any objects in the mouth, or from damaging their clothing.

MTF or DTF rules and regulations

Patients have the right to be informed of the facilities' rules and regulations that relate to patient or visitor conduct. Patients should be informed about smoking rules and should expect compliance with those rules from other individuals. Patients are also entitled to information about the MTF and DTF mechanism for the initiating, reviewing, and resolving patient complaints.

Patients' responsibilities

Providing quality healthcare is a complex task that requires close cooperation between patients and health facility personnel. Patients can take responsibility for their care by helping the medical team give the best possible care. Let's look at the patients' responsibilities.

Providing information

Patients have the responsibility to provide, to the best of their knowledge, accurate and complete information about complaints, past illnesses, hospitalization, medications, and other matters relating to their health. Patients have the responsibility to let their primary healthcare provider know whether they understand the treatment and what is expected of them.

Respect and consideration

Patients are responsible for being considerate of the rights of other patients and MTF/DTF healthcare personnel and for assisting in the control of noise, smoking, and the number of visitors. Patients are responsible for being respectful of the property of other persons and of the facility.

Compliance with medical care

Patients are responsible for complying with the medical and dental treatment plan, including follow-up care, recommended by healthcare providers. This includes notifying the MTF and DTF when appointments cannot be kept.

Medical records

Patients are responsible for ensuring that medical records are promptly returned to the medical facility for appropriate filing and maintenance when patients transport records for the purpose of a medical appointment or consultation, and so forth. All medical records documenting care provided by any MTF or DTF are the property of the US government.

MTF/DTF rules and regulations

Patients are responsible for following the MTF and DTF rules and regulations affecting patient care and conduct. All patients should follow regulations regarding smoking.

Reporting patient complaints

Patients are responsible for helping the MTF and DTF commander provide the best possible care to all beneficiaries. Patients' recommendations, questions, or complaints should be reported to the patient contact or patient advocate representative.

017. Patient sensitivity

A basic definition of patient sensitivity is being aware of how your actions, words, and appearance may be perceived by a patient, and modifying these actions to ensure you do nothing to detract from the image of a competent and caring professional. Honoring and respecting the patient's rights is a good start at patient sensitivity; practicing the "Golden Rule"—do unto others as you want done to you—is another. Although your job is highly technical and does not always involve a great deal of contact with conscious, fully coherent patients, you still can positively or negatively affect a patient's hospital stay. If you notice the first few items in the patient's bill of rights, the terms quality, respectful, considerate, privacy, and confidentiality are key elements. These terms apply not only to your specific patients, but to all patients and *potential* patients.

The key to patient sensitivity is acting and living professionally at all times. You never know when a potential patient is watching you. Regardless of where you are, if you can be identified, or associated in any way with the medical facility you work in, you are presenting a public image of that facility, and can influence the way a patient thinks about that facility. The way a patient perceives the staff of a facility also affects how the patient perceives the care rendered at the facility. If a patient sees only professional, sharp, and competent appearing people, they generally have a positive image of the care they receive at the facility. If, however, even one individual violates the patient's standard of right and wrong, the patient's perception is negatively affected.

As most areas only have one Air Force medical facility in the immediate area, anytime you are in your uniform wearing your medical badge, you are presenting an image of the AFMS to the public. Even if not in uniform, if people overhear you talking about the Air Force, or using typical Air Force acronyms such as NCOIC, PCS (permanent change of station), TDY (temporary duty), or other terminology, they can conclude that you are in the Air Force. If those same people hear you talking about medical care or medical issues, they will probably also conclude you work in the Air Force hospital. If those people are beneficiaries, they are potential patients; if they hear you speaking negatively, or see you acting rudely or being inconsiderate, what image of your hospital are you projecting?

To give you an idea of how all-encompassing patient sensitivity is, consider the following three scenarios.

1. You are picking up a patient for surgery, and the medical service technician assigned to help you is someone you would really like to date. As you are verifying the identity of the patient and checking the chart, you are talking with the other technician about favorite places to "hang out." The patient has asked you two questions, but neither of you heard the questions.
2. You and another scrub technician are leaving work after a 16-hour day. You are in the elevator, and your co-worker says, "This is the third long, nonstop day in a row, if they don't give us a break soon, I'm gonna be sleeping during surgery!" *In the elevator behind you is a man who just learned that the results of some tests indicate he needs major surgery.*
3. A group of scrub technicians and nurses are attending a going-away dinner for a co-worker in a restaurant near the base. The conversation turns to "funny" incidents that happened in some of the procedures, and someone says loudly "Remember that beached whale gallbladder patient? I thought we were going to need two OR beds!" *An overweight diner sitting nearby had gallbladder surgery a few months previously.*

The first scenario is blatant. Neither you nor the medical service technician is doing your job. The other two scenarios are not so blatant. Sometimes we get caught-up in our own worlds and forget that what we say and how we act can frighten or hurt people—our potential patients.

Being "patient sensitive" at all times is not easy. If you strive to act professionally, develop and live by a personal code of morals and ethics, treat other people as you want to be treated, and behave as you want your healthcare team to behave; you will greatly reduce the likelihood of negatively impressing a patient, and will become a true "patient advocate."

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

016. Patients' bill of rights and responsibilities

1. What is a military exception to the patient's right to privacy and confidentiality?
2. Identify the specific patient right that has been violated in the following situations:
 - a. A1C Cindy Wright goes to pick up a patient from the orthopedic care unit. She fails to lock the wheels of the gurney before moving the patient from the bed to the gurney.
 - b. A patient is scheduled for an appendectomy. When you check the patient's chart and question the patient, you discover the consent form was not signed and the patient has no idea what the surgery involves.
 - c. A1C Wilson and SrA Jones are chatting with each other during lunch. During their conversation, they openly talk about a patient who just had a circumcision, mentioning the patient's name and discussing details of the operation.
 - d. During a preoperative interview with an OR nurse, a patient asks to know the names of the surgical team members who will be in the operating room during his surgery. The nurse refuses to divulge this information.
3. What responsibility has a patient failed when he or she (1) does not divulge a history of drug abuse; (2) is smoking in the lavatory; and (3) does not keep appointments on time?

017. Patient sensitivity

1. Briefly define patient sensitivity.
2. What is the key to patient sensitivity?

3-2. Patient's Needs

Surgery may have a profound psychological effect on a person, both preoperatively and postoperatively. Sometimes the mental problems caused by ill health, hospitalization, and surgical treatment are obvious and relatively easy to resolve. Other times, these problems are not so obvious

and may drastically alter a patient's behavior and physiological response to an operation. To effectively treat the patient's physical problems through surgical intervention, each patient must be treated as a whole being; not as a body part that needs fixing. This means that surgical personnel should always consider both the physiological and the psychological implications of all care and treatment they render to a patient.

It is very important that you understand the special needs, fears, and anxieties of your patients. When you can fully comprehend the mental stress and physical trauma they go through, you will be able to provide the kind of competent, compassionate care that every patient deserves and has a right to expect.

In this section, we discuss basic needs of the surgical patient, how nursing personnel determine what the needs are, and what actions the surgical staff can take to ensure their needs are satisfied. We also look at common patient fears, what we can do to lessen them, and the two types of patients with special needs and fears.

018. Recognizing the surgical patient's needs

All people have basic needs, which influence their behavior and must be satisfied for them to survive and remain healthy. When a person becomes ill or injured, the normal process of satisfying these needs is disrupted and the person is motivated to seek medical care to restore normal function and once again satisfy his or her needs. In fact, most decisions on the type of care a patient should be given are based on the doctor's and nursing staff's assessment of each patient's needs. Therefore, it is essential that all medical personnel involved with direct patient care understand human needs, their effects on behavior, and the relationship between medical care and need satisfaction.

Human needs can be categorized in several ways. For our purposes, we'll break them down into the following categories:

1. physical needs,
2. psychological needs, and
3. spiritual needs.

Physical needs

Physical needs are those that are necessary to sustain life and are sometimes referred to as physiological or survival needs. They include the need for food, water, oxygen, sleep, waste elimination, and control over bodily functions. These basic physical needs arise naturally within the body but must be satisfied outside the body. Although psychological needs, such as the need for love, recognition, and safety (discussed next) often seem to be prime motivators of human behavior, they always play a secondary role when a person's primary physical needs are not satisfied. A person who is starving or dying of thirst will disregard personal safety to satisfy the survival needs for food and water.

Patients who cannot satisfy their basic survival needs due to a disease process or injury usually seek medical care. They focus on whatever it takes to correct their problems so they are able to satisfy their basic physical needs and feel "whole" again. These patients may not be very concerned with how they interrelate to other people until their survival needs are taken care of. They are totally consumed by their instincts to survive. When this instinct to survive is coupled with the mental stress caused by a health problem, you can readily understand why some patients may behave in an irrational, even bizarre manner, during their hospitalization—particularly before surgery. After a patient is hospitalized, a great deal of care and treatment is directed at satisfying a patient's immediate physical needs. Various physical examinations and physiological tests are done to ascertain the status of the patient's vital body systems, then, medical treatment and nursing care plans are developed to correct the problems. If you think about it, most of the treatment and care provided by medical personnel throughout the hospital is directed at satisfying the patient's basic physical needs. However, even though satisfying a patient's physical needs is your first priority and involves most of your duties as a

surgical technician, you must never forget the importance of trying to understand and satisfy a patient's psychological needs.

Psychological/emotional needs

A patient's emotional well-being is extremely important to his or her recovery from a debilitating disease or injury. If psychological needs are not satisfied in conjunction with physical needs, no amount of basic medical/surgical care can restore the person to an optimum level of health. Patients who are mentally depressed do not respond well to any type of treatment, and consequently, present a higher surgical risk.

Psychological needs are those needs that arise from your life experiences. They are responsible for controlling the greater part of our behavior and are evident in a desire for nice clothing, fine automobiles, friendship, companionship, praise, prestige, and to excel. Psychologists categorize these needs in different ways. For our purposes, we classify them as safety needs, belonging needs, self-esteem needs, and self-actualization needs.

Safety (security)

People need to feel safe and secure. We want to feel safe from danger and pain, from competitors and criminals, from an unsure future or a changing present; and we want to be able to trust those people around us. A sick or injured person needs to feel protected, comforted, reassured, and cared about. This is important because accidents and illnesses tend to make people feel very vulnerable and insecure. Sick or injured people suddenly realize their own mortality and may feel very much alone as they realize that loved ones cannot protect them from illness, accidents, and even death.

Patients often look to medical professionals and nursing personnel for strength, advice, protection from harm, and companionship. If hospital personnel fail to recognize and attempt to satisfy a patient's need for security, several consequences may develop. Some hospitalized people develop a fear of being alone because of the strangers they are forced to live with, the treatments they have to endure by themselves, and having to submit to the orders of strangers who control virtually every aspect of their lives. Patients may also feel helpless and worried about their safety. They have heard or read stories about medical malpractice, and may believe that hospitalization, or medical treatment in general, does more harm than good. They may also wonder if the people caring for them actually know what they are doing and fear being the victims of a careless act.

Hospitalized patients also may feel abandoned by their friends and families, especially if no one calls or comes to visit them. In this instance, nursing personnel play a vital role in filling the security void created by the absence of the patient's close relatives and friends. On the other hand, some patients have few friends and only feel secure while they are in the hospital among the caring medical and nursing staffs. They fear being discharged before they are ready, or may look upon the nurses, doctors, and technicians as the only friends and family they have.

Belonging

We all need to feel needed, to be a part of a social unit or family. To do this we get married, join clubs, throw parties, and even pray together. Belonging needs include the need to love and feel loved; the desire to share intimate life experiences with others in a reciprocal relationship. Belonging needs also include the need to establish stable, accepted relationships with other people as a functioning member of a group. This includes all the formal and informal groups of people with whom we work, live, and play.

The central theme in both types of belonging needs is that we all want to be liked, accepted, and wanted by others. For the patients, this need translates into the need to receive empathetic understanding and to have someone respond to expressions of their innermost feelings, whether they be positive or negative. Hospitalized people have many doubts and fears relating to their need to belong and to be accepted. For example, the patient who is about to undergo disfiguring surgery, such as an amputation, may have serious doubts about being able to fit back into normal society as a

disabled person. The patient may feel that their peer group, friends, and even family will no longer accept them because he or she will no longer be “normal.”

Sickness or injury requiring hospitalization means separation from loved ones and close friends. Prolonged separation can lead to a patient’s becoming extremely depressed, a condition which can adversely affect the outcome of the patient’s care and treatment. That is why you often see efforts being made to include family members in basic nursing care plans.

Patients want to be treated as individuals and feel very uncomfortable when medical personnel approach them in an impersonal, seemingly uncaring manner. The way a person is handled, made physically comfortable, and communicated with during hospitalization has a definite impact on satisfying the person’s needs of belonging and providing for a positive psychological approach to wellness.

Self-esteem

We all need to feel worthy and respected. This is the need implied when we talk about our dignity, self-respect, honor, or feeling of self-worth. When a person’s need for love and belonging are satisfied, his or her needs for self-esteem also have been met. Persons who receive love, concern, and respect generally feel good about themselves; they will have a positive outlook on life. Conversely, persons who feel that they are disliked, that they are being constantly judged, and that others are not considering their needs and feelings, often have low self-esteem.

Persons who are ill or injured may have a lowered sense of self-worth. They may feel they are of little value not only to themselves, but also to others around them. These people may come to view themselves as a burden on society or as social outcasts who remind “normal” people about the more unpleasant aspects of life. As a result, their will to live or to get well may significantly decrease. They may just give up, feeling that it would be better to die than to live with a disability or chronic disease. Cancer patients, amputees, and patients with crippling spinal cord injuries are among the types of patients who commonly experience low self-esteem as a result of their disability or disease.

Self-esteem suffers a critical blow in the hospital setting when a patient is unnecessarily exposed or examined. In our society, we are not used to being unclothed or intimately touched by strangers. A person facing hospitalization and medical treatment knows that his or her personal privacy will be invaded and, as a result, his or her self-esteem may be adversely affected. Careless exposure of a patient or a failure to address the patient with respect can result in severe humiliation and embarrassment; consequently, a lessening of the patient’s feeling of self-worth.

Self-actualization

Self-actualization refers to a person’s desire for self-fulfillment. In other words, it means the tendency for people to strive to reach their full potential, to develop their abilities fully, and to express their personalities.

When people are ill, it is sometimes hard for them to be themselves instead of what they think other people want them to be. Hospitalized patients are dependent on the hospital staff for care and are unwilling, in most cases, to complain about their care for fear of displeasing them. They may feel obligated to act the way they think the staff wants them to act, rather than the way they would normally act. Long-term patients with chronic health problems are probably less likely to complain about their care than other types of patients because of their ongoing dependency on the nursing staff.

An illness or injury may interfere with a person’s ability to develop and use his or her talents. The loss of one of the senses, an amputation, or paralysis, can temporarily or permanently, affect a person’s drive for self-fulfillment. Elderly patients confined to long-term care facilities may also experience difficulty in meeting self-actualization needs due to a permanent loss of personal ability or lack of opportunity to develop their talents.

People who are hospitalized for long periods and suffer through severe injuries or disease often become more introspective and come to understand themselves better. In this sense, a patient's need for self-actualization may actually benefit from misfortune.

Spiritual needs

AFI 36–2618, *The Enlisted Force Structure*, defines spiritual readiness as “those personal qualities needed to help a person through times of stress, hardship, and tragedy.” Spiritual readiness may or may not include religious activities. Many people believe in a Supreme Being, or God, whose guidance influences life. This belief can be a powerful force in helping a patient withstand the ravages of a disease or injury, as well as the rigors of long-term hospitalization. On the other hand, those who are uncertain about the existence of a Supreme Being, or are uncomfortable with their relationship with God, may feel increased anxiety as the time of their surgery or major medical treatment draws near.

Religious faith can be a patient's foundation for hope, and provide the framework for maintaining a positive, optimistic outlook. The hospital chaplain or the patient's own spiritual adviser can help comfort the patient and provide him or her with the warmth, strength, courage, and support that will help him or her through difficult times. The religious adviser helps fulfill a basic need for the patient by using familiar symbols from the patient's spiritual experience.

There are also patients who do not believe in God or any Supreme Being. These patients are to be treated with the same dignity and respect as everyone else regardless of how you believe. They too have “spiritual needs,” these needs just may not be what those who believe in God or a Supreme Being recognize as such. Every effort should be made by all hospital personnel to accommodate a patient's request for spiritual guidance.

As a Surgical Technician, you need to understand that religious values can many times conflict with medicine. This can often lead to both ethical and legal problems for the patient and health care provider. A patient that is not allowed to receive a blood transfusion because of religious beliefs would be a perfect example of conflict between religion and medicine. With the dramatic increase in multicultural population growth in the United States, you may come into contact with issues like this at your MTF.

019. Assessing and documenting the surgical patient's needs

To ensure that all surgical patients are given the best possible care during the preoperative, operative, and immediate postoperative phases of their hospital experience, a comprehensive plan of nursing care tailored to satisfy each individual patient's needs must be developed. This perioperative nursing care plan serves as a “tool” for surgical nursing personnel, and is designed to identify and satisfy each patient's needs.

Perioperative nursing care plan

In accordance with the standards of practice established for operating room nursing by the Association of Operating Room Nurses (AORN), the Joint Commission (JC), and other national organizations, a plan of care should be developed for all patients who will undergo surgery.

Purpose

The primary purpose of the perioperative nursing care plan is to establish goals for surgical nursing care, which will become the guide for specific nursing actions. The goal of the developed actions is to meet the individual patient's particular needs immediately before, during, and after surgery. The plan should reflect preoperative assessment, priorities for nursing action, and a logical sequence of nursing activities to attain the goals. The plan is developed with, and explained to, the individual, significant others, and healthcare personnel as appropriate. The plan reflects consideration of the individual's rights and desires.

Developing the plan

The nursing care plan is based on the operating room nurse's overall evaluation of the patient, which is based on specific information or data. To collect this data, the nurse will thoroughly review the patient's medical record to include the following:

- A review of current diagnosis and methods of treatment.
- The patient's physical status, special physical needs, and physiological responses (derived from reviewing the history and physical examination reports).
- The results of diagnostic tests, determined by reviewing all available laboratory reports.

Another common method of data collection is the preoperative patient interview; an operating room nurse usually conducts it the day before surgery. During this interview, the nurse tries to evaluate the patient's physical status and particular needs by asking specific questions. The nurse also validates, or confirms, any pertinent information appearing in the doctor's history and physical report.

The nurse asks the patient about his or her cultural background and religious preferences (spiritual needs). Surgical personnel, and whether or not the person desires to speak to a spiritual adviser before or after the operation, do this to determine if there may be a language barrier or belief pattern that may affect the type of care rendered. The nurse also evaluates the patient's physical condition and special needs by direct observation and asking a series of questions. The nurse checks for breaks in the patient's skin, restrictions to the normal range-of-motion of the extremities, and the presence of any physical handicaps. The nurse asks about vision and hearing impairments, allergies to medications, tape, or soaps, and any problems encountered as the result of previous surgery or anesthesia. The nurse also checks for the presence of any existing tubes, drains, special monitoring or infusion lines, and prosthetic devices.

Through questioning, the nurse tries to determine how the patient feels about her or his upcoming surgery. This psychological evaluation includes asking questions about the patient's fears and anxieties, as well as how he or she is coping with preoperative stress. At this time, the nurse also has the opportunity to ensure the patient understands the surgery and the nursing care that is required. The nurse also answers any questions the patient may have that are within his or her technical ability to answer (all other questions will be referred to the surgeon). The nurse also conducts preoperative teaching. This preoperative teaching includes instructions on what is expected of the patient, and an explanation of what the patient can expect prior to, during, and after the surgery is finished. The nurse may tell the people about members of the surgical team, and outline some of the respective roles and responsibilities of each.

Many times, the nurse will ask the patient's immediate family or close friends to be present during this interview. By doing this, the nurse can help establish a better rapport with the patient, dispel some of the apprehensions and fears the family members may have, and achieve a better understanding of the patient's lifestyle. By questioning both the patient and members of his or her family, the nurse can gain valuable insight into their attitudes and daily habits relating to health, nutrition, and healthcare, which may alter nursing care planning. Information extracted from these interviews may also give the nurse an idea of what to expect during the patient's post-operative recovery.

In essence, what the nurse does during the preoperative interview is to gather information about the patient through a combination of objective data sources (the patient's chart) and subjective data sources (direct observation and questioning). The nurse then records this information and develops the perioperative care plan designed specifically for that particular patient.

Documenting the plan

To standardize perioperative nursing care documentation, the AF Form 1864, Perioperative Nursing Record, was developed. During the preoperative interview, the operating room nurse initiates a nursing care plan and begins documenting it on the AF Form 1864. The form has specific sections for

documenting information obtained during the preoperative assessment, for recording preoperative instructions, and for documenting postoperative instructions given to the patient. There is also space provided for the nurse to outline the intraoperative nursing care plan developed from the preoperative assessment.

The AF Form 1864 is used as a checklist of items to be accomplished when the patient is admitted to the surgical suite. The form is also used to record specific nursing care given, and various other significant events that occur during the preoperative, intraoperative, and postoperative periods. The AF Form 1864 is not only used to document the nursing care plan, but also serves as a record of the entire operative procedure.

After the nurse documents his or her findings and develops the care plan, the form is maintained in the surgical suite for all members of the surgical team to use as a reference when preparing for the upcoming surgery. The information on the form is also used as the basis for discussing nursing care strategies during the staff meetings—or “report”—many operating rooms conduct daily before the first patients arrive for surgery.

When the patient arrives in the surgical suite, the nurse (or technician, if permitted) responsible for admitting the patients completes all admission checklist items, then places the perioperative nursing record in the patient’s chart. The circulating nurse then reviews the patient’s chart and the perioperative nursing care record before surgery, and fills out the intraoperative record while the procedure is in progress.

Up to this point, we’ve concentrated on the operating room nurse’s role in assessing and documenting surgical patient needs. As a surgical technician, you also have an important role in the patient assessment process.

Surgical technician’s role

Although it is primarily the responsibility of the operating room nurse to conduct the preoperative interview and patient needs assessment, you can play a vital role by carefully studying the information the nurse documents on the perioperative nursing record. You should also get in the habit of reviewing the patient’s chart prior to scrubbing-in on a procedure and before assisting the nurse as a circulator. In this way, you not only become more familiar with the chart and the documentation it contains, but you also get a better understanding of your patient’s problems and special needs. This, in turn, can help you anticipate any specific needs of the surgeon and sterile team to ensure your patient’s operation is efficient and safe.

You play a more direct role in assessing the patient’s needs when you are assigned to transport patients to the surgical suite and when performing preoperative activities, such as starting intravenous lines. During these periods, observe your patients directly and talk with them. You should make a mental note of, and also report, anything you think is odd or out of the ordinary, especially if something does not correlate with the information you see recorded in the patient’s chart. For example, if you are picking up a patient and notice that he or she seems extremely apprehensive or agitated despite the preoperative sedative, you should report this to the ward nurse, or call your operating room supervisor. The patient may be upset enough to warrant delaying or canceling the surgery; excessive anxiety can influence not only behavior, but also vital body functions. If the patient’s chart lists no allergies, but a rash develops after you use a povidone-iodine swab on his or her wrist, immediately report it; the patient may be allergic to iodine but not know it. If you are removing hair from an incision site and you notice skin eruptions or lesions that are not noted on the perioperative nursing record, report it.

The surgeon may decide to cancel the surgery for fear of increasing the patient’s risk of getting a postoperative infection. These are just a few examples of how you can play a key role in patient assessment. You may not be trained to diagnose the patient’s problems, but you can surely use your powers of observation and common sense to alert the nurses and doctors if a potential problem exists.

Occasionally, a patient may tell you something significant that he or she failed to mention during the preoperative interview. If this happens, never ignore or disregard what the patient says. If the information sounds important in any way, tell your operating supervisor or another nurse. Let them decide if the information affects the plan of care they have developed. As you gain more experience and knowledge, the nursing staff may allow you to become more actively involved in determining what plan of action is best suited for satisfying a certain patient's needs.

020. Meeting the patient's needs

When a person becomes ill or is injured and requires medical or surgical treatment to restore health, the first needs, which must be satisfied, are the basic physical or survival needs. After the survival needs have been attended to, nursing personnel can address the patient's higher-level needs, those of safety, belonging, self-esteem, and self-actualization. The operating room nurse's plan of care will prioritize a patient's needs and outline a course of action to meet those needs. Before the patient comes to the operating room, many of the basic physical needs will have been satisfied by the medical treatment and nursing care provided preoperatively. The surgical team's role is to assess the patient's physical needs in the context of surgery and to meet basic physiological needs during the course of the operation.

To continue to provide "food" and water, the anesthetist (or other staff member) will start an intravenous line to administer such fluids as dextrose in water or lactated Ringer's. Patients are not allowed to eat, as this increases the risk that they may vomit and aspirate gastric contents into their airways, but we can make sure that patients in surgery have the basic fluid and electrolyte balances to ensure survival.

We make sure the patient can breathe properly and that he or she receives the proper amounts of oxygen during the operation and while recovering from anesthesia. This is accomplished by inserting various airways and endotracheal tubes and by providing respiratory assistance by way of mechanical or manual ventilating devices. Although anesthesia personnel primarily are responsible for maintaining the patient's airway and oxygen supply, you may find yourself involved, particularly if you work in the recovery room or become involved in resuscitative efforts when a patient goes into cardiorespiratory arrest.

Also, we can assist the patient with waste elimination and controlling bodily functions by ensuring that a preoperative enema is given or by inserting a urinary drainage catheter prior to surgery. Patients are protected from feeling pain by us giving them anesthesia and postoperative pain-relieving medications that will also allow them the opportunity to sleep so their bodies can heal faster.

We can ensure the patients' comfort and warmth by keeping them covered as much as possible, giving them a warm blanket, using warm irrigating solutions inside the body, turning up the room temperature, and utilizing special warming devices. Once we have satisfied their basic needs, we can attempt to satisfy their psychological needs.

Most of the surgical team's efforts at satisfying the patient's higher-level (psychological) needs will come during the immediate preoperative period. However, when a patient is operated on under local or spinal anesthesia and remains conscious throughout the procedure, you must be very careful about what you say, how you say it, and how you act. A slip of the tongue or overly casual attitude could be misinterpreted by a patient easily and could significantly affect his or her attitude and perception about the operation and the surgical team.

To meet a patient's need for security and safety, you should always follow all safety guidelines precisely. If you act as if you know what you are doing, talk in a kind, reassuring, confident manner, and treat the patient with great respect, you'll have gone a long way towards meeting the patient's need for safety, belonging, and self-esteem. By allowing patients to become involved in the decision-making process regarding their treatment and care, by allowing them to express their feelings, and by answering all their questions about their care and treatment, you allow them to retain their feeling of

self-worth and personal identity. Respecting a patient's personal and physical privacy saves the patient from becoming embarrassed and humiliated in front of strangers and it helps satisfy his or her need for self-esteem. These concepts should not be new to you because they are common sense rules of good interpersonal relations. As we mentioned before, if you treat all your patients as you would want them to treat you, you'll have done your best to meet your patients' needs.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

018. Recognizing the surgical patient's needs

1. Name three categories of human needs.
2. What are physical needs?
3. Identify six physical needs.
4. What category of needs is most patient care and treatment directed at satisfying?
5. Where do psychological needs come from, and what are they responsible for?
6. List four classifications of psychological needs.
7. Why do patients look to medical personnel to satisfy their need for security and what happens if those needs are not recognized?
8. Specify two needs originating from a person's need to belong.
9. How can the separation from family and friends affect the hospitalized patient?
10. Describe the need for self-esteem.
11. Describe what could happen if patients have a lowered sense of self-worth.

12. Identify two actions that might occur in a hospital setting where a patient's self-esteem may suffer critically.
13. Describe the human need for self-actualization.
14. How may an injury or illness affect a patient's need for self-actualization?
15. How can a hospital chaplain or spiritual adviser help a patient satisfy their spiritual needs?

019. Assessing and documenting the surgical patient's needs

1. What "tool" used by surgical nursing personnel is designed to identify and satisfy each patient's needs?
2. What is the main purpose of the perioperative nursing care plan?
3. Name two sources of data the operating room nurse uses in developing the perioperative nursing care plan.
4. Identify three purposes of the nurse's preoperative patient interview.
5. During preoperative interviews, a nurse will ask questions to evaluate patients psychologically. What does this questioning include?
6. List three benefits derived from having a patient's family present during a preoperative interview.
7. What form is used in Air Force medical facilities to document perioperative-nursing care?
8. Where is the perioperative nursing record maintained after the surgical nurse documents the patient assessment and nursing care plan?

9. Describe how the surgical specialist or technician can play a role in assessing the surgical patient's needs.

020. Meeting the patient's needs

1. What are the first types of needs that must be satisfied when a person becomes ill or is injured?
2. What is the surgical team's role in satisfying a patient's physical needs?
3. How is the patient's need for food and water satisfied during surgery?
4. List three ways the surgical team can satisfy the patient's need to stay warm.
5. When will most of the surgical team's efforts at satisfying a patient's higher-level or psychological needs occur?
6. How can surgical team members ensure that a patient's needs for self-esteem and personal identity are satisfied?

3-3. Patient Fears and Anxiety

Undergoing surgery can be a very traumatic experience, one that evokes a great deal of anxiety and outright fear. Because fear and anxiety influences the body in numerous ways, you must not only know what common fears surgical patients have, but also how they affect the patient, and what you can do to alleviate some of their fears.

021. Common surgical patients' fears, their effects, and how to reduce them

Just as each patient is different, so is the patient's emotional response to hospitalization and operative procedures. Regardless of how brave and unconcerned a patient may seem, the patient will still be filled with anxiety and a certain amount of fear. Fears are more easily detected in some individuals than in others. One person may openly express fear while another may attempt to suppress it. Some people may even react with open hostility or irrational behavior. It is very important for you to recognize these reactions as normal for people under stress.

Patient fears

Fear is real, but not everyone fears the same things. Surgical patients; however, have fears that are not encountered in day-to-day living. To help alleviate their fears, you must first understand what they are.

Fear of the unknown

Most of us either fear, or have feared, the unknown. This is probably the most common fear of all surgical patients and stems from the patient's ignorance or misunderstanding of surgical procedures and anesthesia. Anyone who is unfamiliar with standard hospital and surgical routines will feel somewhat apprehensive about the procedures that are necessary during the course of hospitalization. The patient may wonder how long the surgery will take, thinking that longer procedures indicate more serious problems, although this may not necessarily be true. A patient scheduled for an exploratory operation, or a biopsy, will definitely experience anxiety, which could easily develop into extreme fear, particularly if they don't fully understand the implications of the findings, or if his or her questions about the surgery are not properly answered. Patients undergoing surgery and anesthesia for the first time may fear how they will react. They may fear that they will lose control and act in an irrational manner while they are being anesthetized; thereby, embarrassing themselves.

Hospitalized people are subjected to a completely different daily routine than they are used to, and may develop a great deal of anxiety about even the simplest of procedures. For example, the taking of vital signs every four hours on the patient care unit is a common practice; for nursing personnel, it is part of their daily routine. But, for the patient who is awakened, whose privacy is intruded upon, and who must endure the recurrent probing and touching, this common routine can become at least irritating, and may even evoke a great deal of anxiety or fear.

Fear of death, disability, or disfigurement

In some instances, this fear is a very valid one. For example, a patient who is about to undergo major heart surgery has probably been told that there is a high degree of risk involved, and the patient may have a great fear of dying while in the operating room. Even though many cancers are treatable, the term "cancer" immediately brings the fear of death, disability, or disfigurement to many patients. For example, women who have a breast lump not only may fear dying from cancer, but may also have a fear of being rejected because they think they will no longer be attractive or a "whole woman" after a mastectomy. A patient who has a herniated spinal disc that requires surgery may fear that he or she will be paralyzed permanently if something goes awry during the surgery.

There is an element of risk involved with any surgical procedure or administration of anesthesia, so the patient's fears and anxieties are real and are valid; they must be considered when dealing with the patient. One very important point you need to remember about a patient's fear of death: ***If you ever hear a patient express thoughts of dying, or the patient fears death is inevitable during hospitalization or a surgical procedure, report it immediately to a licensed practitioner.*** Even if the remark is directed towards a family member, another patient, or another hospital staff member, ensure one of the patient's care providers is aware of the stated fear of dying. People who believe they are going to die during hospitalization may do just that, they may literally will themselves to die. We'll discuss the death and dying process more in-depth in the next section.

Besides dying, a fear closely related to the fear of dying is the fear of disfigurement or disability. The patient may worry about the impact that his or her hospitalization and surgery will have on his or her family. Will "normal" life resume after the surgery? Can I return to work? Will the scars make me a "freak" to other people? These questions can plague a surgical patient and evoke great anxiety and fear.

A long-term hospitalization is not only hard on the patient, but on the patient's family as well. The lengthy separation from loved ones that the patient and his or her family are accustomed to having present can cause the patient a great deal of worry. The patient also may be extremely worried about how the hospital bills are going to be paid. As you well know, medical and surgical care is not cheap, and a long stay in the hospital can quickly deplete a family's financial resources. Along with these fears and anxieties, the patient may worry about how the family will continue in his or her absence. This is particularly true for anyone who is the sole "bread winner" or the head of a household.

A patient may also have a false idea about the severity of her or his condition and may fear that death or disability is imminent when, in reality, the problem is minor.

