

# **CDC 4Y051O**

## **Dental Assistant Journeyman**

### **Volume 1. Dental Equipment and Basic Clinical Procedures**



**Career Development Academy (AFCDA)**

**Air University**

**Air Education and Training Command**

**4Y051O 01 1206, Edit Code 04**

**AFSC 4Y051**

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YOUR 4Y031 Air Force Specialty Code (AFSC) indicates you are a dental assistant apprentice. Apprentice means learner or novice, which adequately describes your status in training. The Career Development Courses (CDC) 4Y051N and 4Y051O provide the information needed to upgrade to AFSC 4Y051. The information you learned in the basic dental assistant course can now be used as a stepping stone to new levels of knowledge.

CDC 4Y051O contains four volumes, which primarily includes the subject knowledge requirements for your upgrade training.

Volume 1, Dental Equipment and Basic Clinical Procedures, is divided into three units: Unit 1 expands your knowledge of dental equipment and user equipment maintenance. Unit 2 contains information about clinical procedures that are basically performed in most all areas of patient care. This includes initial preparation of the dental treatment room and patient, evaluating the patient for contraindications through patient interview of the medical history and hypertension screening. Unit 3 continues the discussion of clinical procedures and covers the principles of four-handed dentistry.

Volume 2, Clinical Procedure—Part 1, is divided into three units: Units 1 and 2 present procedures, equipment, and instruments utilized for exams, general dentistry, endodontics, oral surgery, and periodontics. Unit 3 outlines the procedures for periodontal instrument sharpening.

Volume 3, Clinical Procedures—Part II, is divided into five units: Unit 1 covers information about subject knowledge and clinical treatment procedures related to prostheodontics. Unit 2 includes information about specific procedures related to complete dentures and removable partial dentures. Unit 3 includes sections on dental implants, and special appliances and provides information about procedures related to orthodontics. Unit 5 covers information regarding pediatric dentistry and includes the function, patient management and basic treatment procedures.

Volume 4, General Emergency, Safety, and Preventive Dentistry, is divided into six units: Unit 1 presents information relating to the preparation and prevention of emergency procedures. Unit 2 stresses safety and health; this includes general safety principles as well as safety specific to dentistry. Unit 3 covers the USAF preventive dentistry program and clinical procedures you may perform in dental health. Unit 4 details the important information covering oral prophylaxis procedures. Unit 5 provides information in the areas of oral health education and preventive dentistry counseling. Unit 6 provides information on the nutritional needs of your patient.

A glossary of terms, abbreviations, and acronyms is included at the end of this volume.

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This volume is valued at 18 hours and 6 points.

## **Acknowledgment**

Preparation of this volume was aided with the cooperation and courtesy of several commercial industries, listed below, who permitted the use of photographs and illustrations from manuals, brochures, and pamphlets. Permission to use this information is gratefully acknowledged.

### **Pelton & Crane**

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### **ADEC Incorporated**

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**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, do the unit review exercises.

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# Unit 1. Equipment Use and Maintenance

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**A**N IMPORTANT part of your job is to know the operation and maintenance of the dental equipment used during patient treatment. In the past, the basic dental treatment room equipment was fairly standardized among manufacturers. Today, there is a wide variety of state-of-the-art equipment. In this unit, we will study the use, operation, and maintenance of the more common types of dental equipment.

## 1–1. Maintenance Principles of Dental Equipment

As a dental assistant, it is crucial that you understand that you are *not* expected to assume the role of a maintenance technician. However, you are expected to be familiar with the proper use of dental equipment and be able to perform basic user maintenance functions. Know your responsibilities and realize your limitations. Nothing is more annoying to the provider, and in some cases the patient, than equipment failure that could be avoided with proper user maintenance. On the other hand, repairing defective equipment is the responsibility of trained biomedical equipment repair technicians (BMET). In either case, if equipment is damaged because you failed to perform user maintenance, or exceeded your limitations, you may be held financially responsible. To help understand your responsibilities and limitations, we'll begin with the different levels of maintenance.

### 001. Levels of maintenance

Each medical organization is responsible for maintenance of its equipment. In this lesson, you will study the four levels of maintenance: user, organizational, intermediate, and depot.