Fear of poor prognosis

Closely related to the fear of death, disability, and disfigurement is the fear of poor prognosis. A prognosis is the doctor's prediction of the outcome of a disease or treatment. For a patient who has been told by a doctor that he or she has a suspicious tumor, all sorts of emotions are evoked. Although the chances are often very good that medical/surgical treatment will eradicate the problem, the patient may be extremely afraid of having the surgery for fear of what the doctor may find. All too often people will put off going to see a doctor, even when they know they have a problem, which requires immediate attention, just because they fear what the doctor will discover more than they fear what will happen to them if they do not seek treatment.

The fear of poor prognosis can be exaggerated if the patient misunderstands what medical personnel say or if he or she overhears a conversation and takes things out of context. For instance, take the case of a patient who thinks he or she may have cancer and goes to a doctor for an examination and diagnostic tests. The doctor examines the patient, and then steps out of the office to consult with another doctor about the results of the examination. The examining physician tells the consultant that the tumor is probably benign, but the patient overhears their conversation and only hears the word "tumor," which means a malignancy to the patient.

Fear of pain

This is probably one of the biggest concerns of all surgical patients, particularly those who will be operated on under local or spinal anesthesia and knows that they will be conscious during the procedure. In fact, many patients fear pain more than they fear the operation itself. Pain can be created and exaggerated by fear alone. Pain created by fear can be just as real to the patient as actual physical pain. Regardless of the origin, pain tires a person out and reduces the body's defense mechanisms.

Everyone has a different pain threshold. Some people can endure severe pain for long periods without so much as a grimace, while others will wince and cry at the slightest needle prick. No matter what a person's pain threshold is, the person should never be lied to about experiencing pain. The patient who is well informed and has an optimistic attitude will most likely react better to pain than the uninformed, pessimistic person. Patients who express a fear of pain should be assured that medications are readily available to relieve their discomfort.

Fear of anesthesia

A fear closely related to the fear of pain is the fear of anesthesia. A patient may fear awakening during the surgery and suddenly experiencing severe and uncontrollable pain. The patient imagines the terror of awakening and seeing himself or herself cut open, bleeding, and people handling body parts. A patient who is about to undergo general anesthesia is particularly susceptible to this fear because that person realizes that he or she is totally dependent upon the surgical team for survival. If the patient does not trust the members of the surgical staff, this fear will be significantly greater.

Some patients may fear the loss of consciousness associated with general anesthesia for fear that they may never "wake up." Their fear may be so great that it can affect the amount of anesthesia required to put them under and, once they are under, can dramatically affect their physiological responses to anesthesia and the surgery.

Fear of loss of privacy

This fear can manifest itself for two reasons. First, patients fear what people will think when they see their most private body areas. Surgical patients know their bodies will be exposed, they may have to be assisted with bodily functions, and that complete strangers will intimately touch them. Young children, adolescents, and elderly patients are particularly self-conscious about body exposure. This

fear goes hand-in-hand with the patient's need to retain self-esteem. Unnecessary exposure or examination of patients can lead to a loss of self-esteem and to the build-up of great anxiety and fear.

A second reason the patient may fear loss of privacy has to do with fears about having to divulge private information about self and family to strangers. This occurs each time a doctor, nurse, or other practitioner takes a history. Closely related is the fear of divulging "deep, dark" secrets while under the influence of drugs and anesthesia.

Effects of patient fears

If a patient's fears are not alleviated in some manner, they can cause many psychological, emotional, and physical problems, which can affect the patient's response to treatment. One of the most common results of fear is increased anxiety (tension) and stress.

Increased anxiety and stress

Anxiety is a persistent feeling of uneasiness or uncertainty that comes from anticipation of real or imagined threats. When a person becomes anxious, his or her body responds by initiating the stress response, the so-called "flight or fight" reaction. The physiological changes that can occur include rapid pulse and palpitations of the heart, faster breathing, increased perspiration, dilated pupils, dry mouth, clammy skin, and even paralysis. The symptoms of an acute anxiety attack somewhat resemble the body's response to shock. Additional indications that a person is extremely anxious or under stress include stuttering, confusion, memory lapses, distorted perceptions of events, an alteration of time perception, and involuntary twitching of muscles.

Highly anxious patients may be extremely hyperactive and dwell on the risks relating to surgery and anesthesia. They may be so preoccupied that they do not hear what you say and will not calm down despite your best efforts to reassure them. They may be moody, overly talkative, and tense, and may even act angry. The highly anxious patient is a poor surgical risk.

These individuals have more difficult anesthetic inductions, are more likely to have fluctuations of their vital signs during surgery, and will have an increase in postoperative pain and discomfort. They may become combative upon arousal in the recovery room, and they are more prone to laryngospasm, shock, and cardiac arrest. Unresolved anxieties can be very dangerous to the surgical patient, so it is important for you to be able to recognize the signs and symptoms of the overly anxious patient. Always contact a nurse or doctor immediately if a patient you are caring for exhibits the symptoms we just discussed.

Extreme fear

Fear is one-step beyond anxiety. It is caused by anticipating danger. A person who is afraid exhibits the same basic signs and symptoms as the highly anxious person. The individual also may experience elevations in blood pressure, more frequent urination, recurring headaches, gastrointestinal upset, and uncontrolled trembling. Patients who are truly terrified may instantaneously become hysterical or exhibit other extremes of behavior. As indicated previously, a patient who has a great fear of dying should be taken very seriously. Always remember, the brain has a powerful influence over the vital body functions.

What can you, as a surgical team member, do to help lessen the fears and anxieties of your patients? Plenty, as you'll see next.

Reducing patient fears

There are many ways you can reduce your patients' fears. Projecting a positive and professional image is one way—remember patient sensitivity? Many of these actions are the same ones we discussed for satisfying patient needs.

Keep patients informed

Always tell the patient who you are, what you are going to do, and why you are doing it. Always use layman's (simple) terms when talking about procedures, and never ignore the patient's questions. One word of caution—*Refer any technical questions the patient has about the specific disease, illness, or other condition to the surgeon.* Never “play doctor.” You are not one, and even though you may be very knowledgeable about a particular procedure, you must never explain the details of surgery. It is too easy for the patient to consider you the authority, and take your word that the scar will be small, the surgery not extensive, or other such comment. The surgeon is the one who knows more about what to expect and what the results will be; if something you say actually contradicts what the surgeon has told the patient, you will probably increase the patient's anxiety or fear.

Treat patients with respect

Always treat your patients exactly as you would want to be treated. Make sure you respect the patient's right to physical privacy by avoiding unnecessary exposure of his or her body, and respect personal privacy by not being “nosy.” Never ignore the patient, and respect the patient's right to refuse treatment. For example, if a male patient refuses to allow a female technician to pick him up for surgery (or a female not allow a male), do not argue with him (her); honor the patient's wish and report it to the unit nurse, the NCOIC, or your supervisor. Also, respect the patient's right to expect that his or her safety will be guarded; pay attention to what you are doing and follow all safety guidelines outlined by local policies. Always be courteous, and address patients by their names and titles unless they specifically tell you to address them otherwise. Just like active duty patients, retired members of the armed forces should be addressed by their rank and last name.

Look and act professionally

As discussed under patient sensitivity, the image you present reflects on your hospital and duty section. One of the best ways to dispel patient fears and establish trust is to look and act “sharp.” Exhibit a self-confident attitude (without being arrogant) when performing direct patient care duties. Be precise and efficient when performing a task. Don't be sloppy, and don't waste time. Maintain the highest standards of personal hygiene, and wear your uniform proudly. To what type of individual would you entrust your care—a disrespectful, smelly, sloppy person, or someone who is courteous, clean, and well groomed?

022. Death and dying

A very critically ill patient is rushed into your operating room for emergency surgery. The patient's chances of surviving the operation are very slim. During the procedure, the patient dies. Are you emotionally prepared to handle this type of situation? Could you assist the circulating nurse in preparing the body for transport to the morgue? Could you face the patient's family if they request to see the body before it is taken to the morgue? These are some very important questions that, hopefully, you will never have to ask yourself.

Attitudes about death

In our culture, death is a subject that is forbidden or unmentionable. Regardless of one's religious beliefs, the thought of death is frightening to most people, especially if one is in very good health. Some people develop a defense mechanism of “it is not going to happen to me.” Others simply refuse to acknowledge or talk about their feelings on death. In earlier years, people often died in their homes; this made the experience of death more common, and people learned at a young age how to deal with it. Today, however, most people die in a nursing home or hospital, making death a strange and foreign experience. Many of you may experience death for the first time during your tenure as a surgical technician.

You are committed to helping patients simply because you work in a medical environment. When a patient dies on the operating room table, it is very easy to feel that you have failed in some way, or that maybe you were not quick enough in your actions to assist the surgeon during the operation. It is

very important that you realize that you are not at fault. Even in this day of modern medical technology, doctors cannot overcome the ultimate process of death. Although you will probably not encounter many terminally ill patients in the operating room environment, it is still important that you understand the physiological stages that occur in the dying process.

Physiological stages in the dying process

According to various psychological studies, a person facing death will go through five emotional stages: denial, anger, bargaining, depression, and acceptance. These stages may not occur in sequence. The stages may overlap or appear to be mixed. The patient may seem to go back and forth emotionally through the different stages.

Denial is the first stage of dying. Denial allows hope to exist. When a person is informed that he or she is going to die, shock and disbelief set in. The person may request a second or third opinion from other doctors, change doctors, or demand more tests hoping to prove the doctor made a mistake in the diagnosis.

Sometimes the patient has accepted the fact that death is inevitable, but the family remains in denial. This, in turn, delays the patient from expressing concerns. The period of denial usually is short-lived because the person begins to worry about unfinished business—for example, personal matters such as what will happen to the family and how will the family manage financially.

The second stage of dying is *anger*. During this stage, the patient begins to feel rage, resentment, and envy. The patient will say things like “Why not someone else? Why me?” This stage is very hard on the family because the patient is subject to outbursts of anger, which may be directed at family members at any time. Also, nothing seems to please the patient during this stage. It is necessary for the patient to express this anger and sense of helplessness to move along to the next stage, bargaining.

Bargaining is the third stage of dying. During this stage, the patient hopes that death can be delayed or postponed, or the person may wish for a few days without physical discomfort or pain. Bargaining usually involves making some type of deal with the doctor, nurse, or God. Examples of bargaining are: “If I can live long enough to see my daughter graduate from college, I’ll be ready to die” or “If I can live a little while longer, I will dedicate my life to God.”

The fourth stage of dying is *depression*. During this stage, the patient realizes that death is certain. Defense mechanisms no longer work and anguish and sadness occur. The patient may cry a lot, which brings support from the family. After the patient gets over the depression, he or she quietly goes into the final stage—acceptance.

Acceptance occurs when the patient no longer feels angry or depressed about the situation. The patient often wants to be left alone, may take naps more frequently, and usually prefers more nonverbal than verbal support from family members. The patient begins to prepare for the “final” journey during this stage. It has been compared to getting plenty of rest before you take a big trip.

Death will probably be the most difficult thing you will have to deal with during your lifetime. Hopefully, most of your encounters in the operating room will be good ones.

023. Caring for pediatric and geriatric patients

There are several categories of people who require special surgical care. Pediatric and geriatric patients are two of the largest categories of patients you’ll encounter with special needs.

Pediatric patients

Pediatric patients are not just small adults. Their bodies respond differently to stress and trauma, and they look at the world around them with a “different eye” than the adult patient. Infants, children, and adolescents have not yet mentally matured, so their needs and fears are going to be quite a bit different from those of the adult patient. It is very important that all members of the surgical team be aware of these differences and knows how to adjust plans of care to fit their young patients.

Common fears

For pediatric patients used to the nurturing, loving atmosphere of the home and family, *physical separation from loved ones* invokes the greatest fear. When children are admitted to the hospital and the parents have to leave them alone among strangers for the first time, they may feel an overwhelming sense of abandonment. They have no idea why mommy and daddy left them there, and they may interpret this action as some kind of punishment for something they've done wrong. Because these children feel very much alone, operating room personnel should make a special attempt to stay close by them at all times. In addition, children should be reassured constantly that they will see their parents as soon as the operation is over.

Another fear that is common among children is the *fear of pain*. The fear of pain that is found in many adults has its roots in childhood experiences, so it is crucial that nursing personnel caring for these impressionable young people take extra care when performing procedures that may cause a child to feel pain. For example, children will remember a painful shot for years to come, so you must adequately prepare them for the experience.

Young people, like adults may have a *fear of anesthesia*. They may not like the idea of someone "putting them to sleep," and they may fight like tigers during induction if they're not adequately prepared. Children may associate the term "sleep" with very emotional experiences in their lives. This is especially true if a pet animal was taken away from them and "put to sleep," or if they've ever been told that a dead relative is "just sleeping." The sights and sounds that are typical in an operating room may terrify children, and they may become scared when the anesthetist puts the cardiac electrodes on or attempts to put the mask over their face. Proper preoperative preparation by surgical and anesthesia personnel can turn a potentially terrifying situation into a fun adventure.

Another common fear in children is a *fear of injury or bodily invasion*. Words like blood, cut, knife, and scissors should be avoided because they will conjure up images of violence the child may have seen on TV or in a comic book. Children will also become scared when a stranger tries to take their clothes off. This is because parents constantly tell their children not to let strangers touch them or look at their "private parts." For this reason, children are usually allowed to wear pajamas until they are anesthetized.

Ways to reduce a child's fears

Just like adults, children need a great deal of mental preparation prior to surgery. This preparation should begin as soon as mom and dad find out their child needs an operation. This usually happens in the doctor's office, so the mental preparation of the child should start there. The doctor and the clinic staff will play a vital role in starting not only the child out on a positive note, but the worried parents as well. The whole idea is to get the child "psyched-up" for the experience. This preoperative preparation should continue at home, with the whole family getting involved. If the child knows everyone cares and the pending surgery is presented in a positive manner, the groundwork will be laid for an uneventful, positive hospital experience.

Once the youngster is admitted to the hospital, the nursing staff must pick up where the family left off. To begin, the nursing staff on the pediatric unit will encourage the parents to bring in some of the child's favorite toys or a familiar object. They will also allow the children to wear their "PJs" from home. If you've noticed, many hospitals will allow the pediatric nurses to decorate the ward brightly and to wear clothes that are more like civilian clothes. All these measures are designed to make the child feel at home and put him or her at ease.

Surgery personnel also play a vital role in continuing this preparation. Following is a list of some of the actions you can take when dealing with your pediatric patients to lessen their fears and anxieties:

- When transporting a child to surgery, you should allow the child to take a favorite toy to surgery in the crib or bed. Obviously, you must use some common sense and not allow the child to have a toy that may be potentially hazardous (no Tonka trucks, please!).

- Unlike adult patients, children should be allowed to wear their own pajamas to surgery. You can imagine how the child may react if you, a total stranger, insisted upon trying to remove his or her clothes! Besides, mom and dad are usually nearby and would not take very kindly to your upsetting their little one.

NOTE: It wouldn't be a very good way to instill trust in either the parents or the child.

- Before you go into an elevator, let the child know what to expect. Going up or down in an elevator flat on your back gives the stomach a little tickle, very similar to the sensation a child would feel when swinging high on a swing set. Tell him or her to expect the "tickle" and make a game out of it. When the child sees that you told the truth, you've done more than you can imagine to contribute to the child's care, and you've also given a favorable impression of "medics."
- Many times the transport technician can ask the parents to accompany the child as far as the entry to the surgical suite, and the recovery room staff can allow the parents into the recovery room so that the parents will be there when the child awakens. This way, physical separation of the child from parents is minimized, and the child will be less likely to become upset (and so will the parents!).
- When communicating with a child, always tell the truth. For example, never tell the child that a potentially painful procedure will not hurt. If you tell the child that and the child feels pain, the child will automatically distrust you and every other medical person. Tell the child to expect some pain, but that it won't be too bad. Try to relate the pain to something that is in the child's experience.

For example, if the child is getting an intravenous line started, ask if he or she has ever been stung by a bee or bitten by a mosquito. Most likely, the answer is, "Yes." Then you could say, for example, that the "shot" won't hurt as much as a bee sting and that it will be over in a second.

- Keep children occupied while someone is performing a procedure so that they can't concentrate on what's going on. If you do a good job of distracting them, they won't even know that the procedure was done. In this case, what they don't know (or can't see), won't hurt them!
- Don't allow children to cry uncontrollably in their cribs or beds. Pick them up and cuddle them. Pretend that you are their big brother or sister. If you do this, you'll be amazed at how the children settle down. Children who don't appear upset can be occupied until they're put to sleep by making a balloon out of a glove and drawing happy faces on them. Many times just talking to them in reassuring tones will keep them from becoming agitated. Above all, never leave a premedicated child (or adult) alone!
- To prepare children for the strange sights and sounds in the operating room, many hospitals conduct preoperative tours for the children and their parents. During this time, the children will be allowed to put on one of our "funny" hats and a surgical mask. They will also see many "creatures" walking around in funny colored pajamas and masks and will learn that these creatures are just friendly people. They'll also be introduced to "Mr. Light." The nurse conducting the preoperative tour may tell the children to look at the mirror in the OR light and make a game out of seeing the funny images that are reflected by the concave dish.

Having done this, children will not be scared when they're put on the operating bed and look up at the light. Even in operating rooms that don't conduct tours, the OR nurse who conducts the preoperative interview the day before surgery will usually make a special effort to tell the children about the sights and sounds they'll experience. The nurse may give the child a surgical hat and mask to take back to the pediatric unit to play with. Just like adult patients, the child who is informed will be less likely to be anxious or afraid.

- Anesthesia personnel are often masters at putting children at ease. During their preoperative interviews, they will let the children play with a mask and will stick electrocardiogram (ECG) electrodes on the children to get them used to what they will be experiencing in the operating room. They may even hook the child up to a monitor to watch his or her heartbeat on “TV.” They’ll find out who the child’s favorite cartoon or storybook character is and will tell the child a story, one in which the child is one of the characters (the hero, of course!). The story will have a happy ending the next day when the child wakes up in the recovery room. Since most of the children you’ll be operating on are Air Force dependents, the anesthetist will often tell the children (especially boys) that they will be jet pilots and will get to wear a mask and breathe the same “special air” the pilots breathe. Some anesthetists keep a variety of fruity smelling oils on hand so that they can put some on the inside of the mask to cover the nasty smell of rubber and the anesthetic gases they use.

The whole idea behind the actions we’ve just described is to take the mystery out of having surgery while, at the same time, establishing a good rapport with both the children and their parents. A child who has been psychologically prepared using some of the techniques just described should not have the traumatic memories that so many people have about childhood hospitalizations and operations.

Geriatric patients

Another special type of patient who requires a lot of “tender loving care” (TLC) is the elderly or geriatric patient. In the past, major surgery on elderly people often was not done because the risks were considered too high. Today, it is commonplace to see retirement age people undergoing major surgery. In fact, probably a large proportion of the surgery you will be involved with will be on elderly patients. This is especially true if you’re stationed at an Air Force hospital, which is near a community with a large military retiree population. For this reason, it is important that you be aware of some of the special needs, which must be considered when developing surgical nursing care plans for the aged.

Older patients tend to have chronic illnesses and deteriorated physiological functions that require special planning on the part of the entire surgical team. These patients may have heart and lung problems, impaired kidney function, gastrointestinal deficiencies, and bleeding problems, which may require extra supplies, drugs, and equipment for their surgery. They may also have sensory problems such as impaired vision and hearing that makes it more difficult to communicate with them before, during, and after surgery. In some cases, people with a serious hearing loss may be allowed to wear a hearing aid to the operating room so that they can hear and understand the directions of the surgical team. Elderly patients may also have a decreased ability to sense temperature changes and, as a result, may become chilled without even being aware of it. It is, therefore, the surgical team’s responsibility to take extra steps to ensure these patients are kept warm. Extra warm blankets may be needed, or the surgeon may request that a special hypo/hyperthermia blanket be placed on the operating bed.

Elderly patients often have dentures or partial plates that they are extremely embarrassed about removing. If a patient insists on keeping his or her “teeth” in during transport to the OR, this can usually be allowed and the dentures can be removed just prior to administering anesthesia. This is a small consideration for the surgical staff, but it may mean a great deal to the patient. Much like the pediatric patient, older people like to have familiar things around them for security. If they wish to bring a favored item to the surgical suite, this will usually be allowed.

Due to their diminished bodily functions, it may be necessary to take extra precautions when moving or positioning older patients. A sudden change in position could cause a drastic lowering of their blood pressure. Therefore, all movements must be done slowly and carefully. Elderly patients tend to bruise very easily, and their joints are much stiffer than those of a younger patient. As a result, modifications may have to be made in the positioning their extremities. Extra care must be taken to pad all bony areas from contacting hard surfaces, not only during the surgical procedure, but in the recovery room as well.

Respiratory reflexes, such as coughing, may not be adequate to dislodge mucous or foreign substances from their airways, so special attention must be directed at keeping their airways clear during the postoperative period. Because their responses are slow, you should not attempt to rush these patients. Be patient and don't give too many directions at once; otherwise they may become confused.

To protect their sometimes-fragile sense of self-worth, allow geriatric patients to do as much for themselves as they can. If you try to do too much for them, they may resent it and become hostile or depressed. As with any other patient, the elderly patient should be treated with respect and his or her privacy should always be guarded. You should always introduce yourself to older patients each time you see them because they very well may forget your name as fast as they learn it. Since elderly patients may have problems understanding you and remembering what you told them to do, you should repeat what you say until they understand it. Be patient and put up with their idiosyncrasies.

Many older people were brought up during a time when good manners were expected and young folks always respected their elders. If you want to get the maximum amount of cooperation from these patients, you'll need to be on your absolute best behavior. Whenever you are involved with caring for an elderly patient, just remember that someday you'll be old and will want to have people around you who really care about you, respect you, and understand your problems and special needs.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

021. Common surgical patients' fears, their effects, and how to reduce them

1. List five common fears of the surgical patient.
2. What causes a surgical patient to fear the unknown?
3. What type of fear is common in patients who have cancer?
4. What action should you take if a patient tells you he or she is afraid of dying during surgery?
5. What does "fear of poor prognosis" mean?
6. What type of surgical patients may be particularly affected by a fear of pain?
7. Why is a patient who will be administered a general anesthetic more susceptible to a fear of anesthesia?

8. Identify specific fears a patient may have relating to a fear of losing privacy.
9. What is anxiety?
10. Identify eight physiological changes that may occur in a patient that is anxious and highly stressed.
11. What may happen if a highly anxious patient is operated on?
12. Name three ways patients' fears can be reduced.

022. Death and dying

1. List the five emotional stages that a person facing death will go through.
2. During which stage does the patient realize that death is inevitable?
3. Briefly describe the acceptance stage.

023. Caring for pediatric and geriatric patients

1. What causes the greatest fear in pediatric patients?
2. Identify two ways you may reduce a child's fear of injury or bodily invasion.
3. When should a child's psychological preparation for surgery begin? Where does this preparation begin?
4. Identify six measures surgery personnel can take to lessen the fears and anxieties of pediatric patients.

5. List five physiological problems encountered in geriatric patients, which require special consideration by the surgical team.
6. Why must extra precautions be taken when positioning or moving elderly patients?
7. What is the reason for directing special attention to maintaining a geriatric patient's airway during the postoperative period?
8. What is one way you can protect elderly patients' sense of self-worth?

Answers to Self-Test Questions

016

1. Physicians and other healthcare providers have a duty to disclose a patient's UCMJ violation.
2.
 - a. Safe environment.
 - b. Explanation of care and informed consent.
 - c. Privacy and confidentiality.
 - d. Identity.
3.
 - (1) Providing information,
 - (2) respect and consideration, and
 - (3) compliance with medical care.

017

1. Being aware of how your actions, words, and appearance may be perceived by a patient, and modifying these actions to ensure you don't detract from the image of a competent and caring professional.
2. Acting and living professionally at all times.

018

1. Physical, psychological, and spiritual.
2. Those that are necessary to sustain life.
3. Food, water, oxygen, sleep, waste elimination, and control over body functions.
4. Physical needs.
5. They arise from life experiences and are responsible for controlling the greater part of human behavior.
6. Safety, belonging, self-esteem, and self-actualization.
7. For strength, advice, protection, and companionship and if the needs are not acknowledged, they may develop fears of being alone and submitting to strangers to control their lives.
8. The need to love and be loved and the need to establish stable, accepted relationships with other people as a functioning member of a group.
9. If the hospitalization is lengthy, the patient may become depressed, which can adversely affect the outcome of the patient's care and treatment.
10. We all need to feel worthy and respected. It is the need implied when we talk about dignity, self-respect, honor, and self-worth.

11. They may feel they are of little value to themselves and others. As a result, their will to live and to get well may decrease.
12. Unnecessary exposure or examination.
13. A person's desire for self-fulfillment or the tendency for people to strive to reach their full potential, to develop their abilities, and express their personalities.
14. It may interfere with the patient's ability and opportunity to develop and use personal talents.
15. By comforting the patient and providing warmth, strength, courage, and support to get through difficult times.

019

1. A comprehensive plan of nursing care (perioperative nursing care plan).
2. To establish goals for surgical nursing care, which will become the guide for specific nursing actions developed to meet individual patient needs.
3. Any two of the following:
 - (1) a review of the patient's diagnosis and treatment;
 - (2) physical and physiological needs and responses;
 - (3) the results of diagnostic tests and laboratory reports; and
 - (4) the preoperative interview.
4.
 - (1) Evaluate the patient's physical status;
 - (2) evaluate the patient's need;
 - (3) validate information in the history and physical reports.
5. Questions regarding fears and anxieties, how they are coping with preoperative stress, and what their understanding of the operation and nursing care routine is.
6.
 - (1) The nurse can establish a better rapport with the patient;
 - (2) dispel some of the family's fears and apprehensions; and
 - (3) to achieve a better understanding of the patient's lifestyle.
7. AF Form 1864.
8. In the surgical suite.
9. By studying the patient's nurse documents and perioperative nursing record and patient's chart to become more familiar with the patient's problems and special needs. This will help the specialist or technician anticipate any needs of the surgeon and sterile team. During direct contact with the patient, you should observe and communicate with the patient and report any unusual physical or emotional occurrences to a nurse or doctor, as well as passing along new information obtained from the patient.

020

1. Physical or survival needs.
2. To prioritize the operating room nurse's plan of care by assessing the patient's physical needs in the context of surgery and to meet basic physiological needs during the course of the operation.
3. By administering intravenous solutions, such as dextrose in water and lactated Ringer's.
4. By any three of the following:
 - (1) providing a warm blanket;
 - (2) using warm irrigating solutions inside the patient's body;
 - (3) turning the temperature up in the operating room; and
 - (4) utilizing special warming devices.
5. During the immediate preoperative period.
6.
 - (1) By allowing a patient to become involved in decision-making processes regarding treatment and care;
 - (2) by allowing them to express their feelings;
 - (3) by answering all their questions; and
 - (4) by respecting their personal and physical privacy.

021

1. (1) Fear of the unknown.
(2) Fear of death, disability, or disfigurement.
(3) Fear of poor prognosis.
(4) Fear of pain.
(5) Fear of anesthesia.
(6) Fear of loss of privacy.
2. An ignorance or misunderstanding of surgical procedures and anesthesia.
3. Death, disability, or disfigurement.
4. Immediately report the incident to a licensed practitioner.
5. A fear of the outcome of a disease or treatment.
6. Patients who will be operated on under local or spinal anesthesia and know they will be conscious during surgery.
7. They realize they will be totally dependent on the surgical team for their survival.
8. (1) Fear of body exposure;
(2) fear of having to be assisted with body functions;
(3) fear of being intimately touched by strangers;
(4) fear of divulging private information about themselves or their family to strangers during interviews; and
(5) fear of divulging personal “secrets” while under anesthesia.
9. A persistent feeling of uneasiness or uncertainty that comes from anticipation of real or imagined threats.
10. Any eight of the following:
 - (1) Rapid pulse and heart palpitations.
 - (2) Faster breathing.
 - (3) Increased perspiration.
 - (4) Dilated pupils.
 - (5) Dry mouth.
 - (6) Clammy skin.
 - (7) Paralysis.
 - (8) Stuttering.
 - (9) Confusion.
 - (10) Memory lapses.
 - (11) Distorted perception of time and events.
 - (12) Involuntary twitching of muscles.
11. (1) The person may have a difficult anesthesia induction,
(2) vital signs may fluctuate during the surgical procedure,
(3) may experience an increase in postoperative pain and discomfort, and become combative upon arousal.
(4) Finally, the person is more prone to laryngospasm, shock, and cardiac arrest.
12. (1) Keep patients informed,
(2) treat patients with respect,
(3) look and act professionally.

022

1. (1) Denial,
(2) anger,
(3) bargaining,

- (4) depression, and
- (5) acceptance.
- 2. Depression.
- 3. (1) The patient no longer feels angry or depressed about the situation;
- (2) often wants to be left alone;
- (3) may take naps more frequently; and
- (4) usually prefers more nonverbal than verbal support from family members. This is when the patient begins to prepare for the “final” journey.

023

- 1. Physical separation from loved ones.
- 2. By avoiding words like blood, cut, knife, and scissors, which can conjure up images of violence; and allowing the child to wear his or her pajamas until anesthetized.
- 3. As soon as the parents find out their child requires surgery. In the doctor’s office.
- 4. Any six of the following:
 - (1) Allow children to take a favorite toy to surgery.
 - (2) Allow them to wear their own pajamas to surgery until they are anesthetized.
 - (3) Tell children about the physical sensation they’ll feel when going up and down in an elevator.
 - (4) Ask the parents to accompany the child to the surgical suite and allow them into the recovery room.
 - (5) Always tell the truth to a child.
 - (6) Keep children distracted during certain procedures so that they won’t be aware of what is happening.
 - (7) Don’t allow children to cry uncontrollably—comfort them when scared.
 - (8) Conduct a preoperative patient orientation so that the children won’t be scared by the strange sights and sounds in the operating room.
 - (9) Anesthesia personnel will show the children common anesthesia supplies and let them play with them. They’ll also tell stories and make the child believe surgery is an adventure with a happy ending.
- 5. Any five of the following:
 - (1) Heart and lung problems.
 - (2) Impaired kidney function.
 - (3) Gastrointestinal deficiencies.
 - (4) Bleeding problems.
 - (5) Sensory problems such as impaired vision or hearing.
 - (6) Decreased ability to sense temperature changes.
- 6. Sudden changes in position could drastically lower their blood pressure; they tend to bruise more easily; and their joints are stiffer.
- 7. Their respiratory reflexes, such as coughing, may not be adequate to dislodge mucous or foreign substances.
- 8. By allowing them to do as much for themselves as possible.

Complete the unit review exercises before going to next unit.

Unit Review Exercises

Note to Student: Consider all choices carefully, select the *best* answer to each question, and *circle* the corresponding letter.

33. (016) Patient rights evolved from, and fall under the
 - a. conglomeration of state laws.
 - b. Code of Federal Regulations.
 - c. Constitution of the United States.
 - d. ethical codes of conduct related to medical personnel.
34. (017) As a surgical technician, having patient *sensitivity* applies to
 - a. outpatients only.
 - b. general anesthesia patients only.
 - c. all patients and potential patients.
 - d. local or regional anesthesia patients only.
35. (017) What is *key* to having patient sensitivity as a technician?
 - a. Informed consent.
 - b. Privacy and confidentiality.
 - c. Acting professionally at all times.
 - d. Thoroughly training all personnel.
36. (018) Which *need* suffers a critical blow when a patient is *unnecessarily* exposed or examined?
 - a. Safety.
 - b. Belonging.
 - c. Self-esteem.
 - d. Self-actualization.
37. (019) Which form is used to document the operating room nurse's assessment of the surgical patient's needs and the plan of care designed to satisfy those needs?
 - a. Air Force (AF) Form 1480, Summary of Care.
 - b. AF Form 1864, Perioperative Nursing Record.
 - c. Standard Form (SF) 511, Clinical Record – Progress Notes.
 - d. SF 516, Medical Record – Operation Report.
38. (019) Where is the perioperative nursing record maintained after the operating room nurse documents all information obtained during the preoperative patient interview?
 - a. In the surgical suite.
 - b. In the patient's chart.
 - c. In the surgeon's office.
 - d. In the nurses' station on the nursing unit.
39. (020) *Most* of the surgical team's efforts at satisfying a patient's *psychological* needs will occur during the
 - a. intraoperative period.
 - b. immediate preoperative period.
 - c. immediate postoperative period.
 - d. patient's postoperative recuperation.

-
-
40. (021) Which patient *fear* is the *most* common and originates from the patient's ignorance or misunderstanding of surgical procedures and anesthesia?
- a. Pain.
 - b. Anesthesia.
 - c. Unknown.
 - d. Poor prognosis.
41. (021) All are responses that the surgical team can expect when a highly anxious patient is operated on *except*
- a. a difficult anesthesia induction.
 - b. an increased incidence of laryngospasm.
 - c. a fluctuation of intraoperative vital signs.
 - d. a decrease in postoperative pain sensation.
42. (022) During which *stage* of the dying process does the patient begin to prepare for the "final journey"?
- a. Anger.
 - b. Denial.
 - c. Bargaining.
 - d. Acceptance.
43. (023) What causes the *greatest* fear in pediatric patients?
- a. Disability.
 - b. Poor prognosis.
 - c. Physical separation from loved ones.
 - d. Concern about the cost of an operation.
44. (023) Surgical personnel can reduce a child's anxieties and fears by doing all of the following *except*
- a. always telling the truth, especially about feeling pain.
 - b. letting the child bring a favorite toy to the surgical suite.
 - c. permitting the parents to stay with the child during the surgery.
 - d. allowing the child to wear his or her own pajamas until he or she is anesthetized.

Student Notes

Unit 4. Safety in the Surgical Environment

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YOU WORK in a hazardous environment. In surgery, patients and personnel are constantly exposed to the risk of electrical shock, fire, explosions, burns, and mechanical injury. There are also hazards associated with sharp objects, drugs, and caustic chemical agents. With all these hazards, it is easy to see why safety is a very important subject to surgery personnel.

To create and maintain a safe patient care environment, you and your coworkers must learn to detect and eliminate unsafe conditions in the operating room. You need to remain alert constantly, exercise good common sense, and be thoroughly familiar with the safety practices and procedures associated with your job.

In this section, we look at the Air Force Occupational Safety, Fire Protection, and Health (AFOSH) program, specific AFOSH standards pertaining to surgery, general safety principles, and specific safety considerations relating to various aspects of your duties as a surgical service specialist or technician, the hospital safety program, and quality assurance. To begin, let's talk about the AFOSH program.

4-1. Air Force Safety Programs

Your health and safety are primary concerns of the Air Force. Each year the Air Force loses millions of dollars in lost productivity and medical expenses because of injuries, illnesses, and job-related deaths caused by accidents. Since people are the Air Force's number one resource, any accident that involves people adversely affects overall mission accomplishment.

You work in a hospital, which is a place devoted to caring for and healing the sick and injured. You might think that this would be one of the safest places on earth, but statistics show that medical treatment facilities have a higher injury rate than many industries. To improve safety standards and awareness among its personnel, the Air Force developed its own safety program. This program is known as the Air Force Occupational and Environmental Safety, Fire Protection, and Health program, commonly referred to as the AFOSH program.

In these lessons, we'll discuss the overall AFOSH program and look at some AFOSH standards for medical facilities. We'll also look at some AFOSH standards and guidelines pertaining to surgery, and discuss some general safety principles that you can apply to your daily duties.

024. AFOSH program purpose and responsibilities

In line with the Federal Occupational Safety and Health Act of 1970, the military services created a safety program equal to or exceeding the federal program. The president, through executive order (EO) (the latest, EO 12196, 26 Feb 80), directed the DOD to create safety programs equal to or greater than the Occupational Safety and Health Administration Act program. To comply with this EO, the DOD created several DOD Instructions (DODI) that outline policy directives involving program policy, standards, inspections, and mishap reporting. The Air Force uses these DODIs to create programs that will fit its particular mission.

For the Air Force, the result was the AFOSH program. It's the only program authorized within the Air Force; however, the AFOSH program must incorporate all Occupational Safety and Health Administration (OSHA) standards into Air Force directives and Air Force facilities may be inspected by OSHA for compliance.

Purpose

The primary purpose of the AFOSH program is to protect all Air Force personnel from work-related deaths, injuries, and occupational illness. The AFOSH program is governed by AFPD 91-2, *Safety Programs*, and implemented by AFI 91-203, *Air Force Consolidated Occupational Safety Instruction*. The AFOSH program applies to all areas and all individuals in the Air Force, and includes all safety, fire protection, and health activities that affect the safety and health of Air Force personnel, including civilians, at their workplace.

The AFOSH program places heavy emphasis on health protection and injury prevention. It establishes standards for such things as air quality, noise levels, lighting, and procedures for handling harmful substances. The AFOSH program designates specific responsibilities to different levels. Your most important responsibility is knowing those imposed on unit commanders, functional managers, supervisors, and the responsibilities of individual Air Force members. According to AFI 91-203, unit commanders, functional managers, and supervisors have the following responsibilities:

- Ensure that all occupational safety and health (OSH) guidelines and standards that apply to their workplace are available to personnel.
- Ensure compliance with OSH, fire protection, and health programs that apply to their workplace.
- Ensure the AFOSH program requirements are part of the measurement of commanders, military, and civilian supervisory personnel's performance. The performance evaluation and appraisal of commanders, military and civilian managers, and supervisors will include measuring to the extent that the responsibilities of this instruction are discharged in a manner consistent with specifically assigned duties and authorities. Military and civilian nonsupervisory personnel must also be evaluated to determine if occupational safety and health work performance is a significant factor in assigned duties.
- Provide safe and healthful workplaces and conduct periodic self-inspections for hazards or deficiencies. Conduct job safety analyses for each work task and determine if there are potential hazards when a new work task or process is introduced to the workplace. Consult the installation ground safety staff and/or the bioenvironmental engineer when assistance is required.
- Establish and implement a hazard reporting and abatement program.
- Notify the installation ground safety personnel of mishaps and accidental occurrences as soon as possible after the accidental event.

- Establish procedures for employees to follow in situations of imminent danger.
- Provide training for employees in job safety, fire prevention and protection, and health as required by OSH guidelines.
- Notify the installation ground safety staff when a military or civilian becomes a supervisor for scheduling the required supervisor safety training.
- Enforce compliance with OSH guidelines.
- Ensure areas and operations that require personal protective equipment (PPE), or other special precautions, are identified, and posted as necessary. A job safety analysis will be required to identify appropriate PPE. AFI 91-203 should be used for guidance.
- Ensure compliance with PPE program requirements.
- Ensure compliance with the Air Force Hazard Communication Program (AFHCP) as outlined in AFI 90-821, *Hazard Communication (HAZCOM) Program*.
- Maintain bioenvironmental engineering (BE), safety, and fire prevention periodic reports until superseded.
- Brief all personnel on the findings and recommendations contained in annual and baseline BE (industrial hygiene) surveys and reports. These reports will be maintained on file in the workplace for a minimum of 10 years. A copy of the survey report will be posted on the work place bulletin board for a period of 10 days after receipt to allow all workers free access to the findings.

Responsibilities

All Air Force personnel are responsible for the following:

- Comply with OSH guidance.
- Report safety, fire, and health hazards and deficiencies promptly.
- Report injuries and illnesses to the supervisor promptly.
- Comply with PPE requirements that apply to the work situation, including its use, inspection, and care.
- Give due consideration to personal safety and the safety of fellow workers while doing assigned tasks.

All Air Force personnel should also have the opportunity to participate in the following areas:

- Take part in the AFOSH program without fear of coercion, discrimination, or reprisal.
- Request inspections of unsafe or unhealthful working conditions or report those conditions to the supervisor, safety manager, fire protection specialist, or BE, including OSHA officials.
- Have access to applicable OSHA and AFOSH standards, installation injury and illness statistics, safety, fire protection, and health program procedures, and their exposure and medical records.
- Decline to perform an assigned task because of a reasonable belief that the task poses an imminent risk of death or serious bodily harm. The person and local management may request an assessment by installation safety, fire protection, or health professionals before proceeding.
- Use official on-duty time to take part in AFOSH program activities.

025. AFOSH and the surgical environment

Hospitals and other medical facilities can be considered potentially hazardous environments. AFI 91-203 merges Air Force safety guidelines, concepts and program elements into a single consolidated occupational safety and health document. It was designed to assist managers of Air Force organizations in maintaining an environment compatible with the safety principles and

concepts of the OSHA and other national consensus safety agencies. This document also outlines the responsibilities of key safety personnel, discusses general safety practices, and specifies safety requirements for particularly hazardous areas in a medical facility. These areas include surgery, pharmacy, laboratory, radiology, and nursing units.

As a surgery technician, you must become familiar with AFI 91–203 and the specific guidelines it contains that relate to surgery and related areas.

AFOSH standards for surgery and related areas

Many sections of AFI 91–203 apply to your duties in the operating room or sterile processing. The discussion here is confined to the specific standards for surgery.

Most of the safety requirements covered under the surgery section of this AFI pertains to areas where inhalation anesthetics are administered. These requirements include, but are not limited to the following:

1. Maintain relative humidity in anesthetizing locations above 50 percent. This is required to reduce the risk of fire or explosion caused by static electricity.
2. Provide an isolated power supply for each anesthetizing location and include a line isolation monitor or ground fault indicator.

NOTE: Medical maintenance personnel will check these detectors regularly and a record of the tests will be maintained.

3. Use conductive flooring, equipment, and footwear in areas where flammable anesthetic agents are used. Additionally, keep casters and other floor contact surfaces on all portable, conductive equipment clean. Do not paint conductive surfaces. These measures are necessary to ensure static electricity is channeled to ground.
4. Do not use linen and clothing made from silk, wool, synthetic textiles, blends of synthetic textiles with unmodified cotton or rayon, and nonwoven material in flammable anesthetizing locations. However, they may be used if tested and found to be antistatic.
5. Certify all portable equipment “explosion proof” if designated for use in a flammable anesthetizing location.

NOTE: This is usually done by the medical equipment repair section.

6. Use only nonflammable agents for anesthesia and the surgical site’s preoperative preparation if an electrosurgical device is used during a procedure.
7. Never cover anesthesia machines because doing so confines gas vapors under the cover. These vapors can ignite from a static spark when the cover is removed.
8. Keep reusable (nondisposable) patient ground plates for electrosurgical devices clean and corrosion-free and ensure they do not have irregular contact surfaces. You must ensure nondisposable ground plates are permanently connected to the ground cable without clamps or clips. All disposable ground plates (and adhesive pads) are exempt from this requirement as long as they are used with reusable cords.
9. Use ventilators that have a low-pressure alarm system on anesthesia machines.

NOTE: The standards outlined in steps 3 through 5 do not apply to modern day Air Force operating rooms or other anesthesia administration areas because explosive/flammable anesthetic agents are no longer used. They are included for your awareness in case you should encounter them in a contingency or emergency situation.

AFI 90-821, Hazard Communication (Hazcom) Program

This instruction establishes the minimum requirements for an effective hazard communication program for those activities that handle or use hazardous materials. It contains the requirements for practices and procedures, assigns responsibilities, and provides guidance for managing the AFHCP. The purpose of AFHCP is to reduce the incidence of chemically induced occupational illnesses and injuries by informing employees of the hazards associated with, and proper preventive measures to be taken when using or handling, hazardous materials in the workplace. It applies to all United States civilian and military employees. This instruction does not cover all possible areas of hazardous materials. Some of the areas that it does not pertain to are listed below:

- Hazardous wastes (such as medical waste).
- Tobacco or tobacco products.
- Wood or wood products.
- Finished articles.
- Food, drugs, cosmetics, or alcoholic beverages in a retail establishment that are packaged for sale to consumers.
- Food, drugs, or cosmetics intended for personal consumption by employees while in the workplace.
- Consumer products that are used in the workplace in the same manner as normal consumer use, and which use results in a duration and frequency of exposure not greater than exposures experienced by consumers.

Workplace written hazard communication program requirements

The elements that should be included in an effective hazard communication program are a written program, hazard determination, material safety data sheet (MSDS), labeling, employee information and training, and hazardous chemical inventories. The workplace written hazard communication program (WWHCP) addresses the following specific program elements:

- Location and access to the MSDS master file.
- Requirement for and availability of employee information and training.
- The work area hazardous chemical inventory.
- Operating instructions (OI) or technical orders (TO) governing nonroutine tasks involving hazardous materials.
- Contractor operations and interface.

MSDS

An MSDS is maintained for each product used in the workplace that contains hazardous chemicals. It is provided by the product manufacturer and contains such information as listed below:

- It contains the product information, including the product name, its generic name, and (sometimes) its chemical formula. The name, address, and phone number of the manufacturer is also listed.
- The specific chemicals that are considered hazardous ingredients are listed separately. The concentration and exposure limit is usually listed, as is (are) the substance(s) volatility, flammability, or reactivity.
- The physical hazard data describes precisely why each chemical or substance is considered hazardous.
- If the item is flammable, the specific “flash point” is usually listed; if it is not flammable, it should specifically state so on the MSDS.

- The health hazard information includes symptoms of various exposures by way of individual routes of exposure, first aid procedures, and specific notes regarding medical treatment for over-exposure to the substance.
- The MSDS lists reactivity data that helps determine specifically how and where the products should be stored and handled.
- There are detailed explanations, including a list of recommended personal protective equipment, provided for handling spills or leaks.
- It contains a list of recommended special precautions and special protection.

BE will maintain the MSDS master file for the installation. For installations without a BE function, the commander will select a qualified representative to maintain the MSDS master file. The master file must include MSDS information for all hazardous materials used on the installation. The information will be maintained in the DOD Hazardous Material Information System (HMIS) on microfiche, compact disk, or hard copy.

Labeling

All materials that are contained on an MSDS should have appropriate labeling. Information that should be included on the label is listed below.

- Identity of the hazardous material.
- Appropriate hazard warnings.
- Name, address, and phone number of the manufacturer, importer, or other responsible party.

You should maintain the labels on the containers so they can be easily read. If the labels become unreadable, you should replace them. When in doubt, or if you have questions about what is required for hazardous materials, contact your installation BE or representative.

Employee information and training

All personnel, including civilian employees, are required to receive AFHCP training. This initial training will occur before employees are exposed to hazardous materials. If new materials, processes, operations, or conditions have hazards on which employees have already been trained, retraining is not required. Employee and supervisor information and training will include the following, as a minimum:

- How employees can obtain and use the appropriate MSDS.
- Any operations in their work area where hazardous materials are present.
- The location and availability of the hazardous chemical inventory and MSDS master file.
- Any methods and observations that may be used to detect the presence or release of a hazardous material in the work area such as monitoring conducted by BE, visual appearance and odor of hazardous materials, and so forth.
- The physical and health hazards associated with potential exposure to work area hazardous materials.
- The measures employees can take to protect themselves from hazards.
- An explanation of the labeling system.

Hazardous chemical inventory

The supervisor and BE will jointly develop an inventory of all hazardous materials used within the work area. Work areas where employees only handle materials in sealed containers that are not opened under normal conditions or use, are not required to develop or maintain this inventory. Chemical inventory lists will include as a minimum, the name of the hazardous material as it appears on the MSDS. It is not necessary to have detailed descriptions of each item. This list will then be

attached to the WWHCP in each work area using hazardous materials. The inventory list needs to be maintained and updated as necessary. BE will review work area inventories annually or as needed.

Nonroutine tasks involving hazardous materials

In each of our jobs, we occasionally perform duties that are not part of our normal daily duties. Your WWHCP should address these issues and it is the supervisor's responsibility to see that they do.

Descriptions of what is considered a nonroutine task are listed below.

- Those tasks included within a work area's normal activities but performed infrequently. An example of this would be cleaning up spills.
- Any temporary duties outside an individual's normal Air Force specialty code or job series.

As stated, it is the supervisor's responsibility to ensure the work area's OI thoroughly describes nonroutine tasks, associated hazards, and controls for the infrequent tasks performed in the work area. OIs do not need to be prepared if TOs or other official documents adequately describe these tasks. Supervisors must ensure workers review these procedures before performing the nonroutine tasks.

When personnel temporarily perform duties outside their normal jobs, the supervisor of the activity will ensure these workers receive the following training before beginning the activity:

- The initial Federal Hazard Communication Training Program (FHCTP) described in paragraph 3.1.2.2 of AFI 90-821 for workers not previously trained.
- Any supplemental training, as necessary, on work area specific chemical hazards and associated controls.
- The supervisor of the activity will forward a letter to the worker's formal supervisor describing the training conducted so that the individual's AF Form 55, Employee Safety and Health Record, can be updated.

General requirements of a comprehensive surgery/SPD AFOSH program

The elements of a complete surgery/SPD safety and health program include a written chemical hygiene plan, standard operating procedures, the appointment of a chemical hygiene officer, properly maintained ventilation systems and ventilation hoods, protective equipment, employee information and training, hazard identification through use of labels and MSDSs, employee exposure determinations, and medical consultation.

AF Form 55

The AF Form 55, Employee Safety and Health Record, is used to document safety, fire protection, and health training for all Air Force personnel. See figure 4-1 for an example of an AF Form 55. Supervisors (or a designated safety officer) must provide this training to newly assigned individuals and, as required, refresher training to existing personnel. Training is also conducted if there is a change in equipment, procedures, processes, or safety, fire protection, and health requirements. Once the training is complete, supervisors should document all safety training on the AF Form 55, or on an approved computer-generated substitute. The sections of the form 55 are as follows:

Section I, Personal Protection Issued—For example, in some operating rooms, eye protection is issued to staff members. This section is used to annotate those unit specific items.

Section II, Personal Protection Provided in Work Area—Do supervisory personnel ensure operators have PPE such as head, eye, and ear protectors, gloves, respirators, and so forth? If so, this section is utilized to document those required items. If your department utilizes PPE additional to what is already listed, your safety officer should document those items in the space provided.

Section III, Record of Safety, Fire Prevention, Environmental, and Health Training and Job Safety Training—This area contains training related to safety, fire prevention, environmental, and health training and job safety mandated by your leadership. Some training may only be needed initially;

The supervisor will maintain your AF Form 55 in the work area or electronically in your Air Force training record, but it is also your responsibility to know where that location is.

026. Key personnel in the hospital safety program

In Air Force medical facilities, facilities management is responsible for running the safety program. The MTF commander usually appoints the facilities manager to act as the safety officer. In large medical facilities, such as medical centers, a safety technician, who works for the facilities manager, may be designated as the safety officer. Facilities management works with the fire, safety, and infection control committees using AFI 91-203 as a guide in developing the MTF safety program. Other safety responsibilities of facility management personnel and the safety officer include the following:

- Performing area fire marshal duties and local procedures for fire and safety inspections, drills, and training.
- Providing liaison with the base ground safety office and acting as a point of contact for the medical facility on safety matters, inspections, and investigations.
- Developing local safety procedures to include safety briefings and newcomer orientations.
- Completing reports on each accident, incident, or mishap occurring on the grounds of, or in, the MTF involving patients, staff, or visitors.
- Ensuring that monthly safety meetings are held in conformance with JC standards and AFI 91-203.

Obviously, because the safety officer needs help implementing the MTF safety program, each functional area (or duty section) within the facility designates someone to act as the safety representative for its respective area. Usually an NCO is assigned this additional duty. The duties and responsibilities of these “safety NCOs” depend a great deal on the local policies and procedures established by the safety officer. Generally, additional duty safety NCOs are responsible for such things as distributing safety information, performing functional area safety and fire inspections, helping develop safety and fire inspection checklists, and conducting and documenting safety briefings and training. The safety NCO also acts as the liaison between functional area supervisors and the MTF safety officer. Usually, the functional area safety NCOs represent their areas as members of the MTF safety committee. Depending on the size of the MTF and its mission, other personnel within specific duty sections may be delegated certain safety responsibilities similar to those associated with the functional area safety NCO.

As discussed previously under the AFOSH program, supervisors are key people in the MTF safety program since they are directly responsible for maintaining a safe and healthful environment in their areas. Several Air Force safety regulations outline specific supervisor responsibilities. Some of the more important supervisor safety responsibilities include those below:

- Conducting periodic self-inspections for hazards or deficiencies.
- Establishing and maintaining a hazard abatement program, and implementing the hazard reporting system.
- Notifying the safety officer of mishaps as soon as possible after they occur.
- Providing all personnel under their supervision job safety training, fire protection, and OSH training. This training should include job and work hazards, duty-specific OSH requirements, personal protective clothing and equipment associated with their duties, local fire plan requirements, and emergency procedures.
- Training workers how to identify and report hazards, accidents, and incidents.
- Documenting safety training.

Although supervisors can, and often do, delegate some of these tasks to other individuals, the supervisors remain accountable for overseeing the safety activities in their individual areas of responsibility.

Supervisors receive safety training through various courses including the Air Force Supervisor Safety Training Course. All personnel assigned to first-level supervisory positions must attend this course. If you are not already an NCO, you can expect to attend this course after you become a Senior Airman.

The last, but probably the most important player on the MTF safety team, is you, the worker. We previously listed your individual responsibilities under AFOSH. Without your active support of established safety programs and compliance with all safety guidelines, the medical facility would be a very unsafe place to work, and be an unsafe place for your patients. People are the key to effective safety programs. Help make your hospital and operating room a safe place to work and a safe, healthy environment for your patients. Think safe and work safe.

027. Reporting accidents and incidents

While the emphasis of any safety program is prevention, accidents do happen. To try to prevent accidents from recurring, all accidents should be reported in detail. Supervisors and safety personnel review these reports to determine what incidents led to the accident, and what steps can be taken to prevent future occurrence.

Accident and incident reporting

What should you do if you witness or are involved in a job-related accident or incident? The best advice is, as always, follow the local policies and procedures. These are written guidelines, and are usually maintained in your department's operating instructions or MTF directives book. All incidents, no matter how minor, should be reported to your supervisor. If your supervisor is not available, continue up the chain of command (your supervisor's supervisor, NCOIC, superintendent, officer in charge {OIC}, etc.) until you contact someone in a supervisory or management position.

These people need to be informed so they can maintain a record of all such incidents to determine if trends are developing. These records can also be used to identify hazards and protect the Air Force from false claims made by patients, visitors, and staff members. Accident and incident reports can also indicate a need for specific safety training programs to prevent future accidents from occurring.

Reportable accidents and incidents

What sort of accidents and incidents do you report? In surgery, needle sticks, scalpel cuts, sterilizer burns, and accidental overexposure to toxic chemicals are a few of the more common mishaps that should be reported. You should also report falls caused by wet floors, back injuries caused by heavy lifting, and electric shocks. Incident reports need to be filled out for incorrect sponge counts, patient burns, and transfusion reactions, just to name a few. The list of reportable mishaps can go on forever, but the main thing to remember is that you report all mishaps. When in doubt—report it! By reporting an incident, you have done your part, and your supervisor can determine whether to take further action.

How do you go about reporting an accident or incident? The first step is to tell your supervisor verbally. Your supervisor will then determine if the incident warrants documentation—most do. In the hospital, AF Form 765, Medical Treatment Facility Incident Statement, is the form used for initially documenting all accidents, injuries, fatalities, and mishaps involving property damage. This form is also used to report situations that could cause an accident. Either you fill out the form, or you provide your supervisor with the information to fill it out. In either case, always provide detailed, specific, factual information on this report. Avoid making assumptions and drawing conclusions—that is not your job.

For example, a statement on an incident report should read “While putting sterile supplies away, I stepped in a wet spot on the floor, slipped and fell.” A statement should *not* read, “I would not have fallen if the floor was not wet.” This is not a factual statement; it is a conclusion.

Forward the AF Form 765 to the MTF risk manager or quality assurance coordinator for review. When the incident involves an accident or unusual occurrence on the grounds of, or in, the medical

facility, an accident report may be required. The MTF safety officer prepares an AF Form 711b, USAF Mishap Report, to report accidents. Any incident that may involve legal action or a potential claim is immediately coordinated with the hospital or base legal adviser. *Under no circumstances should the AF Form 765 be filed or referred to in a patient's medical record.*

Hazard reporting

The hazard reporting program is part of the prevention process; it provides a system of reporting hazardous conditions for the purpose of investigating and correcting those hazards. The primary responsibility for identifying workplace hazards, including equipment problems and environmental situations that may pose a risk, rests with the individual—you! All workers should as a minimum, verbally report to their supervisor any situation they think may be hazardous. This is the quickest and most effective way to abate hazards. If the situation cannot be immediately and permanently corrected, it should be reported to your supervisor and recorded on AF Form 457. If you need help filling out this form, ask your supervisor or safety NCO for assistance.

Just like the AF Form 765, accurate, detailed information is key when reporting hazardous conditions. This information is needed by the hospital risk manager and safety officer to ensure hazardous conditions are eliminated in a timely manner. This information is also used to investigate future hazards with similar characteristics and to develop accident prevention measures.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

024. AFOSH program purpose and responsibilities

1. State the primary purpose of the AFOSH program.
2. List eight of the supervisory responsibilities outlined in the AFOSH program.
3. What are two *responsibilities* all Air Force personnel have under the AFOSH program?
4. What are two *opportunities* all Air Force personnel have under the AFOSH program?

025. AFOSH and the surgical environment

1. Which Air Force publication establishes specific safety guidelines for medical facilities?
2. At what level should the relative humidity be maintained in the operating room?
3. What requirement must all portable equipment meet before being used in a flammable anesthetizing location?

4. Why should anesthesia machines never be covered?
5. What must be included on ventilators used on anesthesia machines?
6. What are four areas that AFI 90-821, *Hazard Communication*, cover?
7. List four AFHCP areas that you are required to be trained on.
8. Where should you document individual safety, fire, and health training?

026. Key personnel in the hospital safety program

1. Who does the MTF commander usually appoint as the safety officer for the medical facility?
2. List three safety officer responsibilities.
3. Who normally acts as a safety liaison between functional area supervisors and the safety officer?
4. Who is responsible for establishing and maintaining a hazard abatement program, and for implementing the hazard reporting system?
5. Who must attend the Air Force Supervisor Safety Training Course?

027. Reporting accidents and incidents

1. Which incidents should be reported to your supervisor?
2. Identify the form used to report accidents and injuries in the MTF.
3. Briefly describe the steps you take to report an incident or accident.

4. What is the purpose of the hazard reporting system?
5. What form is used to report a hazardous condition?

4-2. General Safety Guidelines for Surgical Personnel

The AFOSH program implements and controls standards, and is responsible for ensuring that all Air Force personnel participate in accident prevention. One method of accident prevention is identifying situations or conditions that have the potential for causing personal injury or damage to equipment. Another method of accident prevention is to have an understanding of the general principles of safety. Although the principles discussed in the following paragraphs are not all inclusive, they are a general guide to safely performing your duties.

028. Basic safety principles

In the first section of this unit, we listed some individual responsibilities under the AFOSH program. Two of these responsibilities were to comply with OSH guidance, and to give due consideration to personal safety and the safety of fellow workers while doing assigned tasks. To carry out these personal responsibilities, you should know some basic safety principles.

Preoperational training

Preoperational training is the training that occurs *before* operating a piece of equipment or performing a procedure. The equipment you use on a day-to-day basis is often complex, and nearly always expensive. To prevent inadvertent damage to expensive equipment, and more importantly, to reduce the chances of injuring yourself, your coworkers, or patients, you must ensure you are familiar with, and thoroughly trained on, any new piece of equipment before you attempt to operate it. Your trainer or supervisor should brief you on how to use the equipment, and you should also read the instruction manual that comes with the machine. Make sure that you know every dial, gauge, knob, or button before you use any equipment on a patient!

Patient-care-related procedures also require complete familiarization. A good example of this is basic life support (BLS). Properly performed, BLS can save a life. Improperly performed, BLS may still save the patient's life, but may also result in severe internal injuries and possible disfigurement. The Air Force considers this type of training to be so important that all medical personnel must take annual refresher courses. Likewise, your supervisor may require you to undergo periodic refresher training on certain pieces of equipment to ensure that you know how to operate them safely. You must know your equipment and procedures to do your job safely and efficiently. Training before doing is the key to success.

Discipline

The second general principle is discipline. Discipline can be broken down into two categories—imposed discipline and self-discipline. Imposed discipline is what you got in basic training. Someone was constantly standing over your shoulder telling you what to do, how to do it, and when, where, why, and how often it must be done. Imposed discipline does not require much thought or initiative on the part of the individual. Self-discipline, on the other hand, requires you to be more independent. You are required to think, act, and govern your own behavior. Good self-discipline is required for you to administer patient care safely.

As you gain experience, many procedures and tasks will become second nature for you. You will tend to fall into a routine and your work will become almost automatic. This is not all bad, but can be devastating if you stop thinking and paying attention to what you are doing. Safety is never

automatic; it must be a conscious, disciplined effort on your part. Use self-discipline to check all the safety factors associated with a particular task or procedure, no matter how often you've done it or how routine the task is. Your supervisor does not have time to, and should not have to, watch your every action to make sure you do all the required safety checks every time you are going to do something. You must take the initiative and incorporate safety into everything you do on the job.

Alertness

"Did you see the game last night?" "I heard that Jimmy is dating Carol." Aside from having nothing to do with patient care, idle conversation can also be a big distracter. Alertness means you always pay attention to what you are doing—not occasionally, but *all* the time. What do you think would happen if you passed a scalpel to a surgeon upside-down and point forward because you were not paying attention? An action like this not only has the immediate consequences of an injured hand and compromised sterile field, but also the potential to impact the future. What if the patient carries the Hepatitis C virus? What if the knife severed a tendon or an artery? What if the patient develops an infection? What is your paycheck going to look like after your visit to the commander for dereliction of duty?

The potential for making serious mistakes is always present and is compounded when your attention is not focused on the job at hand. Be aware of distracters that occur around you (e.g., noise, talking, etc.) and of those distracters that occur within you (e.g., financial problems, trouble at home, etc.). Both types of distracters must be eliminated or effectively handled to keep your attention on the job and to prevent you from overlooking that one little safety item that could produce disastrous results.

Avoid unsafe practices

The fourth general safety principle is to avoid unsafe practices. While there are numerous unsafe practices you should be aware of and avoid in a hospital setting, we consider only a few of the more common ones you are to avoid.

Horseplay

Horseplay is not only unprofessional, it can lead to serious injury or damage to government property. How would you feel if you were responsible for permanently blinding someone because you were playing with a syringe and needle? Surgery people love to spray or throw water at each other, especially when someone is leaving a facility, but consider the following incident.

It was a "favorite" OR nurse's last duty day before she was going PCS to a choice overseas assignment. After all procedures were over and the patients were out of the surgical suite, she went back to the OR she was working in to retrieve her CD-player. As she left the room, she was suddenly drenched with a basin of cold water. She jumped in surprise; and, as she landed in the newly created puddle, her feet slipped out from under her. She twisted as she fell to her knees, landing on the CD-player and smashing it.

The result—not simply a broken CD-player. The nurse fractured her patella, tore her anterior and posterior cruciate ligaments, and had lacerations on her knee from plastic fragments. Her injuries required surgery and extensive rehabilitation, resulting in over two months' loss of duty. Her coveted overseas assignment was canceled and filled by someone else while she was recovering.

Save the horseplay for the gym or athletic fields!

Haste

There is an old saying that "haste makes waste." Well if you are unfortunate, you may find out that working too fast can also be unsafe. Read the scenario below and answer the question in your mind.

You are working in the decontamination area, and getting further and further behind cleaning and sterilizing instruments. You are really hurrying to get caught up, and you start taking shortcuts. Instead of carefully removing instruments from the transport

container, you blindly reach in while you look at the washer-sterilizer to see which cycle it is in. The scrub technician who “broke-down” the case was also in a hurry because there was a case to follow; that person inadvertently left a blade on a handle, and also took shortcuts while placing instruments in the pan.

What do you think happens next?

This type of accident can be avoided if you work at a steady pace and take the time to think about what you are doing. You not only can work longer if you pace yourself, but safer too. Never take “shortcuts” to save time.

Improper tools

Always use the right tool for the job. You may be able to use an orthopedic osteotome as a screwdriver, or a hemostat as “mini-pliers,” but doing so not only damages the instrument, but also poses a hazard—to you and your patient. If you slip with the osteotome, you can seriously cut yourself. If the misused hemostat inadvertently gets placed in an instrument set, “Murphy’s law”—anything that can go wrong, will, and at the worst possible time—means it will fail during the most critical part of the procedure.

Improper lifting procedures

Learn and use correct lifting procedures and apply proper body mechanics. Back injuries caused by improper lifting are one of the biggest causes of job absenteeism in the Air Force and civilian industry. This safety guideline is so important to surgical technicians that it is covered in-depth in the next lesson.

Mental and physical fitness

Mental and physical fitness are essential to work at your peak proficiency. You must have mental agility to be able to recognize problems with your patients and to stay one step ahead of the surgeon. Physical fitness is necessary for you to endure the long hours of standing at the OR table and be able to safely transfer patients to and from gurneys or beds; not to mention a requirement in the Air Force. Mental and physical fitness can be maintained through proper diet, rest, and exercise. If you are physically fit, you are much more capable of remaining mentally alert, and able to perform your duties safely and effectively.

Hazard avoidance

Help disprove Murphy’s Law. Hazard avoidance means keeping one step ahead of a potential problem. Anticipate the results of a “what if” situation. Know what potential hazards are associated with the different aspects of your job and take the necessary steps to keep these potential hazards from becoming hazardous accidents.

Environmental safety

This safety principle relates to any measure you take to keep your work area neat, clean, and well-organized. In a hospital or surgical setting, the safety of the patient is always the primary concern, followed by the safety of the staff. The patient is usually at a physical or mental disadvantage and relying on you for protection. A few simple safety precautions are listed below:

- Keep hallways and utility rooms uncluttered. Never leave soiled linen and trash lying around. Avoid stringing tubing or electrical cords across open areas. They pose a serious tripping hazard.
- Arrange storage areas so congestion is eliminated. Keep equipment and supplies readily accessible. Properly label flammable and caustic materials and store them in accordance with local directives.

- Keep medication storage areas neat and clean at all times. Lock up medications and properly dispose of syringes and needles. Promptly wipe up spills and properly discard unused medications.
- Close all file cabinet and desk drawers when not in use because administrative areas can be hazardous if simple safety precautions are not observed. Avoid storing heavy items on top of cabinets or on high shelves.
- Drink, eat, or smoke in approved areas only. Never place a drink on a piece of electrical equipment—it could be a “shocking experience.” Do not eat in patient care areas—why do you think surgery has a “lounge?” Never “sneak” a smoke in the hospital; you may choose to damage your health, but you have no right to impose on patients or on other staff members. Smoking is absolutely prohibited in Air Force medical facilities and workplaces.

Operational risk management

The last general safety principle we want to discuss may be the most important and it is operational risk management (ORM) or preoperational planning. Proper planning should always precede operation. No matter what you are getting ready to do, you should think about it and plan your activities so that you can observe all necessary safety precautions. You must decide if the risks outweigh the outcome. The amount of advanced planning you do will depend on the nature and difficulty of the task. Some jobs require more planning than others do, but all jobs require some degree of planning.

029. Guidelines for good body mechanics

Good body mechanics are a combination of good posture and effective use of skeletal muscles to perform various activities. Since the focus of our discussion is on moving and positioning patients, we only touch on the benefits of maintaining good personal posture by concentrating on using your muscles effectively to move and lift patients.