#### User maintenance

User maintenance includes actions relating to the proper operation, use, daily inspection, cleaning, simple lubrication, and minor exterior repair and operational adjustment of equipment. These areas are the responsibility of the equipment operator. As a dental assistant, user maintenance is your responsibility. As soon as you identify an equipment malfunction, report it to dental logistics; they are responsible for notifying biomedical maintenance.

Among other responsibilities, biomedical equipment repair technicians help identify user maintenance duties and, if needed, provide literature and in-service training. Operator error and improper use of equipment can lead to the injury, or death of a patient, or staff member. In order to prevent such occurrences, biomedical equipment support personnel provide operator training on patient-related equipment as part of departmental in-service training. At a *minimum*, operator training should include:

- Proper operation of features unique to the particular manufacturer, or model of equipment.
- Safety precautions for operators and patients.
- User preventive maintenance, cleanliness, and operational verification procedures.
- Recognition and correction of common operational problems.
- Proper reporting procedures for maintenance requests.

Frequent requests for repair service resulting from operator error or inadequate user maintenance may indicate that operator training is needed.

### **Organizational maintenance**

As the title implies, organizational maintenance includes actions which are the responsibility of and are performed by the using organization on its assigned equipment. These actions include inspecting, servicing, lubricating, adjusting, repairing, calibrating, modifying, and replacing parts or assemblies and subassemblies. Organizational maintenance requires the services of a trained BMET, as well as, tools and test equipment not available to the equipment operator. Organizational maintenance is performed only by, or under the direct supervision of, a fully qualified BMET.

### **Intermediate maintenance**

Intermediate maintenance is performed by a designated maintenance activity supporting multiple using organizations. In the health sciences fields, including dentistry, medical equipment repair centers (MERC) are responsible for providing intermediate level maintenance. This includes supporting organizational maintenance activities, and providing maintenance actions *not* available at the organizational level due to the complexity of the job as well as special skills, tools, or equipment requirements.

### **Depot maintenance**

Depot maintenance includes maintenance actions provided by specialized activities that support organizational and intermediate level maintenance activities. Depot level maintenance actions are normally limited to major repairs, overhauls, rebuilding of components and subassemblies, and manufacture of parts. Depot level maintenance for medical facilities is provided through Army depots and contract maintenance. Handpieces are an example of equipment requiring depot level maintenance.

## **002. Types of maintenance**

Just as there are different levels of maintenance, there are also different categories or types of maintenance. It is important that you know these levels of maintenance because they will help you understand where you fit in the overall maintenance picture. In this lesson we'll cover the different types of maintenance performed on our equipment to help you understand your responsibilities. Knowing the purpose of the different types of maintenance is an important link in ensuring the proper functioning of your equipment. Often, the BMET has to coordinate access to the dental equipment in order for maintenance to be performed. At times, equipment *cannot* be repaired on location and must be sent out for repair. The following paragraphs cover the three maintenance types: scheduled, unscheduled, and contract.

### **Scheduled maintenance**

Scheduled maintenance is necessary for ensuring optimum performance, safe operation, minimum downtime, and the maximum useful life of equipment. It provides regular and systematic servicing, verification of performance and safety. It also provides for detection and replacement of worn or failing components before a serious problem develops. In keeping with its goals, scheduled maintenance is divided into two categories: preventive and calibration/certification which are described in the following table.



Types of Scheduled Maintenance	
Type	Description
Preventive maintenance	<p>Preventive maintenance (PM) is the systematic care, servicing, and inspecting of equipment for the purpose of maintaining it in a safe and serviceable condition, detecting and correcting all minor faults before they develop into major defects.</p> <p>PM is the joint responsibility of equipment operators and maintenance personnel.</p> <p>User maintenance is considered PM.</p> <p>Note that equipment operators must <i>not</i> attempt repairs beyond those authorized as part of the operating techniques described in the operator's manual or manufacturer's instructions.</p>
Calibration/certification	<p>This is the measurement and adjustment of various equipment parameters to make certain the accuracy is within prescribed standards.</p> <p>These actions are <i>not</i> the responsibility of the operator. They are performed by organizational, intermediate, or depot levels.</p>

### Unscheduled maintenance

Unscheduled maintenance involves troubleshooting to isolate the cause of equipment malfunction, and replacing, adjusting components, or subsystems to restore normal function, safety, performance, and reliability of medical equipment. This type of maintenance is also *not* the responsibility of the operator. If you have equipment that needs unscheduled maintenance, notify BMET.