Posture

Your posture is essentially your body alignment and balance. Maintaining a good posture helps your muscles and bones support your weight better, and to help other body systems as well. For example, slumped shoulders, or slouching, decreases the lung’s ability to expand fully. As a surgical technician, you spend most of your time standing, so below we touch on some guidelines for having good posture while standing.

- Keep your feet roughly parallel, between six and twelve inches apart.
- Distribute your weight equally, preferably on the balls of your feet.
- Flex your knees slightly, but do NOT lock them.
- Pull in and tighten your abdominal and buttocks’ muscles to help keep your lower spine straight.
- Pull your shoulders back, slightly thrusting your chest up and out. Try to elongate your waistline.
- Keep your neck straight, head forward, and chin slightly in. Avoid curving the spine supporting your head.

Maintaining a good posture also helps the rest of your musculoskeletal to perform work efficiently, such as lifting and moving patients and objects.

Mechanics of lifting and moving objects

Your body is covered with muscles of varying sizes and strengths. Whenever you attempt to do physical work, your goal should be to use the largest (and strongest) muscles and muscle groups to do most of the work. This seems simple and logical, but when people are in a hurry, they begin to rush and do not always think clearly. This often results in the small, weak muscles being used to perform

strenuous work. How many times have you simply bent at the waist to pick a coin off the ground? If you have done this (as most of us have), you are guilty of not using good body mechanics. The correct way to pick something up is to keep your back straight and using your legs to lift, effectively using the large muscle groups in your legs.

You should receive lifting training at regular intervals (usually annually) in the Air Force. Since many of your duties involve moving patients of varying sizes, shapes, and weights, we discuss some of the basic guidelines to prevent injuring yourself or the patient. Whenever lifting and moving patients or heavy objects you should adhere to the guidelines discussed below.

Plan your movements

When you are standing with a patient half in and half out of a bed or transport gurney, it is too late to decide you need help. Before attempting to move the patient, consider how you will do so, what equipment you need to perform the task, and how much help you need, if any. Failing to plan can get you in a lot of trouble and result in serious injury to both you and your patients.

Be realistic about your capabilities

Even if you can lift more than Mr. and Ms. Universe combined, you cannot SAFELY lift and move a patient single-handedly. Remember, it takes at least two people to move a conscious patient, and at least four people to move an unconscious one. More help may be needed to transfer and position big people or those who have a lot of “hardware” attached to their bodies.

Assess the capabilities of the individual helping you

If you have seen the individuals who are helping you move the patient struggle to lift an instrument set, and you cannot lift much more, then you are going to need help to lift and position a 250-pound patient. Do not assess individuals by their size. Some “skinny folks” are extremely strong, and some of the “big ones” are weaker than they look. One way to learn the capabilities of your coworkers is to watch how well they can perform other physical labor. Perhaps the best way to assess them is to ask them if they have any doubts as to whether they can handle the job, but it takes excellent communication and personal relations skills to do so in a nonthreatening manner. Regardless of their answer, if you have any doubt about your assistant(s) ability to perform a strenuous task, get more help—even if it means telling them you do not think you can handle it. It is far better to take a few minutes to get help than to risk injuring yourself, a coworker, or your patient.

Establish and maintain a broad, balanced base of support

Your base of support is determined by how far apart your feet are; this, in turn, determines how well you are balanced. If you stand with your feet close together, your base of support is small and your balance is unstable. To illustrate this, drop your pen or pencil on the floor. Now, stand with your feet close together and pick it up (bend at the knees, not the back). Drop the pen or pencil again, then broaden your base of support by spreading your feet apart about 15 to 20 inches (roughly shoulder width), and pick it up again. You should notice you are more stable and better balanced with your weight distributed over the wider base. When you are working with patients, plan your base of support according to the amount of stability you think you need.

Keep your center of gravity low and in line with your base of support

Your center of gravity is the point your body mass is centered; for most people (when standing straight), it is centered just below the navel. For greatest stability, lower your center of gravity in a direct line with your base of support. Keeping your back straight, bending your knees, and squatting straight down increases stability because your center of gravity is low and in line. If you lean or bend over with your center of gravity not over your base of support, your balance suffers; the higher and more out of line it is, the more off balance you are. An erect posture also helps you keep your line of gravity over your base of support and protects your back muscles from injury.

NOTE: Keep the work close to your center of gravity

Keeping the object you are lifting close to your center of gravity stabilizes you and allows you to keep the work in line with the force you exert. Before you lift a person or object, get the person or object as close to your body as possible. If the object or patient is too low for you to reach without bending over, squat down to get closer.

Use smooth and even movements

This rule applies because of momentum. Momentum is the tendency of an object to remain in motion until an opposing force acts to stop it. Sometimes momentum works for you, and sometimes against you. Consider moving a gurney. To get the gurney rolling, you have to exert quite a bit of forward force; the gurney has no momentum. Once it starts rolling, it takes less force to keep the gurney moving along because the momentum builds and helps you. To stop the gurney, you have to apply backwards force to overcome the momentum; it will not immediately stop if you just let go of it. Each time the gurney stops moving, momentum is lost, and friction must be overcome to start it moving once again.

Moving patients with a smooth, even motion is easier than with a series of jerky motions because you lose the force of momentum each time you hesitate. Smooth motions also more efficiently use your muscles by providing time for muscle contraction and allowing them to contract more completely. Smooth motions are also much easier on your patients. How do you think it feels to have a broken femur (thighbone) and have someone jerking you around?

Move in a straight direction

This principle relates back to our earlier discussion of momentum. The force of momentum acts in a straight line. If you change directions when you are moving an object, you lose your momentum. What happens when you turn a corner with a gurney? Since the gurney's momentum wants to keep it moving straight, you must apply force in a different direction to turn the corner. When possible, face the direction you want the object you are moving to go; this prevents twisting and straining your back muscles.

Use large muscle groups

This is one of the most commonly violated principles of good body mechanics. Your largest muscles are located in your shoulders, upper arms, thighs, and hips. The muscles in your lower back are much smaller and less powerful. Even so, most people bend over, using the back muscles, to pick up objects rather than squatting and using the strong muscles of the legs and thighs. When you bend over, you place an enormous amount of pressure on your spinal column. If you attempt to pick up an object from this position, you increase the pressure and risk injuring your back.

Along this same line, try to use as many muscles as possible when moving or lifting objects or patients to avoid unnecessary muscle strain. If, for example, you help an ambulatory surgical patient move from a wheelchair to the OR bed, use both arms to hold onto his or her body rather than just one.

Use your internal abdominal girdle of support

When you simultaneously contract your abdominal and buttocks' muscles, you create a muscular supporting barrier around the intervertebral discs in your lower back, preventing them from slipping out of place. This barrier, or internal "girdle" of support, helps protect your lower back when you strain to lift or move heavy objects. If you keep these muscles in shape by regular exercise, you do your overworked back muscles a big favor and are better able to avoid serious back strain.

Use leverage to help move or lift heavy objects

Leverage increases the efficiency of your muscle power. You use leverage when bracing your body against the side of a bed or gurney and use your weight to help pull a patient towards you. In this example, the bed and your body weight provide leverage that increases the force provided by your muscles. This results in less strain on your muscles and allows you to better control the patient's

movement. The most important thing to remember about leverage is to use your whole body as a working unit, rather than just trying to do work with muscle power supplied by only one part of your body.

CAUTION: Use pulling, pushing, or rolling, rather than lifting whenever possible.

When you are lifting, the resistance to momentum caused by friction is less than the resistance caused by gravity when pulling or pushing, and so forth. It is easier and safer for your back to slide a patient to the side of the bed than it is to try to lift him or her. Pulling and lifting movements can be facilitated by the use of “draw sheets.” A draw sheet is nothing more than a sheet folded in half or quarters and placed on a bed or table underneath a patient. This folded sheet serves as a sling or litter, which supports and distributes the weight of the patient’s upper body during movement. It also provides the movers something to hold onto so they do not have to grab onto a part of the patient’s body. Draw sheets should be placed on all transport gurneys, OR beds, and recovery room beds to assist with moving patients, especially those who are unconscious.

Most ORs have patient rollers. These are designed to be placed under one side of the patient, then the patient is pulled across the roller. They greatly reduce friction and virtually eliminate the need to lift the patient as you slide them from bed to bed. If your OR has patient rollers—USE THEM!

Good body mechanics involves thinking before doing. Do yourself and your patients a favor, use your brains more than your brawn when moving and lifting patients and heavy objects.

The most important thing to keep in mind when planning your work is to check any pertinent safety guidelines. No task related to patient care activities should be considered routine. To be safe and work safely, you must always think safety.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

028. Basic safety principles

1. What is meant by the term “preoperational training” and why is it important?
2. What general safety principle can prevent the tendency to perform your duties automatically and without thinking about what you are doing?
3. What must you eliminate or effectively handle to stay alert and avoid overlooking safety items?
4. Explain why it is important to use the right tool for the job.
5. Why should you keep yourself mentally and physically fit?

029. Guidelines for good body mechanics

1. List four guidelines for having good posture while standing.

2. What should your goal be whenever you use muscles to do physical work?
3. What three factors should you consider when planning to move and position a patient?
4. How can you lift a heavy patient or object for the greatest stability?
5. Why is it easier to move a patient with a smooth, steady motion than with a series of jerky motions?
6. Where are the largest, strongest muscles in your body located?
7. Instead of your back muscles, which muscles should you use when picking up objects?
8. How does contracting your abdominal and buttocks muscles help protect your back from injury?
9. How can you use leverage to move a patient towards the side of a bed?
10. Why should you use pulling or pushing movements whenever possible rather than lifting movements?

4-3. Electrical Safety in Surgery

In the operating room, you routinely set up and operate high-voltage electrical and electronic equipment. Understanding electricity and the potential hazards it poses is the first step in ensuring the operating room is an electrically safe environment. Once you know the basic principles of electricity and are familiar with electrical terminology, you can better understand and apply electrical safety guidelines.

This section covers basic electricity, electrical hazards, and general electrical safety guidelines. We also discuss grounding and conductivity devices in the operating room and familiarize you with the operating principles and safety considerations related to electrosurgery devices.

030. Electricity, electrical hazards, and general electrical safety guidelines

To understand the hazards associated with electricity better, it is important for you to learn about basic electrical theory and terms used to describe electricity first.

Basic electrical theory

Electricity is a form of energy produced when negatively charged atomic particles called electrons flow from one point in a material to another. For the electrical current to flow, the material must be a good electron conductor, such as metal or carbon. Materials, such as glass, rubber, and plastic are considered poor electricity conductors because they greatly restrict the flow of electrons. They are called insulators.

The term used to describe the *amount* of electrical current flowing through a conductor is *amperage*, measured in units called *amps*. The force causing the electrons to flow through the conductor is referred to as *voltage*, measured in units called *volts*. Any restriction to the flow of current is known as *resistance*. For an electrical current to flow, resistance must be kept to a minimum and the current path must be continuous (unbroken). An unbroken current path is known as a complete circuit.

Many types of switches and electrical components control electricity and current flow. When you turn on the switch to an electrical device, the current flows from the wall outlet through the internal mechanism of the machine, then back to the wall outlet to complete the circuit. You control the flow by activating the switches and adjusting control devices on the machine. You decide when, where, and how the current will flow and be put to use. The problem comes when you lose control of the current's pathway and the electrical current seeks an alternate, uncontrolled route to complete the circuit.

We stated earlier that electricity flows best when the resistance is low; this means that any uncontrolled current will seek and flow through the path of least resistance. If that path includes a shortcut through someone's body, an electric shock, or worse, may result. The human body is a far better conductor of electricity than it is an insulator. Guess where stray electrical current will go if it has to choose between passing through drapes, a rubber-covered table pad, or a patient lying on that rubber pad?

This is an oversimplified discussion of electrical theory, but it should give you enough knowledge to help you understand some of the electrical hazards and safety guidelines better, which are discussed next.

Electrical hazards

The discovery of electricity is to modern man what the discovery of fire was to our remote ancestors. Electricity allows us to lead better lives and take better care of our patients. But, like fire, electricity can cause harm if it is not used properly. The three most common hazards associated with electricity are electric shock, burns, and fire.

Electric shock

When a human body becomes a conductive part of an electrical circuit, allowing the circuit to be completed, electric shock occurs. Shock can result in a slight tingling sensation, heart flutter (fibrillation), or even death (from cardiac arrest). How the human body responds to electrical shock depends on the amount of current flow (amperage) and the route the current takes through the body. Electrical shock is further categorized as either "macroshock" or "microshock."

Macroshock

This type of electric shock occurs when moderate to high-voltage electrical current contacts or passes through large areas of tissue. The current is conducted, enters the trunk of the body, and is dispersed through the tissues until it finds a suitable exit point to another conductor. If the current entering the body is channeled through the heart, ventricular fibrillation or cardiac arrest may occur. High-voltage macroshock can cause unconsciousness, brain damage, and vascular injuries. Macroshock is the most common type of shock. This is the type of shock you get when you come into contact with a "live" wire or a conductive surface that has an electrical current flowing through it.

Microshock

This type of shock occurs when small areas of tissue come into contact with a low-voltage electrical current. Microshock is usually associated with internal catheters, probes, or electrodes placed in or near the heart. Internal pacemaker leads are a good example of the type of device that could cause a microshock. Internal catheters such as these provide a direct pathway for the low-voltage current to flow from an external source to the heart. The current acts directly on the heart; it is not dissipated through surrounding body tissues as in macroshock. The amount of current required causing heart fibrillation or arrest is very small.

Electrical burns

Defective, high-power electrical devices, such as electrosurgery machines and cardiac monitors, can cause severe skin burns. Burns occur when the current flow is concentrated in a small area of tissue, usually by contact with an external conductor, such as a patient ground electrode for the electrosurgery unit or a cardiac monitoring electrode. In other words, if the electricity enters or leaves a patient's body through a very small area, the electrical energy is focused to that small area and burns the tissue.

Skin burns can also occur when a battery-operated device or instrument, such as a nerve stimulator, is used too close to external electrodes. When battery-powered devices are used, only turn them on for a few seconds at a time to reduce the risk of burns.

Fire

The risk of fire and explosion in the operating room was significantly reduced by the development and use of nonflammable anesthetic agents. However, there is still a risk of fire caused by some chemical agents, a careless act, an electrical short-circuit, or equipment malfunction. Because of this risk, you need to know what causes fires, how to prevent them, and what to do if they start.

As you probably already know, there are three conditions necessary before a fire or explosion can occur. First, there must be combustible material. Tinctures of iodine, acetone, and different types of alcohol are examples of combustibles that may be found in the surgical suite. Second, there must be a source of ignition. Electrostatic sparks (static electricity), electrical equipment, open flames, and excessive heat are the most common sources of ignition. Finally, to complete the so called "fire triangle," oxygen or an oxygen-supplying substance must be present to support combustion. Medical oxygen is used routinely in the operating room and will definitely support combustion.

What can you do to prevent fires or explosions from happening in surgery? One preventative measure is to be aware of the flammable nature of some of the chemicals you work with. As we have already mentioned, alcohols and tinctures of iodine are just two examples of flammable solutions commonly found in surgery. You must take care to avoid spilling or using excessive amounts of these solutions.

Another preventative step you can take is to make sure the linens and cloth used in the operating room are flame retardant and antistatic. Recall that one of the specific guidelines for surgery outlined in AFI 91-203, *Air Force Consolidated Occupational Safety Instruction*, dictated that only antistatic linens be used in the operating room. This is important because high oxygen concentrations combined with the ignition from electric or electrostatic sparking can ignite linens instantly. The last preventative measure we mention is being aware of and eliminating potential sources of ignition. Some of the more obvious measures you can take to eliminate ignition sources include these listed here:

- Avoid storing supplies within 18 inches of a light fixture. Make sure that a cage or protective cover protects any naked light bulbs.
- Do not allow portable personal electronic devices, such as radios, hot-plates, and coffee makers, in the surgical suite unless they meet electrical safety standards and have been approved for use by biomedical equipment repair personnel. Restrict the use of these items to areas where no patient care is provided.

- Keep the OR clean! One of the best fire prevention methods anywhere is good housekeeping. Not only does this help eliminate sources of bacterial contamination, but it also eliminates most common causes of combustion.

If a fire starts in the operating room, would you know exactly what to do? If not, you need to ask your supervisor to brief you, and you need to read your hospital and section fire plan. You must know how to report a fire and evacuate patients from the operating room. You also need to know what your designated evacuation routes are, and where fire alarms and extinguishers are located (and how to use the different types of fire extinguishers). Because fire prevention and fire safety are critical parts of the AFOSH program, all personnel are required to attend annual fire safety briefings and fire extinguisher training. Make sure you attend these training sessions; they could save your life!

General electrical safety guidelines

There are many codes and regulations pertaining to hospital electrical safety. A complete review in this text is impractical, and not necessary, but you should know where to look for further guidance when you need it. Some of the standards and instructions already discussed are good references. AFI 91-203 is particularly useful for safety guidelines relating to Air Force medical facilities. Other Air Force publications and national publications are available. Your safety NCO or safety officer can get these references for you when you need them.

Rather than list every electrical safety standard that could possibly apply to the surgical environment, we list some of the ones below that are most applicable to your duties.

- Never set up or operate a piece of electrical equipment without first reading the manufacturer's operating instructions. Keep these instructions with the device or place them in a readily accessible location known to all personnel.
- Always inspect and check all electrical equipment for proper functioning before use. Never use equipment with frayed power cords or damaged plugs. If the device shows any sign of external damage, have it taken out of service and checked by qualified maintenance personnel.
- Never use an electrical device that exhibits a need for greater power than outlined in the instruction manual. For example, if an electrosurgical unit doesn't seem to work unless the controls are set at an extremely high level, suspect a malfunction and remove the unit from service so it can be checked out.
- Avoid unnecessary contact with any electrical apparatus. Don't lean on the machine, don't let it touch the patient, and don't allow it to touch the OR table or other pieces of equipment.
- Do not clean electrical equipment with "sloppy" wet rags or sponges saturated with a detergent-germicide solution. Electrical equipment should be damp dusted to prevent the cleaning solution from damaging internal circuitry and causing a short circuit.
- Ensure all electrical equipment used in patient care areas is properly grounded and meets standard. Normally, this is a function of the biomedical equipment repair folks, but it is the user's responsibility to ensure that the equipment is periodically tested and labeled to indicate the inspection was performed.

In addition to the guidelines above, the following safety guidelines apply to electrical power cords and adapters:

- All power cords on portable electrical equipment must be of one-piece construction, without switches, from the device to the plug.
- All power cords must be protected by an insulating grommet where the power cord enters the electrical device.

- A cord storage feature should be on all portable electrical equipment to ensure the cord is stored without kinks, bends, knots, or twists. Never wrap the cord tightly around the machine as this may damage both the cord insulation and the internal wire.
- A power cord is never unplugged by pulling on the cord. Always handle the cord by the plug.
- All power cords should be long enough to reach an outlet without putting strain on the cord. Remove all twists, kinks, bends, and so forth, before the cord is plugged into the wall outlet.
- Power cords must be kept out of traffic pathways to prevent damage from equipment being rolled over them. If cords must be placed in areas where people will be walking, tape them securely to the floor to reduce the tripping hazard.
- The use of extension cords should be avoided. If they must be used, they should be constructed of heavy-duty, three-conductor wire with an Underwriter's Laboratory (UL) approved, "hospital grade" plug. Two-wire, household-type extension cords are strictly prohibited.
- Any adapter designed to adapt a three-prong (grounded) plug to a two-prong (ungrounded) plug is prohibited for use except by biomedical equipment repair personnel performing equipment tests. Multiple outlet plug-in adapters are also prohibited.

As stated previously, this list of general electrical safety standards is only a partial one. If you follow the guidelines outlined in this text and know where to look for further safety information, you will be able to fulfill your ethical and legal responsibilities relating to electrical safety in the operating room.

031. Grounding, isolation, and emergency power systems

All electrical equipment used in the operating room must be grounded to prevent electrical shock, burns, and leakage of current outside of the normal conductive pathways. To ensure that hospital electrical circuits and the equipment connected to them are properly grounded, a special ground system is built into the hospital design.

Equipotential grounding systems

Electricity tries to balance its flow, or voltage; if the voltage of two areas is equal, electricity will not try to flow from one to the other. If, however, one area has a higher voltage than another area, the electricity tries to flow from the higher voltage area to the lower voltage area. To reduce the effects an electric shock would have, many hospitals employ an *equipotential grounding system*. This grounding system involves connecting not only items that normally carry or use electricity, but also all other electricity-conducting (metal) devices, to a single, central ground wire.

The electric power is provided to all areas of the hospital by using three wires. One wire is called the "hot" wire, one is referred to as the "neutral" wire, and the third is called the "ground" wire. The electrical current normally flows from the power source, through the hot wire used by the device, and then flows through the neutral wire back to the power source. The third wire is called the "ground" wire because it is attached to a copper rod driven into the ground outside the facility, usually close to the area where the main power lines are brought into the building. Power is provided from a circuit box at this location to all areas of the facility by way of three-wire outlets that include a grounding connection (usually U-shaped) and slots for the "hot" and "neutral" wires.

All electrical equipment approved for use in the hospital has three-wire power cords and three-prong plugs. The exterior metal parts of an electrical device are connected to the ground wire in the power cord. When the device is plugged into the grounded outlet, the current normally flows from the "hot" wire to the equipment and back to the wall by the "neutral" wire. If, however, the internal wiring in the device is damaged, bare power wires may contact the metal surfaces inside the unit causing current to "leak" by flowing through the metal instead of back to the wall. This leakage current could be flowing to the external cabinet or control panel of the unit. As long as the metal case and components are connected to the ground wire, the operator is protected from this leaking current

because the ground wire is the path of least resistance and the current flows back into the wall and to the source.

However, if the device chassis is not grounded, or if the pathway back to the source is interrupted or missing, the current will seek “ground” through other conductive pathways. You or your patient could become a part of one of these alternate pathways, and the result is an electric shock. Another consequence of defective or absent grounding is the possibility of creating sparks that could lead to a fire or explosion.

An equipotential grounding system reduces the likelihood of you or your patient becoming part of the electrical pathway. All items that can potentially conduct electricity are connected to the ground wire, much like the exterior metal parts of the electrical device as described in the previous paragraphs. By connecting all conducting devices to ground, the circuit breaker should interrupt power to any circuit that supplies power to a surface that should not be charged. Items connected to the ground wire include metallic faceplates of electrical outlets and switches, metal conduit or pipes, and any built-in metal furniture or fixtures. When you transport a patient from a high-risk area, such as the intensive care unit (ICU), you often have to disconnect a wire with an alligator clip that attaches the ICU bed to a metal bar on the wall (sometimes the wire comes directly from a fixture in the wall). This wire is connecting the bed to the ground wire as part of the equipotential grounding system.

Isolated power systems

To help further increase safety to personnel, and to prevent using defective electrical equipment accidentally, each operating room and anesthetizing location is supplied with an isolated power system. This simply means that the electrical circuits in the designated area are isolated from the grounded main power circuits. The isolated circuits do not include the common hospital ground (the copper rod driven into the ground) in their current pathways and electrical current only flows from one wire to another. The electricity in this system does not automatically seek ground. For a person or device to become part of the electrical path, both wires (hot and neutral) have to be contacted simultaneously. An isolated circuit is only connected to another isolated circuit. Isolated circuits help prevent people from receiving an electrical shock when they come in contact with leakage current from a defective piece of electrical equipment because the current will not automatically seek ground through that person’s body.

Each isolated circuit is required to have a continual line isolation monitor that constantly monitors the circuit for grounding faults or power overloads within the system. These monitors are mounted in the walls of each operating room. Most of them employ an audible alarm along with green and red signal lights to indicate system status. When the system is normal, the green indicator light is lit. If a ground fault or power overload occurs, the audible alarm sounds and the red signal light comes on. When this happens, take the following steps:

1. Shut off and unplug the last electrical device that was plugged in.
2. If the alarm stays on, unplug each piece of nonessential equipment until the alarm goes off. The last device unplugged before the alarm went off is the defective unit.
3. Remove the defective equipment, notify your supervisor or NCOIC, and find a replacement.
4. If the alarm stays on and the defective unit cannot be determined, close the operating room after the case underway is finished. Keep the room closed until trained maintenance personnel can determine the source of the hazard.

Emergency power systems

Because the normal flow of electricity, or “commercial power,” is prone to occasional short-term power outages, back-up electrical systems are required. The hospital’s back-up power is often divided by the function of each area. Noncritical power supplying such things as office lighting and electricity to patient waiting areas can be interrupted without serious consequences, at least for a short term.

Corridors and work areas must have at least a minimal emergency illumination. Critical areas, such as surgery, must have varying degrees of uninterrupted and minimally interrupted back-up power.

All Air Force hospitals have back-up power generators that automatically supply power to essential areas when commercial power fails. These generators usually supply the surgical suite and sterile processing. Power supplied by these generators is often interrupted for a few seconds while the generator “kicks-in” and the power is transferred. However, even emergency power generators can fail, so “batteries or other types of uninterruptible power generators often supply operating room “spot” lights and specific electrical outlets. As a last resort, most anesthesia providers have a flashlight available in case the emergency power does not come on. There have been caesarean sections by flashlight when backup generators failed; not an experience that is recommended to anyone with a weak heart.

This should be enough electrical theory to give you some appreciation for how electricity flows. It is important for you to understand this so you can fully comprehend our next subject, the specific guidelines for electrical safety when using electrosurgery (Bovie) devices.

032. Electrosurgery safety considerations

Deep patient skin burns are the greatest risk during electrosurgery. These burns can be so severe that they may require debridement and even skin grafting. To prevent accidental burns or electric shock, all surgical personnel must observe the following precautions when setting up and operating electrosurgical devices:

1. Make sure that all surgical personnel are trained to operate the different electrosurgical devices used in the surgical suite and are familiar with electrosurgical hazards.
2. Ensure that complete instruction manuals are readily available for operator reference and that basic operating instructions are conspicuously displayed on, or attached to, the unit.
3. Perform a preoperational inspection of the electrosurgical unit and all attachments to include:
 - a. Check the external housing for signs of damage or indications of internal contamination by liquids.
 - b. Inspect all cables, connectors, and electrodes for cleanliness and signs of damage. This includes the sterile, active electrode, the patient ground cable, and patient ground plate or pad.
4. Position the electrosurgical unit on the surgeon’s side of the operating table. Place the unit as far from the anesthesia machine and monitoring devices as possible. Make sure that all cables hang loosely and are not stretched across traffic lanes in the operating room.
5. Alert anesthesia personnel to the use of electrosurgery. This is important because the cardiac monitoring electrodes they place on the patient need to be positioned as far from the surgical site as possible. Burns can result at the point where the monitoring electrodes contact the patient’s skin if the grounding circuit is interrupted and the current seeks an alternate ground pathway.
6. Avoid the use of flammable agents for preoperative patient skin preparation. Vapors can collect in the drapes and ignite when the electrosurgery unit is activated.
7. Ensure that the dispersive ground electrode is placed in contact with the patient’s skin when monopolar electrosurgery is used. If the device you are using has both monopolar and bipolar capabilities, use a dispersive electrode unless the surgeon specifically dictates otherwise (better safe than sorry!).
8. Place the ground pad or plate as close to the surgical site as possible to minimize current flow through adjacent tissues. Contact the dispersive electrode to a large skin area that is free of hair and scar tissue. Avoid placing the pad or plate on bony prominences such as the kneecap, hip, elbow, or shoulder. Always place the ground electrode on or under a large muscle or soft-tissue mass such as the thigh or buttocks.

9. Ensure that the connection between the ground cable and inactive electrode is secure. If a metal connector is used, make sure it does not touch the patient. Also, make sure the connector doesn't put pressure on the patient's skin.
10. Run the monitor on battery power or plug it into a different wall outlet to minimize the risk of patient burns at the cardiac electrode contact sites. Whenever possible, other electrical devices that will come into contact with the patient are connected to a different power source than the one used for the electrosurgical unit. For instance, many cardiac monitors used in surgery have battery power packs that make it unnecessary to plug them into wall power outlets.
11. Use moist sponges on the sterile field to reduce the risk of fire.
12. Check the position and skin contact of the ground pad or plate periodically during long procedures.
13. Suspect a malfunction if the surgeon repeatedly asks for higher power settings on the electrosurgery unit. This can indicate a defective active or inactive electrode or a damaged unit.
14. Routinely inspect any special electrosurgical instruments or accessories such as those used with laparoscopes or resectoscopes for damage to the insulation or tissue contact areas.
15. ALWAYS FOLLOW THE MANUFACTURER'S INSTRUCTIONS FOR USE AND CARE OF ANY ELECTROSURGICAL DEVICES OR ACCESSORIES.

Statistics show that more patients' injuries result from using electrosurgical devices than any other piece of electrical equipment used in surgery. The primary cause of these injuries is human error. By studying the guidelines we've outlined for basic electrical safety and to use electrosurgical devices safely, you'll ensure that the operating room environment remains safe for both patients and surgical personnel.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

030. Electricity, electrical hazards, and general electrical safety guidelines

1. What is electricity?
2. What is required for an electrical current to flow?
3. Name two variables that determine how the human body responds to electrical shock.
4. What type of electrical shock occurs when low-voltage current contacts a small tissue area?
5. What causes electrical burns?
6. What three conditions must exist for a fire or explosion to occur?

7. List three measures you can take to eliminate ignition sources from the operating room.
8. What should you do with an electrical device that has frayed power cords or plugs that are damaged?
9. What may happen if you wrap a power cord tightly around a piece of electrical equipment?
10. Describe the guidelines or rules for using extension cords in the operating room.

031. Grounding, isolation, and emergency power systems

1. What does the basic hospital grounding system consist of?
2. What might happen to electrical current if the ground pathway from an electrical device back to the wall outlet is missing or interrupted?
3. Briefly describe an isolated power system.
4. What is the purpose of a line isolation monitor?
5. The line isolation monitor alarm stays on after you have unplugged the last piece of electrical equipment that was plugged in immediately before the alarm went off. What do you do next?

032. Electrosurgery safety considerations

1. What is the greatest risk during electrosurgery?
2. Where should basic operating instructions for an electrosurgical device be located?
3. Why should you avoid using flammable agents for preoperative patient skin preparation when electrosurgery is used?

4. List four rules that apply to positioning a patient ground pad or plate.
5. If the surgeon keeps asking you to turn up the power setting on an electrosurgery unit, what might this indicate?

4-4. Additional Operating Room Safety Requirements

In the previous section, we've concentrated on the various aspects of electrical safety in the operating room. Now we'll discuss several other safety guidelines and considerations relating to equipment and procedures common to your surgical work environment.

First, we'll look at the safety factors relating to care, the handling, and storage of compressed gases, and the handling of caustic chemicals. Then, we'll give you a basic "primer" on sterilizer safety (an in-depth discussion of sterilization is presented later in this course). The last two lesson segments familiarize you with safety considerations relating to handling sharp instruments, glassware, and needles. Last, we'll discuss using other medical equipment, preventive maintenance, and other safety considerations. Let's start by looking at some common-sense safety guidelines for compressed gases and caustic chemicals.

033. Safely handling, using, and storing compressed gases and caustic chemicals

One of the biggest fears of many new surgical technicians is handling compressed gas cylinders. The tanks are heavy, awkward, and often hard to handle, and they deserve to be given a great deal of respect because of the high-pressure gases they contain. If improperly handled, a compressed gas cylinder can turn into a "missile" that will wipe out anything or anyone that gets in its path. However, handling these gas cylinders is safe as long as you learn and follow some simple safety guidelines.

Safety guidelines for compressed gases

Compressed gases are supplied "piped-in" or in cylinders. Piped-in gases are used extensively in the operating room. Many safety devices are built-in to the piped-in gas system; it is up to the user to handle the cylinders safely.

Alarm panels with visible lights and audible sirens or buzzers are located in areas where piped-in gas outlets are located. The alarm sounds and lights in all areas using the problem line when something is wrong in the system, such as low pressure, high pressure, or a low supply. The alarm also sounds in a central maintenance area or area of responsibility that is staffed around-the-clock. The audible alarm can be silenced, but the visual warning stays lit until the problem is corrected. One of your duties as a surgical technician is to test these alarm panels for proper function.

Local policy dictates how often you should test them, and most specify a daily test. The procedure varies, depending on the panel used, but most tests simply involve pushing a button labeled "test;" however, if the alarm sounds and the warning lamps light, the panel is working. If the alarm does not sound, or if a lamp does not light, the piped-in gas line that fails the test should not be used until the problem with the line or the alarm panel is resolved.

Each room or area that has piped-in gas outlets also has at least one remote cut-off valve located outside the room. The cut-off valve is often located near the alarm panel. The cutoff valves allow the piped-in gas to be shut down in the event of an emergency, such as if a fire occurs in the operating room. These valves are often located behind a plastic or glass panel; that allows the valves to be easily seen, but protect them from being bumped or accidentally turned off. The cut-off valve should be used only in an extreme emergency, and must never be used while a patient is in the room unless an anesthesia provider specifically orders it.

One precaution you should take when handling compressed gas tanks is to avoid using grease, oil, or any flammable substances to lubricate cylinder valves or regulators. Many tanks contain potentially explosive gases or contain oxygen that supports combustion. Imagine what can happen if oxygen leaks out of the cylinder valve and combines with a flammable lubricant. All it takes for an explosion to occur is a little spark that can be created if you accidentally bump the tank against a hard surface.

A second and very obvious safety measure is to keep ignition sources away from gas cylinders always (NO SMOKING, PLEASE!). This means no sparks, no open flames, and no excessive heat. If you have to thaw out a frozen tank valve (you should never have to do this, but in a contingency situation, you never know...), use warm water. Never use boiling water or an open flame because the heat can ignite leaking explosive vapors.

To eliminate the possibility of sparks when changing a regulator, use a special spark-proof wrench. These tools are made of specific nonsparking metal alloys and designed specifically for turning the nuts on gas regulators.

Several safety factors pertain to compressed gas storage. First, the gas cylinder storage area should be well ventilated, cool, and isolated from main hospital traffic areas. Many gas storage areas are located in hospital basements or on outside loading docks.

Second, large cylinders should always be stored in an upright position with protective valve caps in place. It is acceptable to mount tanks on a cart or stand, and they can be grouped together. Whatever storage method is used, the tanks must always be secured with some type of strap or chain. Occasionally, you may see small cylinders stored in a horizontal position, which is permissible as long as they are in a rack that allows cylinders to be adequately separated and secured. If you ever see a compressed gas tank that is not chained, strapped, or otherwise secured—secure it! If this isn't possible, notify your supervisor or a person responsible for that area.

A third safety guideline related to compressed gas storage dictates that anesthetic gases should not be stored with oxygen cylinders. If the vapors from potentially flammable gases mix with oxygen vapors, it doesn't take much to trigger a flash fire or explosion.

One last safety precaution should be followed. Empty cylinders should always be plainly marked and stored in a different area than full cylinders. Failure to do this can result in someone inadvertently picking up and attempting to use an empty tank. Not only could this jeopardize a patient's life, but it wastes valuable time and effort.

NOTE: When transporting a tank, the valve cap must be on and the tank secured to the cart. Small "E-size" cylinders can be laid down on a cart or rolling table, but they also must be secured.

Safely attaching a regulator

In addition to the guidelines we've discussed so far, there are several safety precautions you need to follow when connecting gas regulators to cylinders. The first thing you need to do is select the proper regulator for the gas you're using. Regulators are designed to be used with specific types of gases. Each regulator is fitted with special couplings that only fit the type of gas cylinder they were designed to be used with.

For example, small cylinders (E size), such as those found on anesthesia machines, have a special pin-index safety system that is designed to fit a pressure-reducing regulator yoke. This coupling system utilizes a series of pins on the regulator yoke that must match the holes on the cylinder valve stem to make a proper connection. This coupling system prevents one type of gas cylinder from being accidentally connected to the regulator for another type of gas. Cylinders larger than the "E" type just described have specially threaded valve outlets. The threads on these outlets are varied to match the gas contained in the cylinder. This safety system for larger cylinders is known as the *American Standard System*. The following identifies the steps required to attach a regulator to a compressed air tank safely:

1. Remove the protective seal from the valve stem, taking care not to lose the sealing washer, and inspect the opening to ensure that it is free of debris and dirt.
2. Turn the valve stem outlet away from any personnel. Warn anyone present that a loud noise is going to occur. Open the valve stem (by turning it counterclockwise) and close it quickly with the wrench, which produces a whooshing sound. This action clears (cracks) the valve and eliminates any dust or foreign materials (fig. 4-2). If you have difficulty remembering which direction to turn the wrench, the saying "righty-tighty, lefty-loosey" may help.
3. Place the regulator on the tank (fig. 4-3).
4. Tighten the regulator securely with a spark-proof wrench (fig. 4-4).
5. Turn off the flowmeter.
6. Open the valve stem slowly with the wrench until the pressure gauge needle stops rising. Usually, one full turn is sufficient. The pressure gauge on a full E-cylinder reads approximately 2000 psi (fig. 4-5).
7. Assess the system for any audible leaks. If you hear a leak, close the valve stem, turn on the flowmeter to bleed all pressure from the regulator, and then turn off the flowmeter. Retighten the connections, open the valve stem, and reassess for leaks.

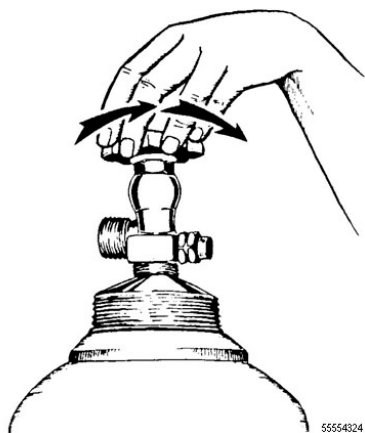


Figure 4-2. "Cracking" the valve.

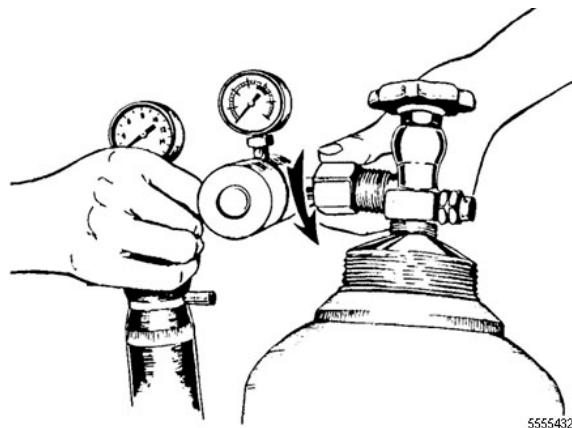


Figure 4-3. Attaching the regulator.

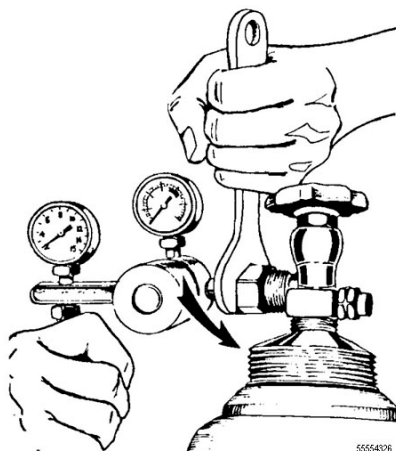


Figure 4-4. Tightening the regulator with a spark-proof wrench.

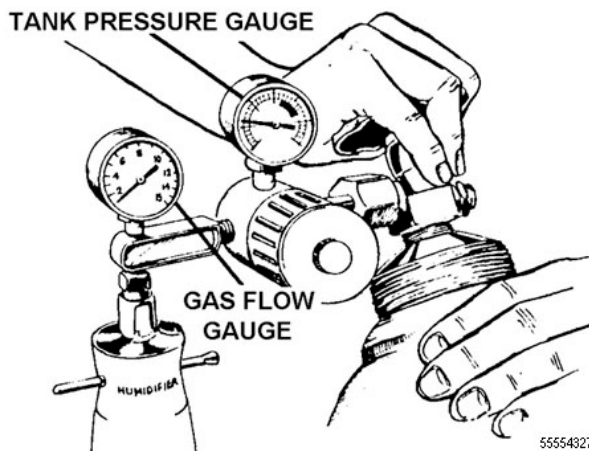


Figure 4-5. Opening the main tank valve.

8. Turn on the flowmeter to register the desired flow rate (fig. 4-6).

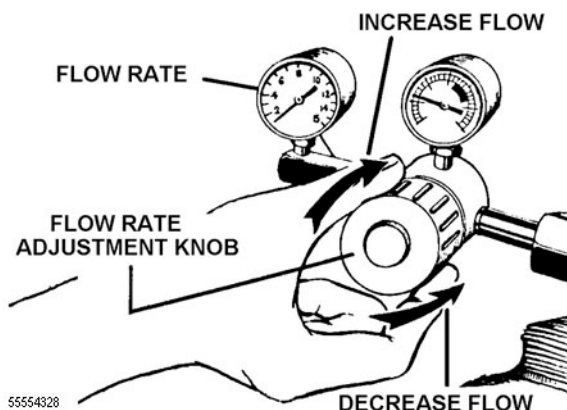


Figure 4-6. Adjusting the flow of the gas.

To remove the regulator, you just reverse the sequence, with two slight variations, as follows.

1. First, close the main tank valve.
2. Then open the flow control valve on the regulator to “bleed” the gas remaining in the regulator.

If you do this properly, both the flow rate and tank pressure gauges should read “zero.” Now it is safe to use the wrench (if necessary) to loosen and disconnect the regulator. Remember to put the valve cap back on the tank, and if the cylinder is empty, be sure to mark it and obtain a replacement. If the regulator looks damaged in any way, turn it in for repair or salvage.

The guidelines just presented apply to all compressed gases. When you handle oxygen cylinders, you must take some additional precautions.

Handling and using oxygen

When setting up and using oxygen tanks, all of the safety measures we previously discussed must be followed. Because oxygen can lead to combustion more easily than other gases we use in the medical facility, you should follow the additional guidelines below when you are handling oxygen tanks or using oxygen.

1. Never handle oxygen tanks with greasy or oily hands.
2. Never drape an oxygen cylinder with a gown, cap, mask, sheet, or other material. This may create a pocket of oxygen-rich air under the drape that could ignite when the drape is removed. This is the reason for never covering anesthesia machines. They not only have small oxygen cylinders, but are also usually hooked up to piped-in oxygen.
3. When oxygen is in use, post NO SMOKING signs where everyone can see them.
4. Never use oxygen fittings, valves, regulators, or gauges for any other service except oxygen.
5. Never use oxygen from a cylinder except through a pressure-reducing regulator. These special regulators allow the pressure to be reduced to a level suited for medical use.

Handling gas cylinders can be a scary experience the first few times you have to do it. But, if you follow the safety precautions outlined in this text, and your supervisor’s instructions, you should never have a problem.

Caustic chemicals

A variety of chemical agents are used in surgery and sterile processing. Most of them fall under the general category of cleaning agents used for surgical housekeeping. Chemical agents are also commonly used to degrease, decontaminate, and disinfect instruments—and even sterilize certain delicate items. When used properly, these agents are relatively harmless, but when handled

improperly, they can cause serious chemical burns. A thorough discussion of surgical housekeeping, instrument processing, and chemical disinfection are presented in later volumes. For now, we stick to basic safety precautions you should follow when handling chemical agents found in surgery.

The first rule is to wear protective rubber gloves always when preparing, using, or discarding chemical agents. Many of the agents used in the operating room not only burn your skin, but can be absorbed directly into the bloodstream through the skin. By using gloves, you protect your hands from the effects of direct chemical contact and the long-term effects of constant absorption. Examples of caustic chemical agents used in surgery that should always be handled with gloved hands include phenolic detergent germicides, activated glutaraldehyde, formalin or formaldehyde, and ethylene oxide. If any of these particular chemicals contact your skin, wash them off immediately.

A second precaution you should take when handling caustic chemicals is to protect your eyes. Ideally, you should wear a full-face shield to prevent the solutions from accidentally splashing into your eyes, nose and mouth. Since this may not be practical, you should at least wear protective goggles or glasses to protect your eyes. If any chemical agent gets in your eyes, irrigate them with copious amounts (lots) of water immediately.

AFOSH standards require that eyewash stations be installed in any area where caustic or toxic chemicals are used. These stations can consist of special rinse bottles mounted to the walls in conspicuous (easily seen) locations, or they may be special water-faucet attachments. Ask your supervisor about the specific way to test and use the eyewash stations in your facility. Do this as soon as possible when being assigned to a new area—before you may actually need them.

Some of the chemicals used in the operating room may give off noxious, potentially harmful vapors. Agents, such as formalin, methyl methacrylate, and many chemical disinfectants or sterilants, release fumes that can irritate the delicate tissues and membranes in your nose and eyes. Inhalation of these vapors, especially over a long period, can lead to permanent lung disease and many other diseases and medical conditions. Make sure you handle these chemicals strictly in accordance with manufacturer's directions and local policy. Use respirators, ventilation hoods, and other vapor protection devices whenever possible. If your eyes begin to water, your nose starts to burn, or you feel dizzy, evacuate everyone from the area and notify your supervisor immediately! We cover specific safety measures when we address the use of each of these chemical agents.

Without doubt, the most important safety rule to follow when handling, storing, or disposing of any chemical substance is to ***always read and follow the manufacturer's directions***. The manufacturer puts a great deal of information on the label not only to provide the user with vital information to ensure safe use of the agent, but also to meet regulatory requirements. Usually, you will find information about dilution and mixture ratios, use, and safe disposal of chemicals. Many facilities will have large "hoppers" or sinks for proper and safe disposal. Some chemicals can just be thrown in the trash and others may require specialized disposal techniques. In any case, you must follow instructions in the MSDS and local policy.

Report any accident or incident involving chemical agents immediately. You may require medical attention, and a hazardous situation may exist that requires prompt correction.

034. Basic sterilizer safety guidelines

Sterilizers are an integral part of your job. Nearly every day you are required to process surgical instruments and supplies through some type of sterilizer, whether it is a steam or ethylene oxide sterilizer. To prevent serious injury to you and other personnel in the sterilizing area, you need to learn how to operate them safely. Since the subject of sterilization is more fully explored in a later unit, we confine this discussion to the basic safety precautions you need to know to operate steam and chemical sterilizers. We begin with the most common type of sterilizers—steam sterilizers.

Steam sterilizers

The main hazard associated with any type of steam sterilizer is the chance of being burned. Burns can result from direct contact with surfaces by touching any hot portion of the sterilizer after the steam supply has been turned on, or by contact with the steam used to sterilize the load. When you turn on the steam, the metal jacket surrounding the inner sterilizer chamber is pressurized with steam. When the jacket is pressurized, the inside walls of the chamber become very hot and can burn any part of you that touches the chamber walls.

The greatest risk of contact burns comes immediately after a sterilization cycle is completed. At this point, the chamber, door liner, chamber rack, and items in the load are extremely hot (well over 200 degrees Fahrenheit) and will burn you instantly. You can also receive burns from the high-pressure steam used to sterilize the load. To increase your chances of avoiding both contact and steam-induced burns, follow these simple safety rules.

Before you open the door on any steam sterilizer that just finished a cycle, allow the chamber pressure to reach zero. Most sterilizers have a pressure baffle designed into the door that keeps the door locked as long as there is any pressure in the chamber. However, mechanical devices do malfunction and you never know when it could be the automatic door lock that fails. So, keep your eye on the control panel and those pressure gauges!

Once you are sure there is no pressure in the chamber, you can open the door. Stand towards the hinged side of the door, and keep the door between you and the opening chamber. Do not open the door all the way; crack the door open a few inches to allow the residual steam and heat left in the chamber to vent to the outside. Once you crack the door, leave it this way for several minutes to allow the load to cool before it is handled (more on this particular subject in the unit on sterilization).

Obviously, a few minutes does not allow the load to cool down enough for you to handle the items with bare hands—you must wear insulated gloves, preferably gloves that cover your hands and forearms. Large sterilizers have rolling racks that you have to move on and off a transfer cart. Some of these racks have insulated pull straps that you can grab to pull the rack back onto the cart after the load is sterilized, but you should still wear the gloves. Also, it is important that you inform the other people in the sterile cooling area that the load is still hot so they will not get burned trying to retrieve a needed supply item off the hot sterilizer rack. A simple way to do this, and one that saves your vocal cords, is to post a sign on or near the hot items.

One of the biggest hazards associated with steam sterilization is the increased risk of burns when sterilizing solutions. Fortunately, most hospitals use solutions presterilized by the manufacturer. Therefore, you rarely, if ever, have to get involved with sterilizing your own solutions. However, in a contingency (wartime or exercises), you may have to sterilize solutions, so remember these important safety considerations.

1. After the sterilization cycle is over, the bottled solutions are still boiling.
2. If you fail to allow a sufficient cool-down time, and attempt to handle these solutions too soon, the vacuum-sealed tops may blow off, scalding everyone in the immediate area with hot solution.
3. The boiling solution creates pressure in the containers, and the containers may burst even without handling them—or during the sterilization cycle. Stay away from them until they are completely cool; as you remove solutions from the sterilizer, beware of broken glass from broken containers. Ideally, to avoid burns, you sterilize solutions as the last load of the day, then open the door, turn off the steam and power to the sterilizer, and let the solution cool in the chamber overnight.

Other sources include AFI 91–203, Environmental Protection Agency regulations, OSHA standards, and the Association for the Advancement of Medical Instrumentation's (AAMI), *National Standards and Recommended Practices for Sterilization*.

Peracetic (peroxyacetic) acid sterilizer

The peracetic (peroxyacetic) acid sterilizer is gaining widespread popularity in many hospitals because of their rapid processing time. It also gives medical facilities the ability to maintain a smaller instrument inventory. Prior to using this system, medical facilities had to maintain a large inventory of high-cost endoscopic instrumentation because the standard sterilization method used was glutaraldehyde, which took 10 hours. Thanks to the new technology of peracetic acid sterilization, they are able to sterilize the instruments in less than 30 minutes.

Peracetic acid is a very caustic acid and strong sterilant and should be handled very carefully. Using the peracetic acid sterilizer is fairly safe because the entire process takes place within a sealed chamber. The peracetic acid sterilizer is designed to sterilize immersible surgical devices in the peracetic acid sterilant. Once the devices have been exposed to the sterilant for 12 minutes at a temperature between 122 and 131 degrees Fahrenheit (50 and 55 degrees Celsius), and a concentration of 175 or greater, four sterile water rinse cycles are initiated to remove the peracetic acid. Once the sterilization cycle is successfully completed, the devices are safe, sterile, and ready for immediate use on the patient.

The packaging of the peracetic acid sterilant also makes it a safe process, if you follow manufacturer recommendations. It is packaged in single use containers to ensure safe handling. *Never attempt to open a sealed container of sterilant.* It may cause skin irritation in sensitive individuals. Peracetic acid is packaged in a special 2-cup container; it has a container within a container. The outer container contains powdered buffers, which minimizes corrosion of the devices being sterilized. The inner portion contains the liquid sterilant. When you place the container in the sterilizer, it punctures the outer container. At this point, the powder is released into the bottom of the sterilizer, but the peracetic acid is still in the inner container. During the cycle, the inner container is punctured, and the peracetic acid is released into the sealed sterilizer chamber to form the proper dilution.

Although it is rare, accidental spillage may occur. If this happens, it is important that you appropriately clean up the spill and try to identify and correct the cause of the problem immediately. If a spill occurs during a cycle, you must take the following steps:

1. Press the cancel button.
2. Unplug the processor once the cancellation is complete.
3. Increase ventilation if strong vapors are present.
4. Don your PPE to include gloves, an impervious gown, goggles or face shield, and a mask to ensure safe cleanup.
5. Wipe liquid up with absorbable towels, sponges, or a mop. Thoroughly rinse and dry the area. Make sure you thoroughly rinse the towels, sponges or mop before disposal.
6. Dispose of the sterilant in the processor by following these steps:
 - a. Remove the container from the sterilizer carefully while you still have on your PPE, and submerge it into a sink filled with at least 12 inches of water.
 - b. Open the container carefully with a pair of scissors to allow the sterilant to mix with the water. Make sure you cut both containers in half. This allows the powder and the liquid to mix with the water so it can be diluted.
 - c. Drain the sink and rinse residual powders away.
 - d. Rinse both the inner and outer cup with large amounts of running water.
 - e. Dry the containers and dispose of them in the trash or in accordance with local policy.

Because the peracetic acid sterilant is packaged in single use containers, it minimizes the chance of leakage during handling and storage. However, there is still the possibility the containers may leak. If a peracetic acid container leaks, take the following steps:

1. Increase ventilation to the room.

2. Shut off any ignition sources.
3. Don your PPE to include gloves, an impervious gown, goggles or face shield, and a mask to ensure safe cleanup.
4. Wipe liquid up with absorbable towels, sponges, or a mop. Thoroughly rinse and dry the area. Make sure you thoroughly rinse the towels, sponges or mop before disposal.
5. Remove leaking box and container and submerge them into a sink filled with at least 12 inches of water.
6. Open the container carefully with a pair of scissors to allow the sterilant to mix with the water. Make sure you cut both containers in half. This allows the powder and the liquid to mix with the water so it can be diluted.
7. Rinse both the inner and outer cup with large amounts of running water.
8. Dry the containers and dispose of them in the trash or in accordance with local policy.

Hydrogen peroxide plasma sterilizer

Another sterilizer that more medical facilities are using is the hydrogen peroxide plasma sterilizer. It too uses a liquid sterilant; which is, you guessed it, hydrogen peroxide. During sterilization, the hydrogen peroxide is converted into plasma with the use of radio frequency energy. One of the advantages of this sterilizer is that the process itself is dry and nontoxic. The by-products of oxygen and water vapor can be safely evacuated into the room atmosphere. It operates at approximately 104 degrees Fahrenheit and sterilizes in about an hour. This sterilizer safely and rapidly sterilizes devices without leaving any toxic residue.

When using this sterilizer, do not sterilize paper, cotton, or other material made from cellulose because they will absorb the hydrogen peroxide. This will interfere with the sterilization process.

The hydrogen peroxide used in this sterilizer is highly concentrated. It is a strong sterilant and should be used with caution. It is corrosive to the skin, eyes, nose, throat, lungs, and gastrointestinal tract. If skin contact or eye contact occurs, flush the area immediately with large amounts of water and seek medical attention. If inhalation occurs, move to fresh air, and consult a physician. Like peracetic acid sterilization, it is used in a closed system.

After the cycle is complete, the device is rendered sterile and ready for immediate use on the patient. If a cycle aborts and the items in the load appear wet, wear gloves while removing the items because hydrogen peroxide may be present. You should avoid handling the used hydrogen peroxide cassettes, but if you do, wear latex or vinyl gloves. Since the sterilant is corrosive, avoid touching your face or eyes.

035. Handling sharp instruments, glassware, and needles

Several routine tasks you perform as a surgical technician involve handling potentially dangerous items. It is all too easy for you to become complacent or let your mind wander when performing your daily duties. When this happens, costly mistakes can be made. Procedures and items that were accepted as being safe and “routine” suddenly become hazardous because you failed to keep your mind on your work and observe common safety precautions.

In this lesson, we discuss some basic safety guidelines you should follow when handling the many sharp instruments, glass items, and needles that are routinely used in the operating room.

Surgical instruments

While performing your duties as a scrub, circulator, or instrument processor, you are constantly handling a variety of potentially dangerous instruments. Ultra sharp scalpel and dermatome blades, scissors, orthopedic bone cutters, chisels, and gouges are just a few examples of the type of items that lurk in your environment, waiting to stab or cut the first careless worker. Hopefully, you remember

the safety guidelines associated with these items that your instructors taught you in technical school. But, in case your memory is failing you, we'll give you a quick refresher.

Blades

Probably the most hazardous instruments you routinely handle are scalpel and dermatome blades. You learned how to safely receive, arm, disarm, and dispose of scalpel blades in your resident course performances. However, these lessons bear repeating because safety cannot be overemphasized. When handling scalpels and scalpel blades, keep the precautions outlined below in mind:

When arming or disarming a scalpel blade, always handle the blade with an instrument. A needle holder is the instrument of choice because you can get a firm grip on the blade without damaging the jaws of the instrument. Figure 4-7 shows how to apply a blade safely; note that the needle holder is firmly gripping the blunt side of the blade towards the point end.

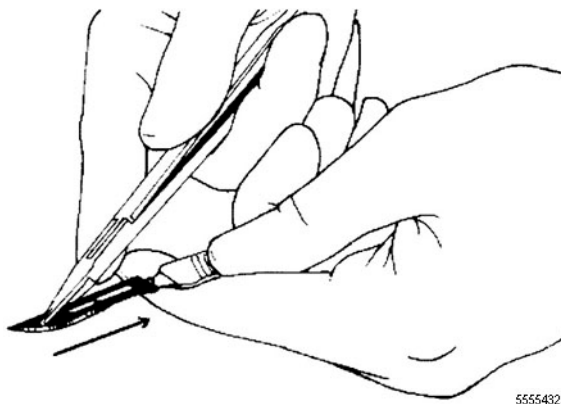


Figure 4-7. Using a needle-holder to arm a scalpel.

Figure 4-8 shows a needle holder being used to remove a blade safely. The needle holder is grasping the blade toward the handle end, and prying the blade up before sliding it forward.

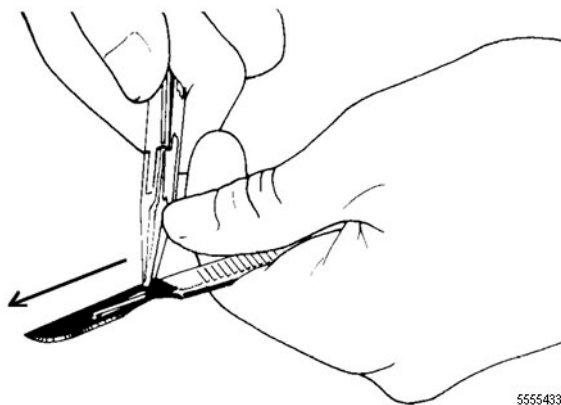


Figure 4-8. Using a needle holder to disarm a scalpel.

When applying or removing blades, point the tip of the blade down at the Mayo tray or back table. This will prevent someone from being injured if the blade breaks or springs off the handle. A rolled or folded hand towel makes an excellent “backstop” when you’re doing this.

If a blade is dropped on the floor, use a piece of wide adhesive tape to pick it up. The tape prevents you from being cut and can also be used to wrap the blade so other people don’t accidentally get cut or stabbed by a loose blade; you must still dispose of it in a sharps container. Figure 4-9 shows a clean, noncontaminated blade being picked up. If the blade were contaminated, the hands would be gloved.



55554331

Figure 4–9. Picking up a dropped (clean) scalpel blade.

When you break down your instruments following a surgical procedure, *always make sure you remove all blades from their handles*. Dispose of the blades in a sharps container before the instruments are taken to the decontamination area. It is the scrub technician's responsibility to remove and dispose of blades and other sharp, disposable items.

When working in the decontamination area, always be on the lookout for scalpel blades that were left on the handles. Never reach blindly into a basin containing dirty instruments. You may get an unpleasant surprise! Do not hesitate to confront a careless scrub who leaves blades on handles. This bad habit is very dangerous and needs to be corrected immediately. A warning may be sufficient enough corrective action, but if it happens repeatedly, ensure the individual's supervisor gets involved.

Always follow established local policies and procedures for disposing of blades and needles. This is very important, particularly considering the risk blood-borne pathogens present. Blades, needles, and other disposable sharps should be discarded in specially designed and labeled sharps boxes. These boxes are usually sealed and incinerated when full.

WARNING: NEVER HANDLE SCALPEL BLADES WITH YOUR FINGERS!!

The procedure for handling dermatome blades is very similar to the one described for scalpel blades, but there are some important differences. Dermatome blades are even sharper than scalpel blades. They must be sharp enough to separate layers of the skin; you can imagine how quickly they can slice a finger to the bone! Because they are so sharp and potentially dangerous, many operating rooms establish policies that say only the surgeon arms and disarms dermatome blades. If your OR does not have such a policy, use great care when handling these blades, especially while breaking down the setup.

Dermatome blades should not be opened until the surgeon or scrub is ready to place the blade in the dermatome. After it is opened, it should be attached to the dermatome immediately. Whenever possible, use an instrument to handle these blades. After the procedure, the blade should be removed and immediately discarded in the sharps container. A dermatome blade should never be left on the back table or in a basin, and must NEVER be discarded in an ordinary trash container.

Sharp instruments

Handle instruments with sharp tips, teeth, or cutting surfaces very carefully. To avoid possible injury from these types of instruments, you should do the following:

- Avoid grabbing or handling the functional end of the instrument. In other words, use the handles to handle the instruments.

- Always keep sharp instruments separated from other instruments. This applies whether you are scrubbing a case, breaking down a setup, or processing instruments in the workroom. By keeping the “sharps” separated, you prevent injuries that occur when someone carelessly reaches into a stack of instruments trying to find a specific item. Too many scrub techs are very negligent in this regard. They break down their setups in a hurry, sending the instruments to the decontamination area in a jumbled mass with the sharp instruments buried in the middle of the pile. This type of sloppy performance not only damages the sharp instruments, but also creates a hazardous condition. One remedy many supervisors use for this is to have the individual responsible clean and decontaminate their own instrument sets; it is amazing how quickly these scrubs “find time” to properly separate their sharps.
- Always inspect all sharp instruments before they are used on a patient. This prevents possible injury or excessive tissue trauma that can be caused by dull or damaged cutting surfaces or tips. It also saves operative time and keeps the surgeon much happier.

Glassware

As you already know, when most glass breaks, sharp edges and tiny fragments are formed. If you use glass objects such as medicine glasses, microscope slides, and blood tubes, handle them as little as possible, and take care when doing so. If you are going to put a glass syringe or medicine glass in a set, ensure you separate it by wrapping it to contain the glass fragments in case it breaks. If the glass item is properly wrapped and contained, local policy may still not let the set be used, but at least you can safely dispose of the broken glass (in a sharps container). As with sharps, always inspect all glass items before use. A chipped syringe barrel or plunger or a cracked medicine glass can result in minute (very small amount) glass fragments being injected into a patient’s blood stream or introduced into a body cavity.

Needles

Inspect hypodermic, biopsy, and suture needles before use to prevent possible injury to patients. Look for burrs, bent tips, and defective cutting edges. Check hypodermic and biopsy needles to ensure the lumen (internal opening or channel) is not clogged. Account for all needles before, during, and immediately after a surgical procedure (we discuss this subject in more detail later in the course). Keep needles separate from other instruments to prevent damage or loss. Once used, dispose of needles properly. Usually, they are placed in the sharps disposal box to be incinerated later. Some needles may be reusable.

Take special care to separate these needles from the disposable ones. Most operating rooms have some type of sterile, disposable container or pad for holding used blades and needles on the sterile field. Some of these containers are magnetic while others use various combinations of foam and adhesive contact surfaces. These containers not only make it much easier to account for needles and blades, but also prevent injury and accidental contamination of the sterile field.

Finally, here are three basic rules for passing and handling sharp items on the sterile field.

1. When possible, use the hands-free technique for passing sharp items. This method involves establishing a neutral ground on the field. When a surgeon asks for a sharp instrument, the scrub places it in the neutral zone and the surgeon retrieves it. After use, the surgeon returns the instrument to the neutral zone, and the scrub retrieves it.
NOTE: We’ll discuss this method in detail in volume 4.
2. When you must pass sharp instruments to the surgeon, pass them in the position of use. This is extremely important when passing sharp instruments, particularly scalpels.
3. Always make sure the surgeon has a firm grip on the instrument before you release it.
4. Any needles, scissors, or scalpels left lying on the sterile field by the surgeon should be retrieved by the scrub technician immediately and put back in their proper place on the setup.

If, despite all your safety measures, you are injured by a needle, blade, or other sharp instrument, the incident needs to be reported to the OR supervisor or NCOIC as soon as possible. You and your NCOIC should fill out a hospital incident report and certain tests may be required to ensure you are not infected with an infectious disease. With the risk of infection posed by blood-borne (and other) pathogens, always report all sharp instrument injuries.

036. Safety guidelines for other medical equipment

In just about any area you work in the surgical environment, it contains a formidable array of “high-tech” equipment. No one expects you to become an expert on every piece of equipment you come in contact with, but you do have to learn how to set up and operate most of it. We discuss setting up some equipment in a later volume. If you can recall your class on medical supplies and equipment in technical school, you’ll remember that everyone in the Air Force is responsible for taking care of government property. In your case, that includes learning how to use, and safely operate, the equipment common to your duty section. It also includes performing some basic operator maintenance to maintain the equipment in good working order. There are two specific areas of equipment responsibility you need to be aware of—using new equipment and preventive maintenance.

Using new equipment

As we’ve stressed before, personnel who use any equipment, especially new equipment that they know little about, must be properly trained and checked out before they are allowed to operate that equipment. Statistics show that over 70 percent of medical equipment malfunctions can be attributed to operator error. Proper training and orientation can usually prevent this. Medical equipment is extremely expensive and funds are very limited. Therefore, you must get maximum use from all equipment items in your section.

Preventive maintenance

This level of maintenance includes the care and servicing of equipment to maintain it in serviceable condition. Preventive maintenance (PM) includes proper operation, systematic inspection, and the detection and correction of potential failures, either before they occur or before they develop into major defects. PM is the joint responsibility of the biomedical equipment maintenance technician (BMET) and the operator of the equipment (you!). It is an extremely important part of any maintenance program.

Operator maintenance responsibilities include proper operation and use, maintenance of oil levels, simple lubrication, daily inspections, cleaning, and minor exterior equipment repairs.

BMET responsibilities include scheduled periodic technical inspections, lubrication requiring disassembly, replacement of worn or deteriorated parts, interior cleaning, adjustments, and calibration.

Safety standards for surgical lasers

“Laser” is an acronym for how a laser works—Light Amplification by Stimulated Emission of Radiation. Although this lesson will not get into how a laser works, it is important for you to know that stimulated and light are the key words to understanding and safely using lasers. Light waves stimulate molecules to generate additional light waves, which, if allowed to continue, generate millions of similar waves until an intense beam of light is created. We cover the use of and specific types of lasers in volume 5; for now, we look at the safety guidelines that pertain to using most surgical lasers.

Every facility is different, and each uses lasers of different types and in different ways. Because of this, standards have been developed to provide guidelines and requirements for safely using lasers.

All medical treatment facilities using surgical lasers must establish and maintain an adequate laser safety program for controlling laser hazards. The laser safety program shall include the provisions below:

- A trained laser safety officer (LSO) who has ultimate authority and responsibility for the program.
- The education of users.
- Any protective measures for personnel, patients, and the environment.
- To manage necessary recordkeeping for medical surveillance, to report accidents, laser registration, OIs, and personnel certification.