### Contract maintenance

This type of maintenance is provided by commercial contract. It may be used at various levels of maintenance depending on the circumstances and the nature of the problem. Contract maintenance is commonly used to repair or rebuild dental handpieces.

## Self-Test Questions

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

### 001. Levels of maintenance

1. What related actions are included in the user level of maintenance and who is responsible?
2. In the dental clinic environment, who is specifically responsible for user maintenance?
3. What responsibility does the user have regarding equipment malfunctions?
4. How can biomedical equipment repair technicians assist in user maintenance?
5. When do biomedical equipment support personnel provide operator training?
6. What should operator training include, at a *minimum*?

7. What may indicate that operator training is necessary?
8. What related actions are included in the organizational maintenance level, and who is responsible?
9. When may someone other than a BMET perform organizational maintenance?
10. What related actions are included in the intermediate maintenance level and who is responsible?
11. What level of maintenance does calibration of dental x-ray equipment require?
12. What related actions are included in the depot maintenance level and who is responsible?
13. What level of maintenance is required for the repair of handpieces?

## **002. Types of maintenance**

1. Why is scheduled maintenance necessary?
2. What does scheduled maintenance provide?
3. Name and describe the two categories of scheduled maintenance.
4. Who is responsible for preventive maintenance?
5. What is unscheduled maintenance and whose responsibility is it?
6. What is contract maintenance commonly used for?

## 1-2. Dental Chair, Unit, and Light

Operation and maintenance of the dental chair, unit, and light are critical to the performance of dentistry. Most dental procedures will fail to start or will end abruptly if any of these fail to function properly. Without the dental light, working in the oral cavity is like being in a dark, deep cave without a flashlight. It's difficult, if not impossible, to see what you and the dentist are trying to accomplish in the patient's mouth. It is important that you know how to properly clean, use, maintain, and make minor adjustments to a dental chair, unit, and light in order to avoid unnecessary delays. The three lessons in this section focus on these elements. We'll begin with the dental chair, then move on to the dental unit, and conclude with the light.

### 003. Operation and maintenance of the dental chair

Imagine the impression your patients will have if you are unable to efficiently operate the dental chair when seating them or when adjusting the chair for treatment. What about the reaction of the dentist you'll be assisting? You can see why knowing how to operate and maintain the dental chair is critical to effective patient treatment. In the following paragraphs we cover some of the basic information that you need to know as a dental professional.

#### Design and use

The dental chair should have a thin, narrow back (fig. 1-1). Chairs with bulky backs make patient positioning difficult, and keep both the provider and assistant from achieving a comfortable working position. The chair should provide complete body support for the recumbent patient, and have independently powered back (tilt) and seat (lift) controls, which can be conveniently adjusted by either the provider or assistant. The chair design should also permit rotation for better patient positioning.



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Figure 1-1. Dental chair, unit and light (courtesy of Pelton & Crane).

## Operation and maintenance

The typical dental chair is electronically controlled and hydraulically powered. An electric motor drives the hydraulic pumps which enables the back of the chair to tilt and the base of the chair to lift (fig. 1-2). Although switches located on the back of the chair control these movements, most models use foot controls for infection control reasons.

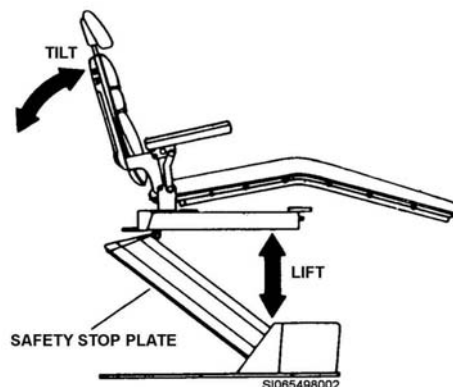


Figure 1-2. Chair tilt and lift (courtesy of ADEC).

The switches on the chair that control the up and down positioning of the back and the base are located on both sides of the chair for ease of access by the provider and assistant (fig. 1-3). When activated, the preposition switch places the chair into a preset treatment position. The auto return switch returns it to the patient entry/exit position. To stop the chair once the preposition or auto return switch is activated, press any other switch or the safety stop plate. If the preset position of either switch is not correct for treatment, consult the manufacturer's instructions for adjusting them. The foot switch (fig. 1-4) only controls the up and down movements of the back and the base.

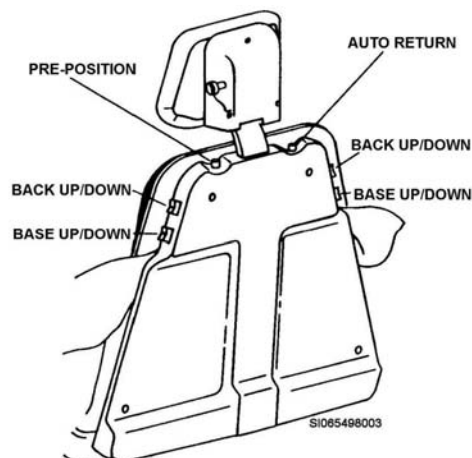


Figure 1-3. Chair control switches (courtesy of ADEC).

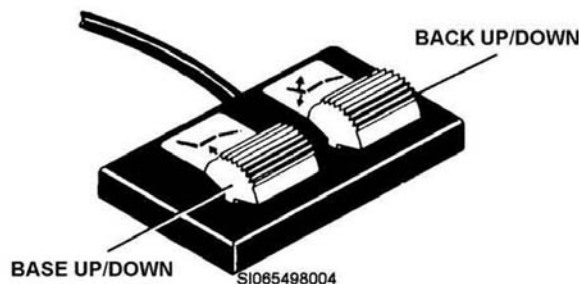


Figure 1-4. Foot control switches (courtesy of ADEC).

Newer chair models have a safety feature similar to the safety stop plate in fig. 1-2, which immediately stops the chair movement if a foot or piece of equipment becomes lodged under the chair. Placing even a little pressure on the safety plate halts chair movement. The base-up function is the only chair position that operates when pressure is applied to the safety device.

Most dental chairs have movable armrests that slide back or raise up to provide easy patient entry and exit. Generally, a release button locks and unlocks the armrests. A swivel/brake device allows the dental chair to rotate approximately 45 degrees from either side of the center and then lock in position (fig. 1-5). Dental chairs are equipped with either articulating or horseshoe style headrests (fig. 1-6). To move the headrest higher, pull up on it; to move it lower, push down on it (fig. 1-7). To tilt the headrest backward, press and hold the headrest lock release button, then tilt it to the desired position. Releasing the button locks the headrest against backward pressure. To move the headrest forward, push it to the desired position.

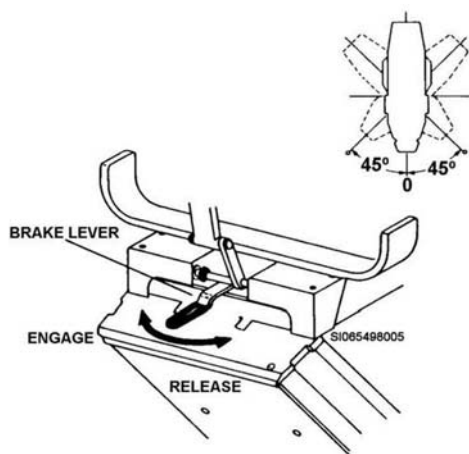
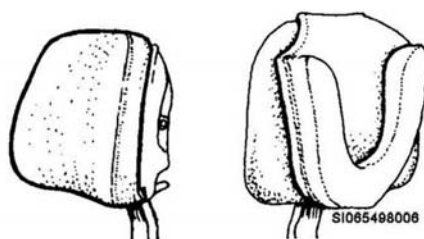


Figure 1-5. Swivel/brake (courtesy of ADEC).



#### ARTICULATING HORSESHOE

Figure 1-6. Headrest styles (courtesy of ADEC).

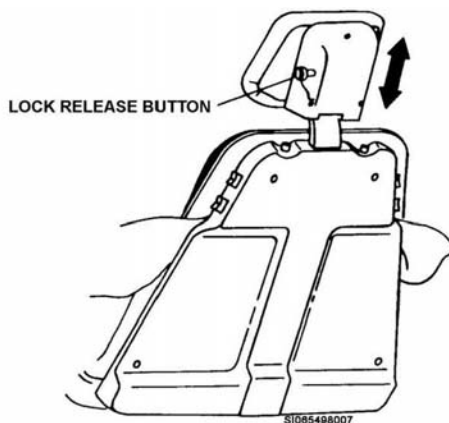


Figure 1-7. Headrest positioning (courtesy of ADEC).