The LSO should also have the responsibility and authority to shut down the laser if a hazardous condition should occur, which means they should be in the room any time a laser is being operated. Covering all aspects of laser safety is impractical for this text, so we only discuss some of the basic safety precautions. The laser is a very powerful and potentially dangerous piece of equipment, so the most important safety guideline is this: never set up, adjust, operate, or otherwise use a laser unless you are thoroughly trained and authorized to do so. Not taking the proper safety precautions can cause you and everyone involved in the procedure serious harm.

Environmental safety

Everyone must be aware of the hazards of laser surgery. Only properly trained personnel are authorized to participate in laser surgery. Some of the precautions you will use during laser surgery include these:

- Post appropriate warning signs on entry doors. Warning signs and labels play an extremely important role in controlling laser hazards. Warning signs may include information about specific precautionary warnings such as “Knock Before Entering,” as well as the kind of laser in use, emitted wavelengths, pulse duration, and maximum output.
- Keep the doors to the room latched or locked while the laser is in use to prevent entry of unprotected or unauthorized persons.
- Develop and use a checklist to prepare, check, and test the laser before the patient is brought into the room. Any malfunction must be reported immediately and the equipment should not be used until it is in proper working order.
- Follow the manufacturer’s instructions strictly for operation and care of the laser. Proper care of lasers and accessory equipment is essential to patient, personnel, and environmental safety.
- Ensure that manufacturer-warning labels are properly affixed to the machine. These labels must indicate points of danger to avoid personnel exposure to laser radiation.
- Use the **standby** or **stop** setting whenever the laser beam is not needed to prevent accidental activation or “firing” of the beam. The laser should be turned OFF and locked when left unattended for an extended period.
- Surgeons are the only individuals who should operate the laser foot pedal to prevent accidental activation of the laser beam. The assistants should operate the pedals for the bipolar or electrosurgery unit. If the surgeon must operate an additional foot pedal, such as for a microscope, place the nonlaser pedal behind him or her.
- Use nonreflective instruments in or near the beam. These instruments may be of a dull blue finish titanium alloy, oxidized stainless steel, or black chrome-plated stainless steel. These defocus and disperse the laser beam (because the beam is a light beam).
- Provide adequate ventilation by using a smoke evacuation system to protect personnel from hazardous by-products from vaporization and hazardous materials associated with laser operation. Airborne contaminants should be captured near the point of evolution. When

practical, instruments that help evacuate smoke, such as endoscopes with additional evacuation portals and speculums with an additional portal for suctioning, should be used.

- Keep in mind the electrical hazards related to high-wattage equipment.

NOTE: All personnel operating the laser must adhere to this.

Patient safety

As with any surgical procedure, the surgeon must explain laser surgery and the potential complications from the surgery to the patient and obtain their written consent. With all lasers, the following precautions should be taken to ensure patient safety:

- Noncombustible anesthetic agents must be used.
- You should use insulated or metallic silicone endotracheal tubes to prevent possible ignition of the endotracheal tube for oral and laryngeal procedures.
- Protect the eyes with moistened eye pads taped securely in place on nonophthalmic procedures.
- Do not use alcohol-based prepping solutions (ethyl or isopropyl alcohol) for skin preparation. Remember, the laser beam is analogous to a flame; it produces heat. All flammable liquids such as alcohol must be kept away from the field.
- Place moistened woven textile or absorbent nonwoven towels over the drapes around the immediate incision area prior to using the laser.
- Protect the tissue surrounding the target tissue with moistened sponges or compressed patties.

A recommendation that a scrub technician has to pay particular attention to is to keep an irrigating syringe and sterile saline on the field. The abdomen, cranium, or other cavity being operated in cavity may be filled with sterile saline to absorb the energy of the carbon dioxide (CO₂) beam in areas not intended for laser application. Sterile saline is also necessary because there have been instances of dry drapes, sponges, and towels inadvertently ignited by the CO₂ laser beam or a hot fiber optic cable.

Personnel safety

Many of the measures already listed protect personnel as well as the environment and the patient, but additional guidelines specifically protect surgical personnel. Most of these guidelines are precautions to avoid skin or eye exposure to direct or scattered radiation during the laser procedure.

Protective eyewear must be worn and should be appropriate for the type of laser system being used.

The most susceptible organ to laser injury is the eye. Because different laser wavelengths are absorbed by and affect the eyes differently, eyewear color and make-up is specific for each type of laser. Argon and Nd:YAG laser beams are absorbed by the retina; CO₂ laser beams are absorbed by the cornea. Argon lasers require amber-tinted lens filters; the Nd:YAG laser requires green-tinted lens filters, and the CO₂ laser requires clear glass or plastic.

Selecting the proper eyewear is based on several other factors. These include, but are not limited to the output parameters of the laser (wavelength, irradiance or radiant exposure, and maximum exposure duration); comfort and wearability, luminous transmittance (the ability of a person to see through the protective lens); optical density (filterability of the material), and the need for prescription glasses.

The protective eyewear for laser use can produce its own hazards. Eyewear can be hot or irritating, posing a distraction to the surgeon or other team member. It can be damaged, and if undetected, lead to a false sense of security; routinely inspect the eyewear for leaks, cracks, discoloration, or other defects. The colored lenses may prevent the operator from being able to see the laser beam; therefore, persons wearing laser eyewear must be especially careful to avoid intercepting the beam with their body or clothing. Fogging can be a problem in hot and humid environments with some goggles styles. Goggles or spectacles with opaque side shields can be hazardous when peripheral vision is essential

to avoid other hazards. People who wear prescription lenses must have protective eyewear that fits over their glasses (coverall goggles) or have a pair of prescription laser safety spectacles made.

Personnel must exercise extreme caution and look for symptoms of exposure to laser radiation or beams. Overexposure to ultraviolet radiation can result in skin sensitivities. Exposure to direct or reflected laser energy can cause burning of the skin. To minimize these hazards, personnel must use extreme caution and be alert to the warning signs in the laser area, and read and follow all warning labels on the machine.

High-filtration “laser” masks should be worn, even when high efficiency smoke evacuators are used. Some viruses and microorganisms have been found to survive in the smoke generated by lasers. To prevent inhalation exposure by surgical team members, specifically designed high-filtration masks should be worn by all personnel involved in the procedure.

Radiographic (X-ray) equipment

When you take X-rays or use fluoroscopy in the operating room, you must take precautions to protect the patient and personnel from the hazards of radiation exposure. Radiation has the ability to modify molecules within body cells. Strict adherence to policies and procedures are necessary to avoid excessive exposure to radiation. Radiation is not seen or felt. Excessive exposure to radiation can cause anemia, sterility, and even burns.

Key factors in minimizing radiation exposure are physically shielding from, increasing the distance from, and limiting the time exposed to, the radiation source. If you know that you are going to be a sterile team member during a procedure involving exposure to radiation, always shield yourself by donning a lead apron prior to scrubbing and putting on your scrub gown. Nonsterile team members have the opportunity to leave the room, you probably won't. If an X-ray will be taken and you are not wearing a lead apron, stand behind a lead shield (or someone who is wearing an apron). If you must stay in the room and a shield is not available, stand as far away from the radiation source as practical; one source recommends a distance of at least six feet. One way to help limit the time of exposure is to rotate assignments so one person does not “scrub” every procedure involving X-ray. If X-ray is used extensively in your facility, you may be required to wear special radiation dosimeter badges to monitor your exact exposure.

For the welfare of the patient, the following should be performed:

- Damp-dust the X-ray machine or C-arm image intensifier before it is brought into the operating room. The X-ray tube or C-arm may be covered with a sterile drape or sleeve before it is moved into the sterile field.
- Make sure that the X-ray cassette holder is properly positioned on the operating table. After the patient is positioned, a scout film or brief fluoroscopic exposure may be taken to check the cassette placement. If the X-ray machine or C-arm image intensifier must be moved out of the way during the surgical procedure, mark the floor with a piece of tape to ensure proper repositioning later on.
- Maintain aseptic technique at all times. Cover the operative field with a towel while the X-ray tube is over it.
- You must enclose the X-ray cassette in a sterile cover if it is to be placed within the sterile field. Disposable sterile X-ray cassette covers or a mayo tray cover can be used for this. Be sure that the scrub's gloved hands are well protected by the cover's cuff when the circulator places the unsterile cassette into the sterile cover.
- Remove all instruments and metallic or radiopaque items from the operative site.
- Make sure that the radiology department is notified that their services will be needed. Waiting for radiology personnel makes for unnecessary delays, which, in turn prolongs the patient's operation.

Summary

Safety is everybody's responsibility. While we could not cover every unsafe action or event you may run across, we did focus on some of the basic guidelines for our best safety weapon—prevention.

This unit opened with a look at some of the formal safety programs of the Air Force, particularly the AFOSH program. Two major elements of AFOSH were discussed, 91–203, *Air Force Consolidated Occupational Safety Instruction* and AFI 90–821, *Hazard Communication (HAZCOM) Program*. We also have looked at some key personnel in the hospital safety program, and procedures for reporting accidents and incidents. The second listed some basic safety guidelines, and emphasized the use of proper body mechanics. We thoroughly discussed electrical safety and the final section covered some specific safety guidelines that are unique to the surgical environment. Before moving on to the last unit in this volume, “Medical Terminology,” answer the following questions. Review the areas you don't feel you “safely” understand.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

033. Safely handling, using, and storing compressed gases and caustic chemicals

1. When a piped-in gas line fails the test, when can it be used again?
2. What is the purpose of a cutoff valve?
3. Why should you avoid using a flame or boiling water to thaw out a frozen cylinder valve?
4. Identify three safety requirements pertaining to the storage of large compressed gas cylinders.
5. What is the purpose of the pin-index safety system?
6. What is meant by the phrase “cracking the valve?”
7. After attaching the regulator, what precaution should you take when opening the main tank valve to check the tank pressure?
8. List five safety considerations that relate to handling and using compressed oxygen.
9. What is the purpose for wearing protective gloves when handling chemical agents?

10. What should be your reference for chemical disposal techniques?
11. What's the most important rule to follow when handling any chemical?

034. Basic sterilizer safety guidelines

1. What is the main hazard associated with steam sterilization?
2. What should you do before opening the sterilizer door to prevent being burned by steam?
3. What safety measure can you take when unloading a steam sterilizer and handling recently sterilized items?
4. What is the first action you should take if a spill occurs during a peracetic acid sterilization cycle?
5. What type PPE should you wear when cleaning up a peracetic acid spill?
6. How do you dispose of the sterilant if a spill occurs during a peracetic acid sterilization cycle?
7. What types of items should not be sterilized in a hydrogen peroxide plasma sterilizer, and why?
8. What action should you take if skin or eye contact occurs while using hydrogen peroxide?

035. Handling sharp instruments, glassware, and needles

1. What instrument is used to safely arm and disarm a scalpel blade?
2. How is a scalpel blade picked up if it falls on the floor?
3. Whose responsibility is it to remove and properly dispose of scalpel blades following a surgical procedure?

4. List safety rules that should be followed when handling sharp instruments.
5. Why are glass items, such as syringes and medicine glasses, inspected before use?
6. What do you look for when inspecting needles?
7. Why are needles separated from other instruments?
8. Cite three safety practices you should follow when passing and handling sharp items on the sterile field.

036. Safety guidelines for other medical equipment

1. What causes most medical equipment malfunctions?
2. What activities are included under any PM program?
3. Who is responsible for performing simple lubrication, cleaning, and routine inspections of medical equipment?
4. Who performs periodic technical inspections and calibrates medical equipment?
5. What does the acronym LASER stand for and what does it mean?
6. What type of instruments should be used within a laser field, and why?
7. Which organ is most susceptible to laser damage?
8. What color lens is required for protective eyewear for an argon laser? Nd:YAG laser? CO2 laser?

9. List the three key factors in minimizing radiation exposure.
10. What should you do if you know X-ray will be used on a procedure you are scheduled to scrub?

Answers to Self-Test Questions

024

1. To protect all Air Force personnel from work-related deaths, injuries, and occupational illness.
2. Any eight of the following:
 - (1) Ensure that all OSH guidelines and standards that apply to their workplace are available to personnel.
 - (2) Ensure compliance with OSH, fire protection, and health programs that apply to their workplace.
 - (3) Ensure the AFOSH program requirements are part of measuring commanders', military and civilian supervisory personnel's performance. The performance evaluation and appraisal of commanders, military and civilian managers, and supervisors will include measuring to what extent they discharge responsibilities of this instruction in a manner consistent with specifically assigned duties and authorities. Military and civilian nonsupervisory personnel must also be evaluated if occupational safety and health work performance is a significant factor in their assigned duties.
 - (4) Provide safe and healthful workplaces, conduct periodic self-inspections for hazards or deficiencies, and conduct a job safety analyses for each work task and when a new work task or process is introduced to the workplace to determine potential hazards. Also, consult the installation ground safety staff and/or the bioenvironmental engineer when assistance is required.
 - (5) Establish and implement a hazard reporting and abatement program.
 - (6) Notify installation ground safety personnel of mishaps and accidental occurrences as soon as possible after the accidental event.
 - (7) Establish procedures for employees to follow in imminent danger situations.
 - (8) Provide training for employees in job safety, fire prevention and protection, and health as required by OSH guidelines.
 - (9) Notify the installation ground safety staff when a military or civilian becomes a supervisor for scheduling required supervisor safety training.
 - (10) Enforce compliance with OSH guidelines.
 - (11) Ensure areas and operations requiring PPE or other special precautions are identified and posted as necessary. A job safety analysis will also be required to identify appropriate PPE and AFI 91-203 should be used for guidance.
 - (12) Ensure compliance with PPE program requirements.
 - (13) Ensure compliance with the AFHCP as outlined in AFI 90-821.
 - (14) Maintain BE, safety, and fire prevention periodic reports until superseded.
 - (15) Brief all personnel on the findings and recommendations contained in annual and baseline BE surveys and reports, which will be maintained on file in the workplace for a minimum of 10 years. As well, a copy of the survey report will be posted on the workplace bulletin board for 10 days after receipt to allow all workers free access to the findings.
3. Any two of the following:
 - (1) Comply with OSH guidance.
 - (2) Report safety, fire, and health hazards and deficiencies promptly.
 - (3) Report injuries and illnesses to the supervisor promptly.
 - (4) Comply with PPE requirements that apply to the work situation, including its use, inspection, and care.

- (5) Give due consideration to personal safety and the safety of fellow workers while doing assigned tasks.
- 4. Any two of the following:
 - (1) Take part in the AFOSH program without fear of coercion, discrimination, or reprisal.
 - (2) Request inspections of unsafe or unhealthful working conditions or report them to the supervisor, safety manager, fire protection specialist, or BE, including OSHA officials.
 - (3) Have access to applicable OSHA and AFOSH standards, installation injury and illness statistics, safety, fire protection, health program procedures, their personal exposure, and medical records.
 - (4) Decline to perform an assigned task if there is a reasonable belief that the task poses an imminent risk of death or serious bodily harm. The person and local management may request an assessment by installation safety, fire protection, or health professionals before proceeding.
 - (5) Use official on-duty time to take part in AFOSH program activities.

025

- 1. AFI 91-203.
- 2. Above 50 percent.
- 3. Be certified "explosion proof."
- 4. Doing so confines gas vapors under the cover, which can ignite from a static spark when the cover is removed.
- 5. A low-pressure alarm system.
- 6. Any four of the following:
 - (1) Hazardous wastes (such as medical waste).
 - (2) Tobacco or tobacco products.
 - (3) Wood or wood products.
 - (4) Finished articles.
 - (5) Food, drugs, cosmetics, or alcoholic beverages in a retail establishment and packaged for sale to consumers.
 - (6) Food, drugs, or cosmetics intended for personal consumption by employees while in the workplace.
 - (7) Consumer products used in the workplace in the same manner as normal consumer use, and which use results in a duration and frequency of exposure not greater than exposures experienced by consumers.
- 7. Any four of the following:
 - (1) How employees can obtain and use appropriate MSDS.
 - (2) Any operations in work areas where hazardous materials are present.
 - (3) Location and availability of the hazardous chemical inventory and MSDS master file.
 - (4) Methods and observations that may be used to detect the presence or release of hazardous material in the work area such as monitoring conducted by BE, visual appearance and odor of hazardous materials, and so forth.
 - (5) Physical and health hazards associated with potential exposure to work area hazardous materials.
 - (6) Measures employees can take to protect themselves from hazards.
 - (7) Explanation of the labeling system.
- 8. On an AF Form 55 or on an approved computer-generated substitute.

026

- 1. The facilities manager.
- 2. Any three of the following:
 - (1) Performing area fire marshal duties and local procedures for fire and safety inspections, drills, and training.
 - (2) Providing liaison with the base ground safety office and acting as a point of contact for the medical facility on safety matters, inspections, and investigations.
 - (3) Developing local safety procedures to include safety briefings and newcomer orientations.

- (4) Completing reports on each accident, incident, or mishap occurring on the grounds of, or in, the MTF involving patients, staff, or visitors.
- (5) Ensuring that monthly safety meetings are held in conformance with JC standards AFI 91-203.
3. The safety NCO.
4. All supervisors.
5. All personnel assigned to first-level supervisory positions.

027

1. All incidents, minor or otherwise.
2. AF Form 765.
3. The first step is to tell your supervisor verbally, who then determines if the incident warrants documentation. If so, then either you or your supervisor completes AF Form 765, providing detailed, specific, factual information, not assumptions, or conclusions. Forward the form to the facility risk manager and safety officer.
4. Investigating and correcting the reported hazards as a preventive measure.
5. AF Form 457.

028

1. Training that occurs before operating a piece of equipment or performing a procedure to prevent inadvertent damage and, more importantly, to reduce the chances of injuring yourself, your coworkers, or patients.
2. Discipline.
3. Personal distracters.
4. Improper use not only damages the instrument, but also poses a hazard to you and your patient.
5. Mental and physical fitness are essential for working at peak proficiency; you must have mental agility to be able to recognize problems with your patients and to stay one-step ahead of the surgeon. Physical fitness is also necessary for enduring the long hours of standing at the OR table and for being able to safely transfer patients to and from gurneys or beds. Finally, if you are physically fit, you are much more capable of remaining mentally alert, and able to perform your duties safely and effectively.

029

1. Any four of the following:
 - (1) Keep your feet roughly parallel, six and twelve inches apart.
 - (2) Distribute your weight equally, preferably on the balls of your feet.
 - (3) Flex your knees slightly and do NOT lock them.
 - (4) Pull in and tighten your abdominal and buttocks' muscles to help keep your lower spine straight.
 - (5) Pull your shoulders back, slightly thrusting your chest up and out. Try to elongate your waistline.
 - (6) Keep your neck straight, head forward, and chin slightly in. Avoid curving the spine supporting your head.
2. To use the largest and strongest muscles or muscle groups to do most of the work.
3. How you will do so, what equipment you need, and how much help, if any, you need.
4. By keeping your work close to your center of gravity, which keeps the work aligned with the exertion.
5. Because the force of momentum is lost when you hesitate, and smooth motions use your muscles more efficiently.
6. In the shoulders, upper arms, thighs, and hips.
7. The muscles of your legs and thighs.
8. It creates a muscular "girdle" of support around the intervertebral disks, preventing them from slipping out of place.
9. By bracing yourself against the side of the bed and using your body weight to pull the patient towards you.
10. Because it is easier to overcome the resistance to momentum caused by friction than the resistance caused by gravity.

030

1. A form of energy produced when negatively charged electrons flow from one point in a material to another.
2. The material must be a good electron conductor, such as metal or carbon; resistance must be kept to a minimum and the current path must be continuous (unbroken).
3. Amount of current flow (amperage) and the route the current takes through the body.
4. Microshock.
5. When the current flow is concentrated in a small area of tissue, typically by contact with an external conductor.
6. There must be a combustible material, an ignition source, and oxygen or an oxygen-supplying substance.
7.
 - (1) Avoid storing supplies within 18 inches of a light fixture and make sure that any naked light bulbs are protected by a cage or protective cover.
 - (2) Do not allow portable personal electric devices such as radios, hotplates, and coffee makers in the surgical suite unless they meet electrical safety standards and have been approved for use by biomedical equipment repair personnel. These items should be restricted to areas where no patient care is provided.
 - (3) Keep the OR clean! One of the best fire prevention methods is good housekeeping. Not only does this help eliminate sources of bacterial contamination, but it also eliminates most common causes of combustion.
8. Remove it from service and make sure it is checked by qualified maintenance personnel.
9. The insulation and internal wire could be damaged.
10. Avoid the use of extension cords. If they must be used, they should be constructed of heavy-duty, three-conductor wire with an UL approved, "hospital grade" plug. Two-wire, household-type extension cords are strictly prohibited.

031

1. A copper rod driven into the ground outside the facility, usually close to the area where the main power lines are brought into the building.
2. The current seeks a ground through other pathways, such as you or your patient, resulting in an electric shock. Another consequence is the possibility of creating sparks that could lead to a fire or explosion.
3. The electrical circuits in the designated area are isolated from the grounded main power circuits. The isolated circuits don't include the common hospital ground in their current pathways and electrical current only flows from one wire to another, and the electricity in this system does not automatically seek ground.
4. It constantly monitors isolated circuits for ground faults and power overloads.
5. Unplug each piece of nonessential equipment until the alarm goes off. The last device unplugged before the alarm went off is the defective unit.

032

1. Deep patient skin burns.
2. Displayed on or attached to the unit.
3. Vapors from the agent can collect in the drapes and ignite when the electrosurgery unit is activated.
4.
 - (1) Place it as close to the surgical site as possible.
 - (2) Contact the dispersive electrode to a large skin area free of hair and scar tissue.
 - (3) Do not place it over bony prominences.
 - (4) Place the ground electrode on or under a large muscle or soft-tissue mass.
5. An equipment malfunction or a defective active or inactive electrode.

033

1. When the problem with the line or alarm panel is resolved.
2. The cutoff valves allow the piped-in gas to be shut down in the event of an emergency, such as if a fire occurs in the operating room.
3. The heat from the flame or boiling water can ignite leaking explosive vapors.

4. Any three of the following:
 - (1) Store them in an area well ventilated, cool, and isolated from hospital traffic areas.
 - (2) Store them upright with protective caps in place and be secured by a strap or chain.
 - (3) Do not store anesthetic gases with oxygen cylinders.
 - (4) Empty cylinders should always be plainly marked and stored in a different area than full cylinders.
5. It prevents one type of gas cylinder from being accidentally connected to the regulator for another type of gas.
6. Quickly opening and closing the tank valve to blow dust and foreign matter out of the valve outlet.
7. Open the tank valve slowly until the gauge needle stops rising.
8. Five safety considerations that relate to handling and using compressed oxygen are:
 - (1) Never handle oxygen tanks with greasy/oily hands.
 - (2) Never drape an oxygen cylinder with a gown, cap, mask, sheet, or other material, which may create a pocket of oxygen-rich air under the drape that could ignite when the drape is removed. This is why anesthesia machines are never covered. They not only have small oxygen cylinders, but are also usually hooked up to piped-in oxygen.
 - (3) Post NO SMOKING signs where everyone can see them when oxygen is in use, although there is no smoking allowed any place.
 - (4) Never use oxygen fittings, valves, regulators, or gauges for any other service except oxygen.
 - (5) Never use oxygen from a cylinder except through a pressure- reducing regulator. These special regulators allow the pressure to be reduced to a level suited for medical use. In a covered container system in a well-ventilated area.
9. To prevent chemical contact burns of the skin and absorption of the chemical into the bloodstream as well as hands from direct contact and long-term absorption effects.
10. The manufacturer's directions.
11. Follow instructions contained in the MSDS and your local policy.

034

1. The chance of being burned.
2. Ensure the chamber pressure is zero, then open the door by standing towards the hinged side, and keep the door between you and the opening chamber.
3. Wear insulated gloves to protect hands and forearms.
4. Press the cancel button.
5. Gloves, impervious clothing, eye goggles, and a mask.
6. While you still have on your PPE, carefully remove the container from the sterilizer and submerge it into a sink filled with at least 12 inches of water. Open the container carefully with a pair of scissors to allow the sterilant to mix with the water, making sure you cut both containers in half so the powder and liquid mixes with the water so it can be diluted. Then rinse both cups with large amounts of running water. Dry the containers and dispose of them in the trash.
7. Paper, cotton, or other materials made from cellulose because they will absorb the hydrogen peroxide, which interferes with the sterilization process.
8. Flush the area immediately with large amounts of water and seek medical attention.

035

1. A needle holder.
2. With a piece of wide adhesive tape.
3. The scrub technician's.
4.
 - (1) Avoid grabbing or handling the functional end of the instrument (use the handles).
 - (2) Keep sharp instruments separated from other instruments.
 - (3) Inspect sharp instruments before they are used on a patient always.
5. Chipped or cracked glass can allow tiny glass fragments to be introduced into a patient's body.

6. Burrs, bent tips, and defective cutting edges.
7. To prevent damage and loss.
8. Cite any of the following:
 - (1) When possible, use the hands-free technique for passing sharp items.
 - (2) If they must be passed, pass them in the position of use.
 - (3) Make sure the surgeon has a firm grip before releasing the sharp item.
 - (4) Retrieve any sharp instruments or items left lying on the sterile field.

036

1. 70 percent by operator error.
2. Proper operation, systematic inspection, the detection and correction of potential failures before they occur or before they become a major defect.
3. The equipment operator.
4. The BMET.
5. Light amplification by stimulated emission of radiation and it describes how a laser works.
6. Nonreflective instruments; they defocus and disperse the laser beam.
7. The eye.
8. Argon: amber; Nd: YAG: green; and CO2: clear glass or plastic.
9. Physically shielding from, increasing the distance from, and limiting the time exposed to the radiation source.
10. Shield yourself by donning a lead apron prior to scrubbing and putting on your scrub gown.

Do the unit review exercises before going to the next unit.

Unit Review Exercises

Note to Student: Consider all choices carefully, select the *best* answer to each question, and *circle* the corresponding letter.

45. (024) The *primary* purpose of the Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) program is to
- a. establish and implement a hazard reporting and abatement program.
 - b. protect all Air Force personnel from work-related deaths, injuries, and occupational illnesses.
 - c. ensure all personnel have available, and properly wear, all personal protective equipment when appropriate.
 - d. enforce compliance with all Occupational Safety and Health Administration (OSHA) guidelines and standards.
46. (025) AFI 91–203, *Air Force Consolidated Occupational Safety Instruction*, was designed to
- a. assist managers of Air Force organizations in maintaining Occupational Safety and Health Administration (OSHA) requirements.
 - b. explain the Air Force Fraud, Waste and Abuse program relating to the surgical environment.
 - c. provide Air Force supervisory safety training for all surgical technicians.
 - d. enforce all commanders' organizational safety responsibilities.
47. (025) Which type of products does AFI 90–821, *Hazard Communication (Hazcom) Program*, not pertain to?
- a. Tobacco products.
 - b. Hazardous waste, such as medical waste.
 - c. Chemical disinfectants.
 - d. Drugs intended for personal consumption by employees in the workplace.
48. (025) Which form is used to document safety, fire protection, and health training for all Air Force personnel?
- a. Material Safety Data Sheet (MSDS).
 - b. AF Form 55, Employee Safety and Health Record.
 - c. AF Form 457, USAF Hazard Report.
 - d. AF Form 765, Medical Treatment Facility Incident Statement.
49. (026) This individual is *usually* appointed as the safety officer in an Air Force medical treatment facility.
- a. Facilities manager.
 - b. Resource management officer.
 - c. Superintendent of hospital services.
 - d. Ranking member on the quality assurance committee.
50. (026) Who is responsible for training workers on how to identify and report hazards, accidents, and incidents?
- a. Individual.
 - b. Supervisor.
 - c. Risk manager.
 - d. Safety officer.

51. (026) Who *must* attend the Air Force Supervisor Safety Course?
- All Air Force personnel.
 - All first-level supervisors.
 - Only the medical facility safety officer.
 - Only functional area safety noncommissioned officers (NCO).
52. (027) What is the *quickest* and *most* effective way to abate hazards?
- Report all injuries and mishaps to the hospital risk manager.
 - Report any situation you think may be hazardous to your supervisor.
 - Complete AF Form 457, USAF Hazard Report, and forward it to the safety officer.
 - Complete AF Form 765, Medical Treatment Facility Incident Statement, and forward it to the safety officer.
53. (027) What form would you use to document any safety condition that is *not* immediately corrected?
- Material Safety Data Sheet (MSDS).
 - AF Form 765, Medical Treatment Facility Incident Statement.
 - AF Form 457, USAF Hazard Report.
 - AF Form 55, Employee Safety and Health Record.
54. (028) What *principle* of general safety are you following when you check all the safety factors associated with a particular task or procedure, even the routine ones?
- Alertness.
 - Discipline.
 - Competency.
 - Environmental safety.
55. (028) Which unsafe practice is one of the *biggest* causes of job absenteeism in the Air Force and civilian industry?
- Working too fast.
 - Horseplaying in the work area.
 - Using the wrong tool for a job.
 - Lifting heavy objects improperly.
56. (029) Which is *not* a guideline for good posture while you are standing during surgery?
- Slightly flex, but do not lock, your knees.
 - Pull in and tighten your abdominal and buttocks muscles.
 - Keep your feet perpendicular, between 12 and 20 inches apart.
 - Distribute your weight equally, preferably on the balls of your feet.
57. (029) Which large, strong muscles should you use *primarily* when picking a heavy object up off the floor?
- Forearm muscles.
 - Abdominal muscles.
 - Lower back muscles.
 - Large leg muscle groups.
58. (029) When lifting or moving patients or heavy objects, you can increase the *efficiency* of your muscle power by
- using leverage to help move or lift the patient or object.
 - keeping your center of gravity close to your base of support.
 - moving the patient or object within reach so that you can stand erect.
 - widening your base of support by standing with your feet farther apart.

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-
59. (030) Materials such as glass, rubber, and plastic are resistant to electrical flow and are called
- amps.
 - volts.
 - insulators.
 - conductors.
60. (030) What type of electric shock will occur if you touch a *live* wire connected to a wall power outlet?
- Macroshock.
 - Electrostatic.
 - Low-voltage.
 - Microshock.
61. (030) What should be done with an electrical device that shows signs of external damage?
- Continue to use the device until it malfunctions.
 - Remove it from service and send it to maintenance for testing.
 - Plug it in to see if current is leaking into the damaged cabinet.
 - Remove the cabinet and perform operator maintenance to repair the damage.
62. (030) If an extension cord *must* be used in surgery, it should be constructed of
- light-duty, two-conductor wire.
 - light-duty, three-conductor wire.
 - heavy-duty, two-conductor wire.
 - heavy-duty, three-conductor wire.
63. (031) Why do operating rooms have isolated power systems?
- To provide a backup source of electricity during power outages.
 - To prevent power surges from damaging sensitive electrical equipment.
 - To help prevent electrical shocks caused by leakage current from defective equipment.
 - To step up the line voltage in order to operate all the high-powered equipment used in the operating room (OR).
64. (031) What is the *first* thing you do when a continual line isolation monitor indicates there is a ground fault or circuit overload?
- Shut off and unplug the last electrical device that was plugged in.
 - Shut off and unplug the first electrical device that was plugged in.
 - Tell the surgeon a hazardous situation exists and call facilities management.
 - Unplug all electrical equipment in the operating room and call the fire department.
65. (032) The *greatest* risk during electrosurgery is
- a fire.
 - an explosion.
 - some deep patient burns.
 - a physician experiencing macroshock.
66. (032) Which type of electrosurgery system always requires using a separate patient grounding electrode?
- Monopolar.
 - Bipolar.
 - Tripolar.
 - Multipolar.

67. (032) To use electrosurgery guidelines on a patient, you *must* place the ground electrode pad on a
- large skin area as close to the surgical site as possible.
 - large skin area as far from the surgical site as possible.
 - bony prominence as close to the surgical site as possible.
 - bony prominence as far from the surgical site as possible.
68. (033) This safety feature is found on each piped-in compressed gas line.
- Valve cap.
 - Remote cut-off valve.
 - Pin-index safety system.
 - Gas-specific key lock system.
69. (033) What safety feature found on small, E size gas cylinders, and their corresponding regulators, prevents you from accidentally making the wrong connection?
- A pin-index safety system.
 - A gas-specific key lock system.
 - A gas-unique color coding system.
 - A variable valve outlet thread pattern.
70. (034) What is the *main* hazard associated with any type of steam sterilizer?
- Burns.
 - Explosion.
 - Toxic vapor.
 - Macroshock.
71. (034) What action should you take to reduce the risk of being burned when sterilizing solutions?
- Cool the hot bottles by slowly pouring cold water over them.
 - Crack the lids on the bottles to allow the steam inside to vent out slowly.
 - Place the solutions on a cool storage shelf immediately after they are sterilized.
 - Run the solutions as the last sterilizer load of the day so they can cool overnight.
72. (035) The *best* instrument to use when applying scalpel blades to a handle and taking them off is a
- needle holder.
 - Kocher clamp.
 - mosquito clamp.
 - Rochester-Pean clamp.
73. (035) What should you do as soon as possible if you are injured by a sharp instrument, needle, or blade?
- Check your immunization record to see if you need a tetanus shot.
 - Do a long surgical scrub every two hours for the first 12 hours after the injury.
 - Use double gloves to prevent contamination of your wound with germs from the patient.
 - Report the incident to the noncommissioned officer in charge (NCOIC) or operating room (OR) supervisor so that an incident report can be filled out.
74. (036) Which type of instruments should *not* be used in or near a laser beam?
- Oxidized.
 - Reflective.
 - Black-colored.
 - Dull blue titanium.

75. (036) This organ is *most* susceptible to laser injury during surgery.

- a. Eye.
- b. Liver.
- c. Ovary.
- d. Uterus.