Depending on the manufacturer and design, your dental chair may have the ability to convert the dental unit from one side or the other to accommodate either right- or left-handed providers. The manufacturer's manual will indicate if this is possible and provide the instructions for completing this procedure. It's always a good idea to determine if your equipment has this feature when reporting to a new clinic.

The *best* approach for dental equipment preventive maintenance is to make a visual inspection followed by an operational check. Before seating your first patient of the day, always inspect the chair and perform an operational check. Look for oil leaks and broken or missing parts. This visual inspection can prevent embarrassing moments and excessive treatment delays before you seat your patient or begin treatment.

Make sure the exterior surfaces are clean and the upholstery is in good repair, with no tears or other damages. Cleaning the dental chair involves cleaning plastic, painted, metal, and upholstery surfaces. As a general rule, clean the external surfaces *at least* once a day with a solution of water and mild detergent. Dry metal surfaces with a soft, lint-free cloth. Remember, abrasive cleaners or scrubbing pads can damage these surfaces and should *not* be used. Vinyl upholstery surfaces can be cleaned using water and a mild detergent or commercial foam-type upholstery cleaner following the manufacturer's instructions. Clean lightly soiled areas on fabric upholstery with the commercial foam-type cleaner. Clean heavily soiled areas with a commercial dry cleaning compound. Always check the manufacturer's instructions before attempting to remove stains or deposits from any equipment surface.

The hydraulic and electrical systems are seldom a source of trouble. If there is a problem, as a general rule, do *not* attempt to repair or replace the inner workings of these systems! This is a job for BMET. Make the appropriate call if you encounter problems in these areas.

#### **004. Operation and maintenance of the dental unit**

The dental unit is a vital, complex piece of equipment. When a dental unit is down for repairs, that treatment room is "down" and not available for patient treatment. It is essential that you learn the proper operation and maintenance of the dental unit so that you can help prevent unnecessary repairs and downtime.

##### **Design and use**

A dental unit provides the basic utilities for dental treatment including water, compressed air, electricity, and vacuum. It may also include handpiece controls, foot controls, bracket tray, tubing flush system, syringes, and suction apparatus (fig. 1-1). Most units are designed so that hose-attached equipment, such as handpieces, three-way syringe, and oral evacuation devices, are conveniently positioned for both the provider and assistant. The unit is also designed so that it is compact and does not occupy space needed by the assistant.

##### **General operation and maintenance**

One of your dental assistant duties is taking care of dental units. There is no single "standard" design which results in many types of units; each different in design and shape depending on manufacturer. However, all have basic features in common and provide water, air, electrical and vacuum systems. As we discuss each system we will cover, in a limited manner, some specific maintenance procedures. For practical reasons, the maintenance instructions given here are mostly general in nature. For more specific and complete maintenance procedures always refer to the manufacturer's manuals.

Like the dental chair inspection mentioned earlier, begin each day making a visual inspection and an operational check of the unit. During your inspection look for obvious problem areas first, such as frayed electrical wiring, missing screws, water leaks, etc. Follow this with an operational check of each system. For example, test the water, air, and electrical and vacuum systems by operating the

three-way syringe, fiber-optic handpiece, dental light, and saliva ejector. In the following paragraphs we look at each of the dental unit's basic systems and equipment along with the routine adjustments and maintenance for each one.

### ***Water system***

A malfunctioning water system affects the operation of the three-way syringe, and the handpiece water spray. If any of these items fail to work, make sure that the necessary valves and switches are turned on. If you cannot solve the problem at this point, read the manufacturer's instructions before continuing. Water leaks are usually the result of loose connections or defective washers and valves. When necessary, have BMET replace defective parts.

### ***Air system***

A large central air compressor provides compressed air. It operates up to three handpieces and the three-way syringes. Due to its noise level as well as safety requirements, this system is located outside of the patient treatment area. Unless you have had special training, contact BMET for any problems that indicate the need for repairs to the air system.

### ***Electrical system***

The electrical system is probably the most complex system on the dental operating unit. The dental unit's electrical system impacts the water heaters and solenoids (electrically operated switches). Unless you have had special training and have special electrical test equipment, *do not attempt accessing the electrical system*. Whenever there is an electrical problem, turn it over to BMET.