Student Notes

Unit 5. Medical Terminology

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LIKE ANY other occupation or profession, members of the Medical Service use unique terms and expressions to communicate with one another. In technical school, you were introduced to the “language of medicine”; but since the terms and expressions were most likely new to you, and working situations were only simulated, you probably did not retain everything. Nobody expects you to memorize a medical dictionary. Once you know some of the most commonly used medical and surgical terms, and develop an understanding of how these terms are formed, you will probably be able to figure out what a surgeon is talking about, or at least which anatomical region the surgeon is referring to, by the components of the words used.

For you to understand what other members of the surgical and healthcare delivery team are talking about effectively, this unit reinforces what you learned in technical school, and adds some new terms. The first section will discuss the elements of medical terminology and how these elements are combined to form medical terms. In the second section, you will study some medical terms used to describe operations, commonly used medical abbreviations and symbols, and medical reference terms for anatomical relationships and body movement.

Before you can become an adept “medical linguist,” you need to learn more about the various components or elements that are combined to form medical words.

5–1. Elements of Medical Terminology

This section is designed to help you learn commonly used medical terms. It will provide you with an understanding of the basic word components, which, when put together, form those long, hard-to-pronounce (and spell!) medical terms and expressions.

A great number of the words used in medicine and surgery are formed by combining units called *prefixes*, *suffixes*, and *root words*. Many of these units, when used alone, may already be familiar to you, but when you see and hear them combined in a long, strange-sounding word, they may sound more like a foreign language. There is a good reason for this—most medical words are derived from ancient Greek and Latin word components.

Since you should already have a basic working knowledge of medical word components, the simplest way to review them and introduce you to new ones is to provide you with a list. In the text that follows, we briefly discuss the three major word components, list examples of each, and provide you with their corresponding definitions. Then we look at how these elements are combined to form medical terms.

We start by discussing word components that appear in the first part of a medical term—prefixes.

037. Identifying medical prefixes

Perhaps the best way to begin a lesson on terminology is to analyze the meaning of a prefix. A prefix is a syllable or group of syllables joined to the beginning of a root word to alter its meaning or create

another word. Prefixes are always used in conjunction with a root word or with a root word and suffix; they cannot stand alone to form a word or term. With this definition fresh in your mind, carefully study the following list of medically related prefixes, accompanied by their definitions. The list is arranged in alphabetical order to facilitate review.

Prefix	Definition	Prefix	Definition	Prefix	Definition
a-, an-	absence of	exo-, e-	outside	neo-	new
ab-, abs-	away, from	extra-	outside, beyond	non-	not
ad-	to, towards, near	fore-	in front of	olig-	little
aer-	air	glyco-	sugar	pan-	all
ambi-	both	hemi-	half	para-	beside
ante-, antero-	before, forward	hetero-	Other	peri-	around
auto-	self	homo-	same, similar	poly-	many, much
bi-	two	hydra-, hydro-	water	post-	after
bio-	life	hyp-, hypo-	below, less	pre-	before
brady-	slow	hyper-	above, excessive, over	pro-	before, in front of
circum-	around	in-	not, in	pseud-, pseudo-	false
co-, com-, con-	with, together	infra-	below, beneath	retro-	backward, behind
contra-	against, opposed	inter-	between	semi-	half
de-	from, not	intra-	within	sub-	under
dia-	across, through, apart	iso-	equal	super-	above, excess
deca-	ten	latero-	side	supra-	over, above
demi-	half	leuco-, leuko-	white	sym-, syn-	with, together
di-	two	macro-	large	tachy-	fast
dis-	negative, apart	mal-	bad, disordered	topo-	place
dys-	difficult, painful	med-	middle	tox-	poison
ecto-	on the outside	meg-, mego-	great, large	therm-, thermo-	heat
en-	in	melan-	black	trans-	across, through
endo-	within	meno-	monthly	tri-	three
epi-	upon	meta-	beyond	ultra-	excess
erythro-	red	micro-	small	uni-	one
eu-	well, normal	mono-	single		
ex-, e-	away from, without	multi-	many		

There are many more prefixes we could add to this list, but the ones listed should give you a good foundation on which to build your medical vocabulary.

Let's take a look at one of these prefixes and see how it is used to make a word. You are probably familiar with the word "biology." But did you ever stop to think where this word came from? Actually, biology is a combination of two Greek words, "bio" meaning "life," and "logy" meaning "the study of or the science of." When you combine "bio" and "logy," you form the word "biology," which means the science or study of life.

Simple, isn't it? Biology is just one example of how a prefix is combined with other word components to form a term with a definite meaning. If you study (and memorize) the prefixes in the preceding list, you can break down just about any medical term and figure out what it means. Of course, to fully analyze medical terms and decipher their meaning, you also need to understand the elements of medical language that appear at the tail end of a word—suffixes.

038. Commonly used medical suffixes and their meanings

A suffix is a syllable or group of syllables added at the end of a word or a word's base to change its meaning, to give it grammatical function, or to form a new word. Suffixes may be found in combination with a prefix and a root word or just with a root word. Like prefixes, suffixes cannot be used alone to form a word or term. As we did with prefixes, we look at a list of some common suffixes, along with their meanings, used to form medical terms.

Suffixes	Definition	Suffixes	Definition	Suffixes	Definition
-algia	pain	-graphy	making a recording	-pexy	fastening, fixation
-asis	condition, usually abnormal	-iasis	condition of	-phagia, -phagy	relating to eating and swallowing
-asthenia	weakness	-iatry	treatment of a disease	-phasia	ability to express one's self
-biotic	living matter	-ism	a condition	-phobia	exaggerated fear
-cele	tumor, cyst, hernia	-itis	inflammation	-plasty	surgical reshaping or remodeling
-centesis	puncture and aspiration of	-ize	to treat by a special method	-plegia	paralysis
-cide	causing death	-ilith	stone or calculus	-poiesis	formation of
-cyte	cell	-logy	science or study of	-ptosis	falling, sagging, or dropping down
-desis	binding or fusion	-lysis	destruction of, decomposition	-rhage, -rhagia	excessive flow, breaking/ bursting forth
-ectasis	dilation, stretching	-malacia	softness, softening	-rhaphy	suturing or sewing
-ectomy	removal of	-megaly	enlargement	-rhea or -rhea	flow, discharge
-emia	blood	-meter, -metry	measurement, measuring instrument	-scope	lighted examination instrument
-esthesia	feeling, sensation	-oid	form, shape, resemblance	-scopy	examination using a scope
-gene	production, origin	-oma	tumor	-stasis	a standing still
-genic	producing	-osis	process (usually disease)	-stomy	to create an opening
-gram	a tracing or mark	-pathy	disease, suffering	-tomy	incision or cutting into
-graph	a writing or record	-penia	lack or reduction in number of	-uria	relating to urine

Although limited, this list contains enough suffixes to strengthen your vocabulary. Now, look at how these suffixes are used to form a medical term.

For our example this time, let's try something a bit harder than the one we used to illustrate prefix use. If the word "tracheo" refers to your trachea or throat area, how would you change the word to mean "a surgical incision into the trachea or throat"? If you look through the preceding list, you will see that the suffix "-tomy" (or "-otomy") means "incision or cutting into." To make the word you want, simply add one of these suffixes to the root word "tracheo." The term you formed by combining the two elements is "tracheotomy," which means a "surgical incision into the throat or trachea."

You probably noticed that there is very little difference between the meanings of some of these suffixes but that there is a significant difference in the way they are spelled (and used). So, it is very important that you pay particular attention to learning the subtle differences so that you do not confuse and misinterpret a term.

Study these word endings closely and notice how they are used in day-to-day verbal and written communications so that you can avoid mixing them up. Also, notice how these suffixes are used later on in this unit when we discuss common surgical terms.

No discussion of medical terminology would be complete without mentioning the elements that form the "heart" of medical terms—root words.

039. Root words that relate to the human body and its processes

With the definitions of medical prefixes and suffixes fresh in mind, you now have the basis for becoming proficient in the language of your profession. However, to become more familiar with terms that apply to human anatomy and physiology, you need knowledge of commonly used medical root words.

A root word can be defined as the main part or portion of a word from which other words may be formed by the addition of a prefix, a suffix, or both. Very often, a vowel is added when two root words are combined or when a suffix is added to a root word. This combining vowel is usually an "o" or an "i," but a "u" is sometimes used. *This combining vowel is used to make pronunciation easier when there is no vowel between the two root words or between the root word and suffix.*

The following alphabetical list of root words and their definitions relate to the human body and body processes. The most common combining vowel is shown in parentheses.

Root Word	Definition	Root Word	Definition	Root Word	Definition
abdomin(o)	abdomen	glyc(o)	Sugar	pharyng(o)	pharynx
acou(i)	hearing	gyn, gyne, gynec(o)	Woman	phleb(o)	vein
aden(o)	gland	hem, hema, hemo, hemat(o)	Blood	physio	relating to nature, life
adren(o)	adrenal gland	hepat(o)	Liver	pneum(o)	lung or air
Angi(o)	vessel (usually blood vessel)	hydr(o)	Water	proct(o)	rectum
arteri(o)	artery	hyster(o)	uterus	psych(o)	mind, soul
arthr(o)	joint	ile(o), ili(o)	Ileum	pulmo	lung
Audi(o)	pertaining to hearing	jejun(o)	jejunum	py(o)	pus
bil(i)	relating to bile	kerat(o)	cornea	pyel(o)	pelvis of the kidney
blephar(o)	relating to an eyelid or eyelash	kinesi(o)	movement	rect(o)	rectum

Root Word	Definition
brach(i)	arm
bronch(o)	pertaining to a bronchus or the bronchi
calcane(o)	heel
card(i), cardi(o)	pertaining to the heart
carp(o)	wrist
cephal(o), capit	head
cervic(o)	neck
chole, chol(o)	bile
cholecyst	gallbladder
chondr(o)	cartilage
col(o)	colon (large intestine)
colpo	vagina
cost(o)	rib
crani(o)	skull
cyst(o)	urinary bladder, cyst
cyt(o)	cell
dactyl(o)	finger or toe
dent(o)	relating to a tooth or the teeth
derma	skin
doch(o)	duct
duoden(o)	duodenum
encephal(o)	brain
enter(o)	intestines
fibr(o)	fiber, fibrous
gastr(o)	stomach

Root Word	Definition
laparo	abdomen, loin, or flank
laryng(o)	larynx
latero	side
lip(o)	fat
lith(o)	stone
lymph	watery fluid from special gland
mamm(o)	breast, mammary gland
mast(o)	breast, mastoid process
mening(o)	membrane
meno	menstruation
metra, metro	uterus
myel(o)	bone marrow, spinal cord
my(o)	muscle
nas(o)	nose
necro	death
nephr(o)	kidney
neur(o)	nerve
ocul(o)	eye
oophor(o)	ovary
ophthalm(o)	eye
opto	relating to vision
orchi(o)	testicle
orth(o)	straight, normal, correct
os	bone or opening
oste(o)	bone

Root Word	Definition
ren(i)	kidney
rhin(o)	nose
sacro	sacrum (vertebra)
salping(o)	tube (uterine or auditory)
sarc(o)	flesh (skeletal muscle tissue)
splen(o)	spleen
spondyl(o)	vertebrae, spine
sten(o)	narrow, constriction
stern(o)	sternum
stomato	mouth
teno, tenonto	tendon
therm(o)	heat
thoraco	chest, thorax
thromb(o)	clot, thrombus
thyr(o)	thyroid gland
tox	poison
toxic(o)	poison, poisonous
trachel(o)	cervix
trache(o)	trachea
uretero	ureters
urethro	urethra
ur(o), urin(o)	relating to urine or urinary organs
uter(o)	uterus
vas(o)	blood vessel, vas deferens
ven(o)	vein

Root Word	Definition
genu	knee
gloss(o)	tongue
gluc(o)	glucose, sweetness

Root Word	Definition
ot(o)	ear
path(o)	relating to disease
ped(o)	child, foot

Root Word	Definition
ventri, ventro	abdomen
vertebr(o)	spine, vertebrae
vesico	urinary bladder

As was the case with the prefixes and suffixes we previously listed, this list of root words is not all-inclusive. However, it does contain most of the root words you will encounter in the operating room or surgical clinics.

You probably noticed that many of these root words do not look or sound like the subjects they describe. The reason for this is that most of them are derived from ancient Greek and Latin, as are the other elements we discussed. Unless you are well versed in these languages, you are going to have to memorize them.

If you take the time to learn the elements of medical terminology presented in this section, you should be able to look at most medical terms and figure out what they mean (or at least be close). When you put all these word components together in different combinations, you formulate the words and expressions that are an integral part of everyday communication between members of the health care delivery team. Since your duties primarily will involve working in the operating room environment, and possibly the surgical clinics, it is important that you be familiar with some of the more common terms used to describe surgical procedures. You also need to know something about the “shorthand” that medical folks use when writing comments on patients’ charts. In the next section of this unit, we take a closer look at these subjects.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

037. Identifying medical prefixes

1. Define prefix.
2. When are prefixes used alone to define a word or system?
3. Match the definition in column A to the appropriate prefix in column B. Each prefix may be used once, more than once, or not at all.

Column A

- ___ (1) White.
- ___ (2) Difficult.
- ___ (3) Red.
- ___ (4) Life.
- ___ (5) Little.
- ___ (6) Absence of.
- ___ (7) Black.
- ___ (8) Sugar.
- ___ (9) Excess.
- ___ (10) Below, beneath.
- ___ (11) Beside.

Column B

- a. ab.
- b. a/an.
- c. auto.
- d. bio.
- e. dys.
- f. erythro.
- g. glyco.
- h. infra.
- i. leuco/leuko.
- j. melan.
- k. olig.

- | | |
|-----------------------------|-----------|
| ____ (12) Over, above. | l. para. |
| ____ (13) Backward, behind. | m. retro. |
| ____ (14) Fast. | n. supra. |
| | o. tachy. |
| | p. ultra. |

038. Commonly used medical suffixes and their meanings

1. Define suffix.
2. Match the definition in column A with the appropriate suffix in column B. Each suffix may be used once, more than once or not at all.

<i>Column A</i>	<i>Column B</i>
____ (1) Removal of.	a. algia.
____ (2) Surgical reshaping/remodeling.	b. centesis.
____ (3) Pain.	c. cyte.
____ (4) Destruction of/decomposition.	d. ectomy.
____ (5) Examination using a scope.	e. esthesia.
____ (6) Incision or cutting into.	f. lysis.
____ (7) Sensation, feeling.	g. megaly.
____ (8) Enlargement.	h. pathy.
____ (9) Disease suffering.	i. plasty.
____ (10) Puncture and aspiration of.	j. rhage.
____ (11) Create an opening.	k. rhaphy.
____ (12) Excessive flow.	l. scopy
____ (13) A standing still.	m. stasis.
____ (14) Suture or sew(ing).	n. stomy
	o. tomy.
	p. uria.

039. Root words that relate to the human body and its processes

1. Define the term “root word.”
2. What is the purpose of a combining vowel?

3. Match the definition in column A with the appropriate root word in column B. Each root word may be used once, more than once, or not at all.

Column A

- ____ (1) Bone.
- ____ (2) Blood.
- ____ (3) Cartilage.
- ____ (4) Cell.
- ____ (5) Cervix.
- ____ (6) Cornea.
- ____ (7) Finger or toe.
- ____ (8) Hearing.
- ____ (9) Intestines
- ____ (10) Muscle.
- ____ (11) Pertaining to the heart.
- ____ (12) Pertaining to a bronchus or bronchi.
- ____ (13) Skin.
- ____ (14) Stone.
- ____ (15) Vagina.
- ____ (16) Vein.
- ____ (17) Vertebrae, spine.
- ____ (18) Urinary bladder.

Column B

- a. acou(i).
- b. bronch(o).
- c. cardi(o).
- d. chondr(o).
- e. colpo.
- f. cyt(o).
- g. dactyl(o).
- h. derma.
- i. enter(o).
- j. hemat(o).
- k. kerat(o).
- l. lipo.
- m. lith(o).
- n. mast(o)
- o. my(o).
- p. oste(o).
- q. spondyl(o).
- r. trachel(o).
- s. ven(o).
- t. vesico.

5-2. Surgical Terminology, Medical Shorthand, and Terms of Reference

There are three other aspects of medical language that you need to be familiar with in addition to the elements of terminology already presented. First and foremost, you need to gain a good working knowledge of the terms used to describe commonly performed surgical procedures. This is necessary so you can decipher the surgery schedule and have a basic idea of how the surgeon plans to treat your patients surgically. Second, you need to learn common abbreviations and symbols used by medical practitioners and nursing personnel to save time and space when documenting patient status, care, and treatment in medical records. The reason for this should be obvious. If you cannot interpret the “shorthand” entries in the patients’ charts, you are not able to understand fully your patients’ medical problems, the treatment regimen that the doctors have ordered to correct the problems, and the care that has been rendered.

Last, but not least, you need to expand your medical vocabulary to include terms that medical personnel use to describe anatomical movement and structural relationships. After studying the information in this section and combining it with what you already know about medical terminology, you should have a good command of our unique language.

The lessons in this section expand your knowledge of surgical terms, familiarize you with commonly used medical abbreviations and symbols, and introduce you to medical terms that describe body movement and directions. The first area we look at deals with medical terms used to describe surgical procedures.

040. Defining operative procedures

When you are preparing to scrub or circulate on a surgical procedure, it is essential that you understand the nature of the operation that the surgeon plans to perform. You need to know what area of the body will be affected by surgical treatment and what that treatment will consist of. Each day you will read the surgery schedule so you will know what procedures you will be involved with and what preparations are required to perform these procedures. This is when your knowledge of medical terminology will really pay off. If you are not familiar with a procedure that is posted on the schedule, you simply break the surgical term into its component parts. After you identify the prefix, root word, and suffix, you can recombine them and come up with an overall definition of the operation to be performed.

In this lesson, you are provided with a list of common surgical procedures and their definitions to study. This list is only the “tip of the iceberg” and is designed to familiarize you with how the three elements of medical terminology are combined to form descriptive terms. As you study the following list of operations, try to identify the prefixes, root words, and suffixes so you can see how the definitions evolved. If you get in the habit of doing this, you will have no trouble reading and deciphering even the most complicated medical/surgical terms.

Common Surgical Procedures and Definitions	
Surgical Procedure	Definition
Appendectomy	Removal of the appendix.
Arteriography	Injection of a dye into the blood stream to make an X-ray study of the arteries.
Arthroplasty	Reconstruction of a joint.
Biopsy	Removal of tissue for the purpose of making a diagnosis.
Blepharoplasty	Reconstruction of an eyelid.
Bronchoscopy	Examination of the bronchus through a scope (lighted, lensed instrument).
Cholecystectomy	Removal of the gallbladder.
Colectomy	Removal of part or the entire colon (large intestine).
Colostomy	Creation of an opening into the colon or large bowel through the abdominal wall.
Colporrhaphy	To suture (repair) the vagina (usually associated with narrowing the vaginal opening).
Craniotomy	Incision into the skull.
Cystectomy	Removal of all or part of the urinary bladder.
Cystoscopy	Examination of the urinary bladder through a scope passed through the urethra.
Debridement	To clean and remove foreign bodies and dead tissue from a wound.
Diverticulectomy	Removal of pouches or pockets of tissue called diverticula (usually associated with the lining of the colon).
Endoscopy	Examination of any body cavity through a scope.
Enterostomy	Creation of an opening into any portion of the intestines (small or large) through the abdominal wall.
Esophagoscopy	Examination of the esophagus through a scope.
Gastrectomy	Removal of the stomach.
Gastroenterostomy	Creation of an artificial passageway between the stomach and intestines (usually a portion of the small intestine).
Hemorrhoidectomy	Removal of hemorrhoids (varicose veins in and around the anus and rectum).
Herniorrhaphy	To suture (repair) a rupture (usually in the abdominal wall).

Common Surgical Procedures and Definitions	
Surgical Procedure	Definition
Hydrocelectomy	Removal of a fluid-filled sac or cyst-like structure from the scrotum or spermatic cord.
Hysterectomy	Removal of the uterus (through a vaginal or abdominal approach).
Keratoplasty	Repair or reconstruction of the cornea.
Laminectomy	Removal of the posterior arch of a spinal bone (vertebra).
Laparotomy	Incision into the abdominal cavity.
Laryngectomy	Removal of the larynx.
Lobectomy	Removal of a lobe of an organ (usually the lung, but can also refer to the liver, thyroid gland, or brain).
Mammoplasty	Reconstruction of a breast.
Mastectomy	Removal of a breast.
Mastoidectomy	Removal of diseased mastoid bone from behind the ear.
Mediastinoscopy	Examination of tissue and organs behind the sternum (the mediastinum) with a scope.
Meniscectomy	Removal of crescent-shaped cartilage (meniscus) from a joint (usually the knee).
Myringotomy	Incision into the eardrum (usually for inserting small tubes to drain pus from the middle ear).
Nephrectomy	Removal of a kidney.
Nephrolithotomy	Incision into the kidney to remove a stone.
Oophorectomy	Removal of an ovary.
Orchiectomy or Orchidectomy	Removal of a testicle.
Orchiopexy	To place and fasten an undescended testicle in the scrotum.
Osteoplasty	Reconstruction of a bone.
Pyloromyotomy (or Ramstedt Procedure)	Incision into the muscular tissue that surrounds the passageway between the stomach and duodenum (pylorus) to relieve a constriction (pyloric stenosis).
Rhinoplasty	Reconstruction of the nose.
Salpingectomy	Removal of all or part of a tubular structure (usually associated with the fallopian tubes).
Sigmoidoscopy	Examination of the rectum and lower portion of the large intestine (sigmoid colon) with a scope.
Splenectomy	Removal of the spleen.
Tenotomy	Incision into a tendon (usually associated with eye muscle surgery).
Thoracotomy	Incision into the chest (thoracic) cavity.
Thyroidectomy	Removal of the thyroid gland.
Trachelorrhaphy	To suture (repair) a lacerated cervix.
Tracheostomy	Creation of an opening in the trachea and insertion of a breathing tube.
Transurethral Resection (TUR)	Removal of a portion of an enlarged prostate gland through an instrument inserted into the urethra.
Ureterolithotomy	Incision into a ureter to remove a stone.
Urethroplasty	Reconstruction of the urethra.
Vagotomy	To cut the nerves that control stomach secretions (branches of the vagus nerve).
Vasectomy	To tie and remove a portion of the vas deferens.

If you study this list of terms that describe surgical procedures and the word components used to form them, you should have a better understanding of medical terminology as a whole. Although you may want to memorize the preceding list of operations, it is not necessary; once you become familiar with

the prefixes, suffixes, and root words that were used within the terms, surgical procedures are self-explanatory.

The next facet of medical terminology we'll explore is the "shorthand" used to document comments in your patients' medical records.

041. Understanding medical abbreviations and symbols

As a surgical technician, you probably will not perform a lot of "charting" of patient care because the OR nurses usually perform this task. However, you still need to learn the different abbreviations and symbols used to document comments in medical records so that you can read, understand, and carry out the surgeon's orders for immediate preoperative and postoperative patient care. You also need to know them so you can document various procedures or make notes if, and when, you are assigned to a surgical clinic.

Common abbreviations

There are extensive lists of medical abbreviations. Some are used quite often; others are used very infrequently. To standardize the abbreviations used in medical records, professional medical and nursing organizations have developed lists that are nationally accepted. From this national compilation of abbreviations, the health (medical) record committee of each Air Force medical treatment facility (MTF) may decide to publish extracts of abbreviations for use in that particular facility. This is often done to standardize the manner in which all personnel within the hospital document patient care and treatment.

Before you begin your study of the abbreviations provided here, there are some restrictions concerning the use of abbreviations that you should be aware of in the event you have to do some "charting." A few of the key restrictions relating to the use of abbreviations in outpatient and inpatient records are as follows:

1. The JC has distributed a list of "Do Not Use" abbreviations for accredited organizations. Only nationally recognized standard abbreviations may be used. If your facility publishes a list of approved abbreviations, make sure that you use only the ones that appear on this list.
2. Abbreviations and symbols are not used to record a patient's final diagnosis. Whenever possible, the use of "medical shorthand" should be avoided in other parts of outpatient and inpatient records as well.

NOTE: This is recommended to avoid misinterpreting recorded information, particularly in a court of law.

3. Avoid using abbreviations that have more than one meaning and abbreviations that are obscure or vague. If there is any doubt in your mind about the clarity or specificity of an abbreviation, you should write the word or phrase out in full, or in a form that eliminates doubt as to your intended meaning.

Remember, all individual records in a patient's chart are legal documents. Therefore, all documentation that appears on those records must be accurate, legible, and easy to understand.

The lists of abbreviations that follow are limited to those which you will see used most often in your patients' records. To make it easier for you to study and remember these abbreviations, they have been divided into four different categories: (1) medications and treatments, (2) weights and measures, (3) body structures and areas, and (4) miscellaneous abbreviations. In addition, the lists within each category show the abbreviation, the Latin or other foreign expression from which it is derived (if applicable), and the English translation. Concentrate on studying the abbreviations and their English meaning. The foreign derivatives are included so that you can see the actual words from which the abbreviation was formed.

NOTE: Unless otherwise indicated, all foreign derivatives are Latin.

Abbreviations for Medications and Treatments					
Abbreviation	Foreign Derivative	English Translation	Abbreviation	Foreign Derivative	English Translation
a or aa	ana (Greek)	of each	non rep	non repatur	don't repeat
a.c.	ante cibum	before meals	NPO	non per os	nothing by mouth
ad lib	ad libitum	as desired	Pil	pilula	pill
a.m.	ante meridiem	before noon	p.c.	post cibum	after meals
Aq	aqua	water	p.m.	post meridiem	afternoon (evening)
ASAP	none	as soon as possible	P.O.	per os	by mouth
bid	bis in die	twice a day	prn	pro re nata	as needed
Bin	bis in noctus	twice a night	Pulv	pulvis	powder
Cap	capsula	capsule	Q	quaque	every; each
Comp	compositus	compound	Qh	quaque hora	every hour
dc. or D/C	none	discontinue or discharge	q2h	quaque secunda hora	every 2 hours
Dil	dilue	dilute	Qhs	quaque hora somni	every night at bedtime
Elix	al iksir (Arabic)	elixir	qid	quater in die	four times a day
FF	none	force fluids	Qs	quantum sufficiat	sufficient quantity
Fl	fluidus	fluid	Rx	recipe thou	take (prescription)
H. or hr.	hora	hour	Rep	repatur	repeat
h.s.	hora somni	at bedtime	sc; subc	sub cutis	subcutaneously
IM	intramusculus	Intramuscular	Sol	solutio	solution
inj.	injectio	injection	Sos	si opus sit	if necessary
IPPB	none	intermittent positive pressure breathing	Ss	semis	half
IV	intravenosus	intravenous	SSE	none	soap suds enema
KVO	none	keep vein open	Stat	statim	immediately; at once
liq.	liquidus	liquid	Tab	tabella	tablet
LPM	none	liters per minute	Tid	ter in die	three times a day
M.H.	none	moist heat	tr; tnct	tinctura	tincture
mid noc	medius nox	midnight	tx	tractare	treatment
Mist	mistura	mixture	ung	unguentum	ointment
Noc	nox	night			
C	Celsius (Swedish astronomer)	centigrade or Celsius	kg	kilogramme (French)	kilogram

Abbreviations for Medications and Treatments					
Abbreviation	Foreign Derivative	English Translation	Abbreviation	Foreign Derivative	English Translation
cc; cm ³	cubique centimetre (French)	cubic centimeter	lb	libra	pound
Cm	centimetre (French)	centimeter	M	metre (French)	meter
Dr	drachma (Greek)	dram or drams	m	minimus	minim (a fluid drop)
F	Fahrenheit (German physicist)	Fahrenheit	mg; mgm	milligramme (French)	milligram
fl dr	fluidrachma (Greek)	fluid dram	Min	minuta	minute
fl oz	fluidus uncia	fluid ounce	MI	mille (Latin) litre (French)	milliliter
ft	none	foot or feet	Mm	mille (Latin) metre (French)	millimeter
Gal	none	Gallon	Oz	uncia	ounce
Gm	gramma	Gram	Pt	pint (German)	pint
Gr	granum	grain	sp gr	species gravitus	specific gravity
Gtt	gutta	drop	T	temperatura	temperature
h; hr	hora	hour	Tbsp	none	tablespoon
Ht	hieytho (Old English)	height	Tsp	none	teaspoon
In	uncia	inch	Wt	wiht (Old English)	weight
ABD	abdere	abdomen; abdominal	LUQ	none	left upper quadrant of abdomen
A.D.	auris dextra	right ear	ocul	oculus	eye
AE	none	above elbow	O.D.	oculus dexter	right eye
AK	none	above knee	O.L.	oculus laevus	left eye
A.S.	auris sinistra	left ear	O.S.	oculus sinister	left eye
A.U.	auris unitas	both ears	os	oris	mouth or opening into a body cavity or passageway
BE	none	below elbow	os	ossis	bone
BK	none	below knee	O.U.	oculus uterque	each eye; both eyes
CNS	none	central nervous system	RLL	none	right lower lobe of lung
C-spine	none	cervical spine	RLQ	none	right lower quadrant of abdomen

Abbreviations for Medications and Treatments					
Abbreviation	Foreign Derivative	English Translation	Abbreviation	Foreign Derivative	English Translation
GI	gaster (Greek) intestinalis (Latin)	gastrointestinal system	RML	none	right middle lobe of lung
GU	genitalis urina	genitourinary systems	RUL	None	right upper lobe of lung
LE	none	lower extremity	RUQ	None	right upper quadrant of abdomen
LGI	(see GI)	lower gastrointestinal region	Sub-Q	sub cutis	subcutaneously
LLL	none	left lower lobe of lung	TMJ	temporalis andibulae junctio	temporomandibular joint
LLQ	none	left lower quadrant of abdomen	UE	extremitas	upper extremity
LUL	none	left upper lobe of lung	UGI	(see GI)	upper gastrointestinal region

NOTE: The foreign derivative column has been deleted from the chart below.

Miscellaneous Medical Abbreviations			
Abbreviation	Meaning	Abbreviation	Meaning
a	before	L & D	labor and delivery
ALS	advanced life support	LBP	lower back pain
AMA	against medical advice	MI	myocardial infarction ("heart attack")
BLS	basic life support	NAD	no acute distress
BM	bowel movement	NSA	no significant abnormality
BP	blood pressure	NSC	no significant change
Bx	biopsy	OB	obstetrics
C	with	OOB	out of bed
Ca	cancer	O.I.	operating instruction(s)
CA	cardiac arrest; coronary artery	PACU	postanesthesia care unit (recovery room)
CAD	coronary artery disease	\overline{p}	after
CBC	complete blood count	PERRLA	pupils equal, round, and react to light and accommodation
CCU	coronary care unit	PID	pelvic inflammatory disease
c/o	complains of	PMH	past medical history
COPD	chronic obstructive pulmonary disease	Pt.	patient
CPR	cardiopulmonary resuscitation	PVC	premature ventricular contraction
C-Sec	Caesarean Section	R/O	rule out

Miscellaneous Medical Abbreviations			
Abbreviation	Meaning	Abbreviation	Meaning
CVA	cerebrovascular accident (stroke)	ROM	range of motion
DJD	degenerative joint disease	s	without
DOS	day/date of surgery	SOB	short of breath (not what you think!)
DTs	delirium tremens	S.O.P.	standard operating procedure
Dx	diagnosis	Sx	symptom
ECG or EKG	electrocardiogram	TB	tuberculosis
EEG	electroencephalogram	TPR	temperature, pulse, respirations
EGG	an embryo (usually avian)	U/A	urinalysis
f/u	follow up	URI	upper respiratory infection
FHT	fetal heart tones	UTI	urinary tract infection
Fx	fracture	VD	venereal disease
GSW	gunshot wound	VDRL	venereal disease research laboratory
GYN	gynecology	V/S	vital signs
HIV	human immunodeficiency virus ("AIDS" virus)	V.S.S.	vital signs stable
HNP	herniated nucleus pulposus (slipped intervertebral disk)	VT	ventricular tachycardia
Hx	history	WNL	within normal limits
ICU	intensive care unit	Y/O	year old
I & O	intake and output		
IVP	intravenous pyelogram		

Although you may feel “abbreviated-out” after studying all these lists, it’s important that you try to commit them to memory. Knowledge of these commonly used medical abbreviations will help you understand the information in your patients’ charts. This, in turn, will enable you to better assess your patients’ needs and make the preoperative preparations necessary to ensure the best possible surgical treatment and patient care is rendered. It will also make it possible for you to interpret the surgeon’s postoperative orders accurately should you be assigned to work in the postanesthesia recovery room.

In addition to the numerous abbreviations you may encounter in medical records, various symbols are sometimes used in conjunction with abbreviations and medical terms to save time and space.

Symbols used in medical documentation

There are several symbols used in documenting patient care and treatment; but, in the interest of simplicity and brevity, we confine our discussion to only eight symbols. In the following table, the symbols are identified and defined. Next to the definition is an example of how the symbol may be used in a patient’s chart.

Some Medical Documentation Symbols, Meanings, and Usages		
Symbol	Meaning	Example of Usage
×	Multiplication, times	Take vital signs q2h × 3. (Take vital signs every 2 hours, 3 times)
<	Less than	Diastolic BP < 90, notify physician. (If diastolic blood pressure is less than 90, notify physician)

Some Medical Documentation Symbols, Meanings, and Usages		
Symbol	Meaning	Example of Usage
>	Greater than	Pt. pulse > 80, notify nurse. (If patient's pulse is greater than 80, notify the nurse)
↑	Elevated, above	Keep Rt. Arm ↑ on 2 pillows q24h. (Keep the right arm elevated on 2 pillows for 24 hours.)
↓	Decreased, below	Prep abdomen ↓ umbilicus to pubis. (Prep abdomen below umbilicus to the pubis.)
♂	Male	24 y/o ♂ admitted to ER w LLQ pain × 3 days. (24 year-old male admitted to emergency room with left lower quadrant abdomen pain for the past 3 days.)
♀	Female	86 y/o ♀ with DJD × 20 yr. scheduled for Lt. THR. (86 year-old female with degenerative joint disease for 20 years scheduled for left total hip replacement.)
△	Change	Notify Dr. Lock ASAP if significant △ in urinary output. (Notify Dr. Lock as soon as possible if significant change in urinary output.)

As you can see from the short examples provided, symbols and abbreviations can definitely save a lot of writing, yet still effectively convey a great deal of information. The next time you have the opportunity to review a patient's chart, read the patient's history and physical. You may be surprised at the number of symbols and abbreviations you find in the doctor's written comments and findings. While you're reading the chart, try to decipher what the sentences containing abbreviations and symbols would look like if they were written in "longhand." If you do this frequently, you will soon be able to read a patient's entire chart without any difficulty. Like everything else, becoming a proficient "medical linguist" requires continual practice, so use what you've learned up to this point every chance you get.

042. Terms used to describe body movement and structural relationships

To help round out your ever-increasing knowledge of medical terminology, there are two types of medical reference terms that you must learn. The first group of terms is those used to describe the movement of the body and its extremities. The second group is those that help us describe the positional relationship of different body structures and areas, usually expressed in relationship to the body trunk.

Terms for body movement

Most of the terms that are used to describe the movement of body parts relate to the action that occurs when the extremities, or parts of the extremities, are moved. These terms are commonly used to describe the range of motion of the extremities at their joints. You need to know these terms not only to understand fully the lessons in this course on anatomy and physiology, but also to be able to assist the surgeon during a surgical procedure. If the surgeon tells you to "adduct the knee" during an arthroscopy, you need to know exactly what to do; if you do the opposite, you risk damaging the arthroscope, and worse, injuring the patient. We discuss these terms in this section—learn them!

The position created when you stand erect (as in the position of attention) with the palms of the hands facing forward is called the *normal or standard anatomical position*. This position is illustrated in figure 5-1, and is sometimes referred to when anatomical terms of reference are discussed. This position is used as a baseline when discussing the motion of joints.

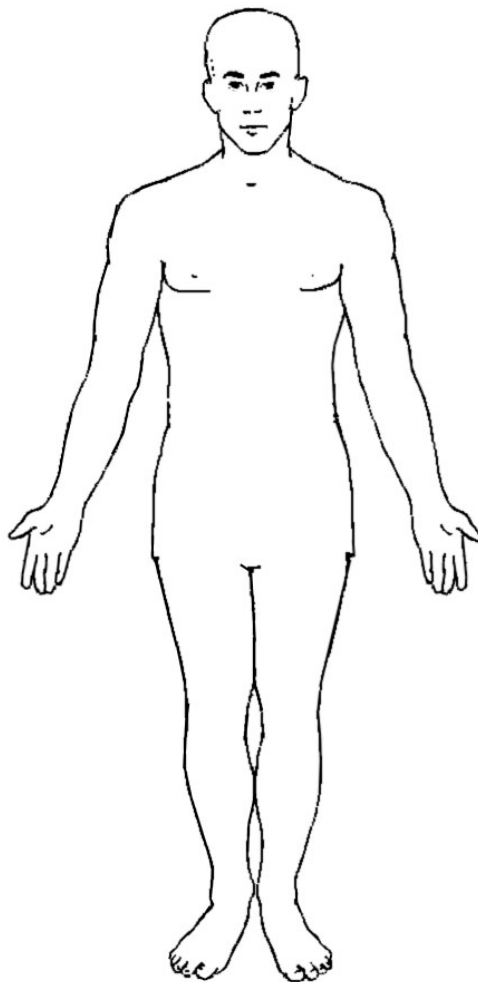


Figure 5-1. The standard anatomical position.

1. *Range of motion (ROM)*—the range, measured in degrees of a circle, through which a body part can be rotated, extended, or flexed at a joint.
2. *Longitudinal axis*—a line passing lengthwise through a portion of the body or a bone. It divides the part equally and symmetrically. For example, rotation of the arm occurs around the long (longitudinal) axis of the humerus (the bone in the arm between the shoulder and elbow).
3. *Axis of joint rotation*—a line projecting at right angles to the plane of motion. The axis of rotation for most joints changes with the motion of the joint due to the joint's structure and the variety of angles in which the joint can be moved. The axis of joint rotation is also called the *fulcrum*.
4. *Rotation*—a joint motion whereby a part moves or turns about its longitudinal axis. When you move your head from side to side looking for traffic before crossing a street, you are rotating your head on its axis.
5. *Circumduction*—a movement whereby the distal end of a part (the end farthest from the point of origin) makes a circle while the rest of the part outlines a cone. This is the type of movement you are creating when you do arm circles or “head roll” calisthenics as part of a warm-up routine.
6. *Supination*—the movement where the forearm rotates outward so that the palm of the hand faces forward. To make this a bit clearer, stand with your arms hanging loosely by your sides,

then rotate your forearms so that the palms of your hands face forward. You have just *supinated* your forearms!

7. *Pronation*—this movement is the opposite of supination. It rotates the forearm inward, causing the back of the hand to face forward (when the arms are held in the normal anatomical position).
8. *Flexion*—a motion described when adjacent body parts *approach* each other, *decreasing the angle* between them. More simply stated, flexion is the act of folding, bending, or withdrawing a body part. When you bend your elbow and move your forearm up towards your biceps' muscle, you are “flexing” your forearm, and the action is called “flexion.” Two other examples of flexion include moving your head forward so that your chin rests on your chest, and bending your torso forward at the waist. Figure 5-2 illustrates flexion of your elbow, wrist, knee, and hip.
9. *Extension*—a movement that *increases the angle* between two adjacent body parts. Or, the movement that returns an extremity or body part to the standard anatomical position. Extension is the opposite of flexion. It returns a flexed part to its normal anatomical position. When you straighten your elbow and your arm after flexing it (as described above in the explanation on *flexion*), you are extending it. Figure 5-2 shows extension of some of the joints.
10. *Hyperextension*—this is extreme opposite of flexion, usually increasing the extension of a joint beyond 180 degrees (or beyond the normal anatomical position). When you tip your head back to look at the sky, your neck is hyperextended; figure 5-2B shows a hyperextended wrist. It is normal and natural for the neck and wrist to be hyperextended, but for most joints, hyperextension often results in injury. When an elbow or knee is hyperextended, as shown in figure 5-2A and 5-2C, the joint is stretched beyond its normal range of motion.

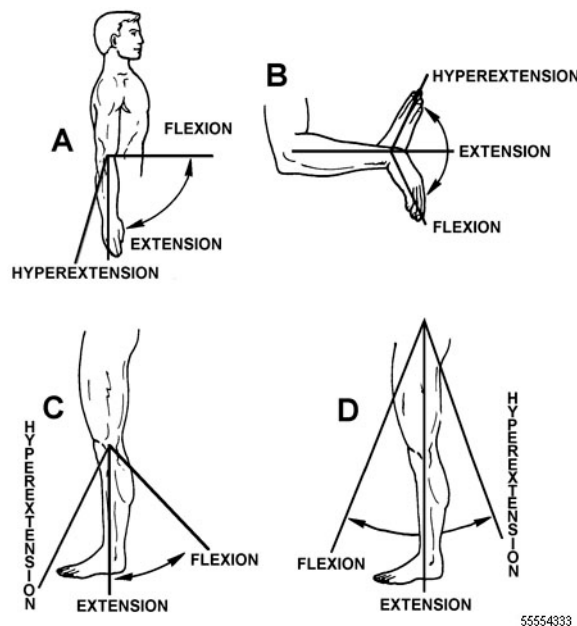


Figure 5-2. Flexion, extension, and hyperextension at the A. elbow, B. wrist, C. knee, D. hip.

11. *Abduction*—movement of a body part *away from* the middle or trunk of the body (referred to as the midline, or median plane). For example, as shown in figure 5-3, when you raise an arm that has been hanging at your side to shoulder level, you are abducting it. When you move your foot out towards the side, away from your body, you are abducting it. You can remember this term by identifying its prefix, “ab,” which means “away from.”

NOTE: One graphic way to remember this is that kidnappers *abduct*, or take children *away from* the heart.

12. *Adduction*—the opposite of abduction. This movement brings a body part *closer to* the midline or medial plane of the body. An example of this movement would be to lower the arm (as shown in fig. 5-3A) that was raised in the previous example so that it once again rests by the side of the body. Adduction of the leg is illustrated in figure 5-3B. This term can be remembered by identifying its prefix, “ad,” which means “toward” (as in advance).

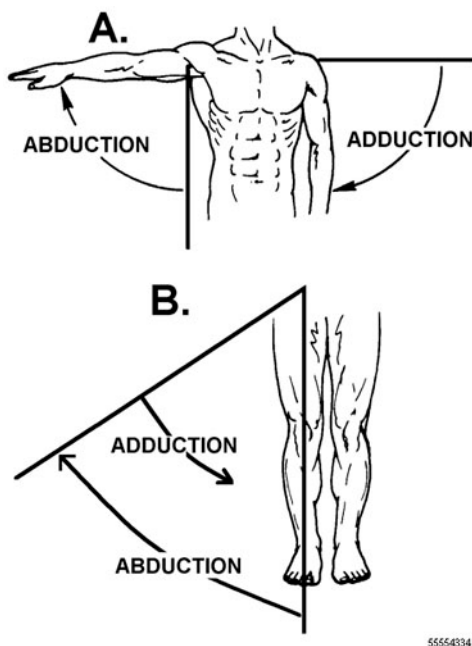


Figure 5-3. Examples of abduction and adduction.

13. *Dorsiflexion*—a special type of flexion, shown in figure 5-4A, used to describe ankle and foot movement where the top, or dorsal surface of the foot, moves closer to the leg, causing the angle between the leg and foot to decrease. When the foot is held level or at right angles to the leg, it is said to be in a *neutral position* (fig. 5-4B).

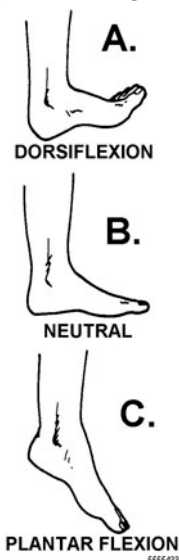


Figure 5-4. A foot in A. dorsiflexion; B. neutral; and C. plantar flexion.

14. *Plantar flexion*—another special type of flexion used exclusively to describe ankle/foot movement (fig. 5-4C). It occurs when the ankle is moved so that the bottom or plantar surface of the foot moves away from the leg and the angle between the heel and the calf of the leg decreases, as when you “point” your toes.
15. *Inversion*—a special term used to describe the movement that turns the sole of the foot *inward*.
16. *Eversion*—another special term used to describe the movement required to turn the sole of the foot *outward*.
17. *Protraction*—movement of a body part forward, as in jutting out your jaw (pushing the chin forward).
18. *Retraction*—the opposite of protraction. Retraction moves a protracted part backwards or inwards, closer to the middle of the body.

These terms are the ones most frequently used to describe body movement. The last group of terms we discuss in this unit are those that describe locations of body surfaces and positional relationships between different body parts.

Terms that describe anatomical relationships

The terms discussed here are used to describe the relationship of one body part, or anatomical structure, to a specific area of another part of the body, usually the trunk or torso. Refer to figure 5-5 as each term is discussed.

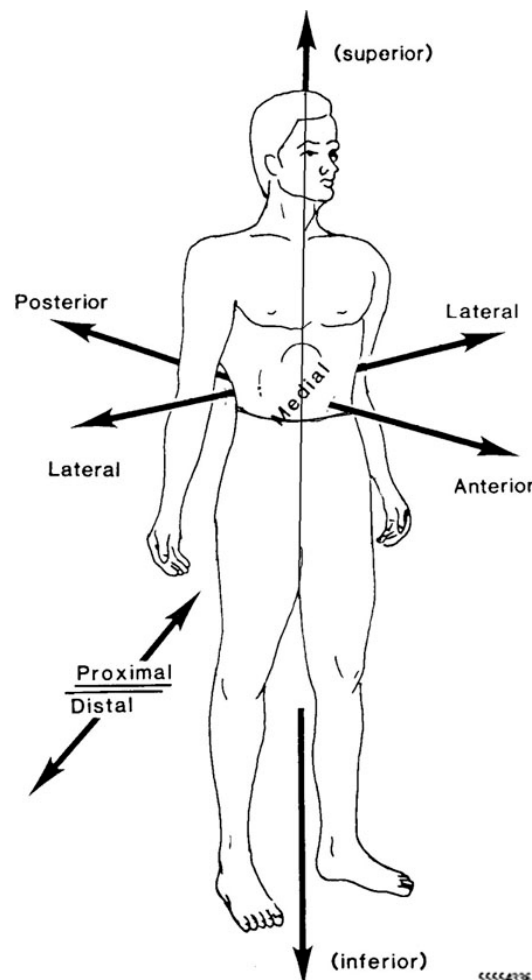


Figure 5-5. Anatomical relationship terms.

1. *Medial* describes structures that are toward or near the midline of the body. If the line (in fig. 5-5) from the Cephalad to the Caudal passed completely through the body, it would be referred to as the midline. Using the midline as a reference point, you should be able to see that the umbilicus (navel) is medial to the hips, and the sternum is medial to the ribs (as are the spine and the heart).
2. *Lateral* refers to areas or structures away from the midline, towards the right or left sides of the body. The hips are lateral to the umbilicus, the arms are lateral to the torso, and the outsides of the knees are lateral to the (medial) insides of the knees. When you assist with a “right knee lateral meniscus repair,” you are repairing the outside cartilage of the right knee.
3. *Anterior (ventral)* refers to areas away from the midline but toward or nearer the front of the body. The eyes are anterior (ventral) to the ears, the rib cage is ventral (anterior) to the heart, and the patella (kneecap) is anterior to the knee joint.
4. *Posterior (dorsal)* is the opposite of anterior (ventral); it refers to areas away from the midline but toward or near the backside of the body. The spine is posterior (dorsal) to the ribs, and the buttocks are dorsal (posterior) to the groin.
5. *Superior (cephalad)* refers to areas or structures toward the head or upper part of the body. In other words, it’s any part that is *above*, or closer, to the head than another part. The head is superior (cephalad) to the torso, the pelvis is cephalad (superior) to the legs.
6. *Inferior (caudal)* is the opposite of superior, and refers to areas or structures below, or towards the feet or lower part of the body. The neck is inferior (caudal) to the head, the buttocks are caudal (inferior) to the chest, and the stomach is inferior to the lungs.
7. *Proximal* refers to areas that are toward or closer to a *point of origin*, usually in terms of the midline. In other words, a structure that is closer than another structure to a given point of reference, usually the trunk of the body. The elbow is proximal to the wrist, and the shoulder is proximal to the elbow. The knees are proximal to the ankles, and the hips are proximal to the knees.
8. *Distal* is the opposite of proximal, referring to areas or structures that are away from or farther from a point of origin, again, usually the midline or trunk. The elbow is distal to the shoulder, and the wrist is distal to the elbow. The knees are distal to the hips, and the ankles are distal to the knees.
9. *Internal (deep)* refers to structures toward the inside of the body or a body part. The intestines are internal (deep) when compared to the muscles of the abdominal wall, and muscles are deep tissues (internal) when compared to the skin.
10. *External (superficial)* is the opposite of internal, and refers to structures toward the outside (surface) of the body or a body part. The mouth is an external (superficial) orifice in the body, and the epidermis is a superficial (external) layer of the skin.
11. *Peripheral* generally means surrounding structures; they can be distal from the center of the body or proximal to the body surface. Peripheral structures are those that surround a specific point of reference; in many cases, peripheral refers to branches of central systems. The term is often used when describing small arteries, veins, and nerves, which branch off from larger, more centrally located structures. The spinal nerves branching from the spinal cord are considered part of the peripheral nervous system, and surgery on the arteries supplying the arms and legs is called peripheral vascular surgery.

Summary

Confused yet? It may take some time to grasp medical terminology completely; the key is to study the terms and practice using them. When you hear surgeons and other professional staff members use a term you are not familiar with, ask them what it means. If asking is not appropriate or feasible (or if you just don’t like to admit you don’t know all the answers), remember the term and look it up later.

Most medical dictionaries contain all the prefixes, suffixes, root words, abbreviations, and symbols commonly used.

One important thing to remember while developing your medical vocabulary—your goal is to express, not impress. It is important that you understand what a procedure involves and why it is being done, not so you can “play doctor” for friends and relatives, but so you can understand and communicate with other medical staff to help ensure that the care you provide your patients is the highest quality you can provide. To see what you know about medical terminology, answer the questions that are caudal to this sentence.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

040. Defining operative procedures

1. Define each of the following surgical terms and break the term into suffixes and root words:

- a. Arteriography.
- b. Blepharoplasty.
- c. Colostomy.
- d. Colporrhaphy.
- e. Diverticulectomy.
- f. Esophagoscopy.
- g. Gastroenterostomy.
- h. Hydrocelectomy.
- i. Keratoplasty.
- j. Laminectomy.

- k. Mastoidectomy.
- l. Nephrolithotomy.
- m. Orchiopexy.
- n. Pyloromyotomy.
- o. Rhinoplasty.
- p. Thoracotomy.
- q. Trachelorrhaphy.
- r. Vagotomy.

041. Understanding medical abbreviations and symbols

1. Why are abbreviations and symbols never used to record a patient's final diagnosis?
2. Give the English translation for each of the following medication/treatment abbreviations:
 - a. a.c.
 - b. bid.
 - c. D/C.
 - d. IPPB.
 - e. KVO.

f. prn.

g. qid.

h. subc.

i. SSE.

j. tx.

3. Give the English translation for each of the following weights/measures abbreviations:

a. cc.

b. fl oz.

c. Gm.

d. kg.

e. mg.

f. sp gr.

4. Give the English translation for each of the following body structures/areas:

a. ABD.

b. A.D.

c. BK.

d. GI.

e. GU.

f. LUQ.

g. O.S.

h. TMJ.

i. UE.

j. UGI.

5. Give the English translation/meaning for each of the following miscellaneous medical abbreviations:

a. ALS.

b. BM.

c. Bx.

d. CBC.

e. COPD.

f. CVA.

g. EEG.

h. GSW.

i. HIV.

j. IVP.

k. MI.

l. NAD.

m. \bar{p} .

n. PMH.

o. PVC.

p. UTI.

q. V.S.S.

r. WNL.

042. Terms used to describe body movement and structural relationships

1. Define each of the following terms used to describe body movement:

a. Range of motion.

b. Circumduction.

c. Supination.

- d. Flexion.
 - e. Hyperextension.
 - f. Abduction.
 - g. Inversion.
 - h. Protraction.
2. Define each of the following terms used to describe anatomical relationships:
- a. Medial.
 - b. Anterior.
 - c. Superior.
 - d. Distal.
 - e. Peripheral.

Answers to Self-Test Questions

037

1. A syllable or group of syllables joined to the beginning of another word to alter its meaning or create another word.
2. Never, as they are used to form other words or terms.
3.
 - (1) i.
 - (2) e.
 - (3) f.
 - (4) d.
 - (5) k.
 - (6) b.
 - (7) j.
 - (8) g.
 - (9) p.
 - (10) h.
 - (11) l.
 - (12) n.
 - (13) m.
 - (14) o.

038

1. A syllable or group of syllables added at the end of a word or word's base to change its meaning, give it grammatical function, or form a new word.
2.
 - (1) d.
 - (2) i.
 - (3) a.
 - (4) f.
 - (5) l.
 - (6) o.
 - (7) e.
 - (8) g.
 - (9) h.
 - (10) b.
 - (11) n.
 - (12) j.
 - (13) m.
 - (14) k.

039

1. The main part or portion of a word from which other words may be formed by adding a prefix and/or suffix.
2. Used to make pronunciation easier when there is nothing between the two root words, or between the root word and suffix.
3.
 - (1) p.
 - (2) j.
 - (3) d.

- (4) f.
- (5) r.
- (6) k.
- (7) g.
- (8) a.
- (9) i.
- (10) o.
- (11) c.
- (12) b.
- (13) h.
- (14) m.
- (15) e.
- (16) s.
- (17) q.
- (18) t.

040

1. (a) Injecting dye into the blood stream to make an X-ray study of the arteries; arterio = ROOT graphy = SUFFIX.
- (b) Reconstructing an eyelid; blephar(o) = ROOT, plasty = SUFFIX.
- (c) Creating an opening into the bowel through the abdominal wall; col(o) = ROOT, stomy = SUFFIX.
- (d) Suturing (repairing) the vagina; colpo = ROOT, rrhaphy = SUFFIX.
- (e) Removing pouches or packets of tissue called diverticulae; diverticula = ROOT, ectomy = SUFFIX.
- (f) Examining the esophagus through a scope; esophag(o) = ROOT, scopy = SUFFIX.
- (g) Creating an artificial passageway between the stomach and intestines; gastr(o) and enter(o) = ROOTS, stomy = SUFFIX.
- (h) Removing a fluid-filled sac or cyst-like structure from the scrotum or spermatic cord; hydro = PREFIX, cele = SUFFIX acting as a ROOT, ectomy = SUFFIX.
- (i) Repairing or reconstructing the cornea; kerat(o) = ROOT, plasty = SUFFIX.
- (j) Removing the posterior arch of a spinal bone; lamin(e)(a) = ROOT, ectomy = SUFFIX.
- (k) Removing a diseased mastoid bone from behind the ear; mastoid = ROOT, ectomy = SUFFIX.
- (l) Making an incision into the kidney to remove a stone; nephro(o) and lith(o) = ROOTS, tomy = SUFFIX.
- (m) Placing and fastening an undescended testicle in the scrotum; orchi(o) = ROOT, pexy = SUFFIX.
- (n) Making an incision into the muscular tissue that surrounds the passageway between the stomach and duodenum to relieve a constriction; pyloro and my(o) = ROOTS, otomy = SUFFIX.
- (o) Reconstructing the nose; rhino = ROOT, plasty = SUFFIX.
- (p) Making an incision into the chest (thoracic) cavity; thoraco = ROOT, tomy = SUFFIX.
- (q) Suturing (repairing) a lacerated cervix; trachel(o) = ROOT, rrhaphy = SUFFIX.
- (r) Cutting the nerves that control stomach secretions (branches of the vagus nerve); vago (relating to vagus nerve) = ROOT, tomy = SUFFIX.

041

1. To avoid misinterpretation of recorded information, particularly in a court of law.
2. (a) Before meals.
- (b) Twice daily.
- (c) Discontinue/discharge.
- (d) Intermittent positive pressure breathing.

- (e) Keep vein open.
 - (f) As needed.
 - (g) Four times a day.
 - (h) Subcutaneously.
 - (i) Soap suds enema.
 - (j) Treatment.
3. (a) Cubic centimeter.
- (b) Fluid ounce.
 - (c) Gram.
 - (d) Kilogram.
 - (e) Milligram.
 - (f) Specific gravity.
4. (a) Abdomen/abdominal.
- (b) Right ear.
 - (c) Below knee.
 - (d) Gastrointestinal system.
 - (e) Genitourinary systems.
 - (f) Left upper quadrant of abdomen.
 - (g) Left eye.
 - (h) Temporomandibular joint.
 - (i) Upper extremity.
 - (j) Upper gastrointestinal region.
5. (a) Advanced life support.
- (b) Bowel movement.
 - (c) Biopsy.
 - (d) Complete blood count.
 - (e) Chronic obstructive pulmonary disease.
 - (f) Cerebrovascular accident.
 - (g) Electroencephalogram.
 - (h) Gun shot wound.
 - (i) Human immunodeficiency virus.
 - (j) Intravenous pyelogram.
 - (k) Myocardial infarction.
 - (l) No acute distress.
 - (m) After.
 - (n) Past medical history.
 - (o) Premature ventricular contraction.
 - (p) Urinary tract infection.
 - (q) Vital signs stable.
 - (r) Within normal limits.

042

1. (a) The range, measured in degrees of a circle, through which body parts can be rotated, extended, or flexed at a joint.
- (b) A movement where the distal end of a part makes a circle while the rest outlines a cone.
 - (c) The movement that occurs when the forearm rotates outward so that the palms of the hand face forward.

- (d) A motion described when adjacent body parts approach each other, which decreases the angle between them.
 - (e) A type of extension where a body part is extended and stretched beyond its normal anatomical position.
 - (f) Movement of a body part away from the midline or medial plane of the body.
 - (g) The movement where the sole of the foot turns inward.
 - (h) A movement of a body part forward.
2. (a) Structures that are toward or near the midline of the body.
- (b) Structures that are toward or near the front side of the body.
- (c) Structures that are toward the head or upper part of the body.
- (d) Structures that are away or farther from the point of origin.
- (e) Structures that surround the center of the body and can be either distal or proximal to the body surface.

Unit Review Exercises

Note to Student: Consider all choices carefully, select the *best* answer to each question, and *circle* the corresponding letter. When you have completed all unit review exercises, transfer your answers to the Field-Scoring Answer Sheet.

Do not return your answer sheet to the Air Force Career Development Academy (AFCDA).

76. (037) What does the medical prefix “retro” mean in the word “retroperitoneal”?
- a. Above.
 - b. Before.
 - c. Behind.
 - d. Outside.
77. (038) A syllable or group of syllables added at the end of a word, or a word’s base, to form a new word or give it grammatical function is called a
- a. root.
 - b. suffix.
 - c. prefix.
 - d. combining form.
78. (038) Which medical suffix is used to indicate a cyst or hernia?
- a. -Oid.
 - b. -Cele.
 - c. -Cyte.
 - d. -Gene.
79. (039) The purpose of combining a vowel between the root word and the suffix in medical terminology is to
- a. make the spelling easier.
 - b. make the pronunciation easier.
 - c. clarify the meaning of the root.
 - d. clarify the meaning of the suffix.
80. (039) The medical root word that refers to the “head” is
- a. colpo.
 - b. crani(o).
 - c. cephal(o).
 - d. chondr(o).
81. (039) Which medical root word refers to the *cornea* of the eye?
- a. Ocul(o).
 - b. Kerat(o).
 - c. Blepher(o).
 - d. Ophthalm(o).
82. (039) Which medical root word denotes the cervix?
- a. Hyster(o).
 - b. Trache(o).
 - c. Trachel(o).
 - d. Salping(o).

-
-
83. (039) This is the medical root word that refers to the urinary bladder.
- Vesico.
 - Ventro.
 - Urethro.
 - Nephr(o).
84. (040) The term used to describe the surgical removal of a gallbladder is
- enterostomy.
 - appendectomy.
 - hydrocelectomy.
 - cholecystectomy.
85. (040) Which medical term would you use to describe the surgical reconstruction of a breast?
- Mastotomy.
 - Mastectomy.
 - Mammoplasty.
 - Mammorrhaphy.
86. (040) This medical term is used to refer to a bone reconstruction.
- Osteotomy.
 - Osteoplasty.
 - Arthroplasty.
 - Laminectomy.
87. (040) Which medical term should you use to refer to an incision into a tendon?
- Tenotomy.
 - Tenoplasty.
 - Tenectomy.
 - Tenorrhaphy.
88. (041) The abbreviation that means “if necessary” is
- qs.
 - tid.
 - p.c.
 - sos.
89. (041) What is the medical abbreviation for biopsy?
- Tx.
 - Bx.
 - BP.
 - DX.
90. (041) Which symbol is used to indicate the surgeon is referring to a female patient?
- ♂.
 - ♀.
 - △.
 - @.
91. (042) The medical term that describes moving a body part *towards* the body’s midline is called
- eversion.
 - inversion.
 - abduction.
 - adduction.

92. (042) What medical directional term *best* describes the relationship of the elbow to the wrist?
- a. Distal.
 - b. Medial.
 - c. Inferior.
 - d. Proximal.

Glossary

Terms

amperage—The strength or amount of electrical current flowing through a conductor, measured in amperes (amps).

beneficiaries—**1.** A person or persons entitled to medical care and other privileges at a military installation. **2.** A person or persons who receive money or property from a will.

circulator—A nurse or technician who performs nonsterile duties in support of the surgical team during an operation.

conductor—Any material that allows a free flow of electrons, thereby acting as a channel for the flow of electrical energy.

defamation—Making false statements about another person, either in writing (libel) or verbally (slander). It is a civil tort.

dermatome—An extremely sharp surgical instrument used to remove thin layers of skin from a patient's body for the purpose of skin grafting.

electrostatic—Energy created by discharge of static electricity between two or more charged bodies.

ethylene oxide—A hazardous, volatile gas used in special sterilizers to sterilize items that cannot withstand high temperatures or moisture.

insulator—Any material that restricts the flow of electrons and inhibits the flow of electricity.

isolated power system—An electrical power supply where the circuits are isolated from, or not connected to, the main ground terminal.

line isolation monitor—A device used to monitor an isolated power system for power overloads and ground faults.

resistance—Restriction to the flow of electrical current through a conductor.

scrub—A surgical technician (or nurse) who performs sterile duties in direct support of the surgeon and other sterile surgical team members.

shredout (shred)—**1.** An alphabetical suffix on an AFSC to designate an ability, skill, or special qualification closely related to the base (slick) AFSC. **2.** A technician who performs duties in a shredout AFSC.

tort—An intentional or unintentional wrongful act committed against a person or property.

vesicant—An agent, usually chemical, that causes blistering of the skin and mucous membranes.

voltage—The force causing electricity to flow through a conductor, measured in volts.

Abbreviations and Acronyms

AAAHHC	Accreditation Association for Ambulatory Health Care
AAMI	Association for the Advancement of Medical Instrumentation
AE	aeromedical evacuation
AFA	Air Force Academy
AFHCP	Air Force Hazard Communication Program
AFI	Air Force instruction
AFMS	Air Force Medical Service
AFOSH	Air Force Occupational Safety, Fire Protection, and Health
AFROTC	Air Force Reserve Officer Training Corps
AFS	Air Force specialty
AFSC	Air Force specialty code
AHA	American Hospital Association
AIDS	Acquired Immunodeficiency Syndrome
alpha	alphabetical
ALS	advanced life support
AORN	Association of Operating Room Nurses
ARC	Air Reserve component
ASCP	Airman Scholarship and Commissioning Program
BE	bioenvironmental engineering
BMET	biomedical equipment maintenance technician
BLS	basic life support
BSC	Bioenvironmental Corps
CBSPD	Certification Board for Sterile Processing and Distribution
CCAF	Community College of the Air Force
CDC	career development course/Centers for Disease Control and Prevention
CE	continuing education
CEM	chief enlisted manager
CFC	chlorofluorocarbon
CFETP	career field education and training plan

CME	continuing medical education
CO₂	carbon dioxide
COHC	Certified Occupational Hearing Conservationists
COT	Commissioned Officer Training
CPOP	Certificate Program for Otolaryngology Personnel
CPR	cardiopulmonary resuscitation
CRCST	Certified Registered Central Service Technician
CRNA	certified registered nurse anesthetist
CSSS	Central Sterile Supply Service
CT	Computed Tomography
CUA	certified urology associate
DANTES	Defense Activity for Nontraditional Education Support
DBMS	Director of Base Medical Services
DOD	Department of Defense
DODI	Department of Defense Instruction
DPSC	Defense Personnel Support Center
DTF	dental treatment facility
ECG	electrocardiogram
EHS	Environmental Health Services
ENT	ear, nose, and throat or ear-nose-and-throat
EO	executive order
EPA	Environmental Protection Agency
EPR	enlisted performance report
FHCTP	Federal Hazard Communication Training Program
FTCA	Federal Tort Claims Act
GME	graduate medical education
HAZCOM	hazardous communication
HCFC	hydrochlorofluorocarbon
HIPAA	Health Insurance Portability and Accountability Act of 1996
HIV	human immunodeficiency virus
HMIS	Hazardous Material Information System
ICU	intensive care unit

JC	Joint Commission
LASER	light amplification by simulated emission of radiation
LSO	laser safety officer
MAJCOM	major command
MD	medical doctor
MDG	medical group
MDW	medical wing
MEMO	Medical Equipment Management Office
METC	Medical Education and Training Campus
MRI	Magnetic Resonance Imaging
MSC	Medical Service Corps
MSDS	material safety data sheet
MTF	medical treatment facility
NC	Nurse Corps
NCCT	National Center for Competency Testing
NCO	Noncommissioned Officer
NCOIC	Noncommissioned Officer in Charge
NFPA	National Fire Protection Agency
OB/GYN	obstetrics/gynecology
OI	operating instructions
OJT	on-the-job training
OR	operating room
ORM	operational risk management
OSH	occupational safety and health
OSHA	Occupational Safety and Health Administration
OTC	orthopedic technologist
OTS	Officer Training School
PA	physician assistant
PACU	Post-anesthesia Care Unit
PAFSC	primary AFSC
PM	preventive maintenance
PPE	personal protective equipment

PRP	personnel reliability program
PSI	pounds-per-square-inch
PVC	polyvinyl chloride
QA	quality assurance
RM	risk management
RN	Registered Nurse
ROM	range of motion
SG	surgeon general
SNCO	senior noncommissioned officer
SPD	Sterile Processing and Distribution
STS	specialty training standard
SUNA	Society of Urologic Nurses and Associates
TA	tuition assistance
TB	Tuberculosis
TLC	tender loving care
TO	technical order
TOPA	TRICARE Operations and Patient Administration
TUR	Transurethral Resection
UL	Underwriters Laboratory
WWHCP	Workplace Written Hazard Communication Program

Student Notes

Student Notes

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