### ***Central vacuum system***

Generally, a central vacuum system provides suction to numerous dental units. Hoses connect the unit with the vacuum system and oral evacuation equipment such as the high volume evacuation (HVE) and saliva ejector. After each patient, draw clean water through the HVE and saliva ejector to clear any debris. After rinsing with water, draw air through the system for a few seconds in order to clear all water from the hoses.

When required, there are several cleansers with special disinfectant properties that can be used for dental vacuum systems. Always follow the manufacturer's recommendations when using one of these cleansers. *Never* use a sudsing-type detergent for cleaning the vacuum accessories.

Pay special attention to the solids separator (fig. 1-8) that serves as a filtering component of the central vacuum for both the HVE and saliva ejector. It contains a strainer that collects large pieces of debris that could clog suction hoses. Remove and clean the strainer daily. If the strainer cannot be cleaned daily, clean it at *least* once a week or whenever a decrease in vacuum is experienced. This ensures proper suction from the central vacuum and maintains proper treatment-room infection control.

### ***High volume evacuator***

The water spray from handpieces and three-way syringes, along with debris from the patient's mouth, must be removed. The most efficient way to do this is with a high volume evacuator. The principle of this evacuator is low pressure and high volume. The operating and maintenance procedures are as follows:

- Place a tip in the HVE handpiece.
- Turn suction off and on by a control valve.
- At the end of each day, remove the control valve by pressing the valve out of the HVE body from the backside of the handpiece (fig. 1-8).
- Wash, disinfect, and thoroughly dry the HVE housing and valve.

- Apply a light coating of silicone lubricant to the O-ring seals of the valve and then reassemble.
- Check the operation of the HVE to ensure that it functions properly.

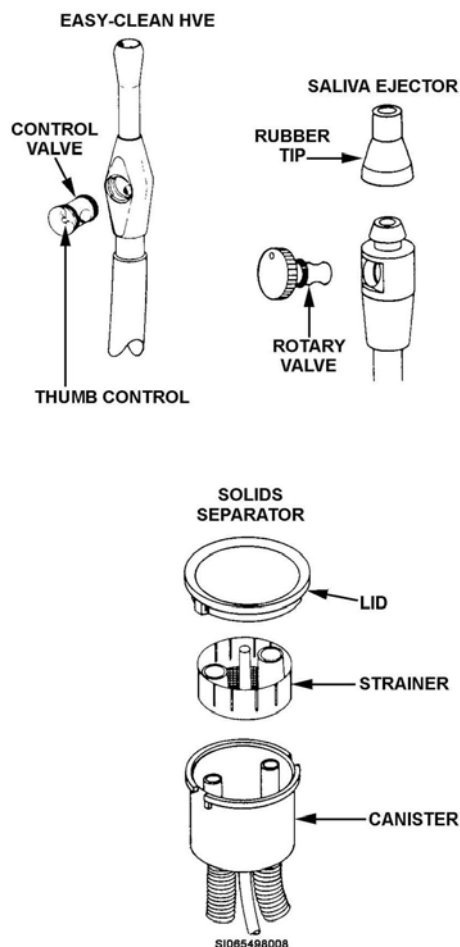


Figure 1-8. Central vacuum components (courtesy of ADEC).

### Saliva ejector

During certain procedures, the provider may choose to keep the working site dry by using the saliva ejector. This type of suction is effective only when there is a limited amount of fluids, such as saliva, to remove from the patient's mouth. It can also be used to hold the tongue away from the working site and keep an area dry for placement of material that takes a long period to set. The saliva ejector's operating and maintenance procedures are as follows:

- Insert a disposable plastic saliva tip into the rubber tip of the saliva ejector for use.
- After use, remove the rubber tip and rotary valve (fig. 1-8) to clean and disinfect them.
- Pull the rotary valve straight out to clean and apply a light coat of silicone lubricant before pushing it back in place.
- After you clean and disinfect the rubber tip, reassemble by pressing and twisting the tip until it snaps into place.

### Control system

This system is designed to automatically deliver the drive air and coolant to whichever handpiece is lifted. The control system is made up of two parts: handpiece controls and a foot control.



### Handpiece controls

Most of the handpiece controls are located on the bracket tray which is usually able to accommodate three handpieces (fig. 1-9). The water coolant flow and maximum drive pressure are individually adjustable for each handpiece.

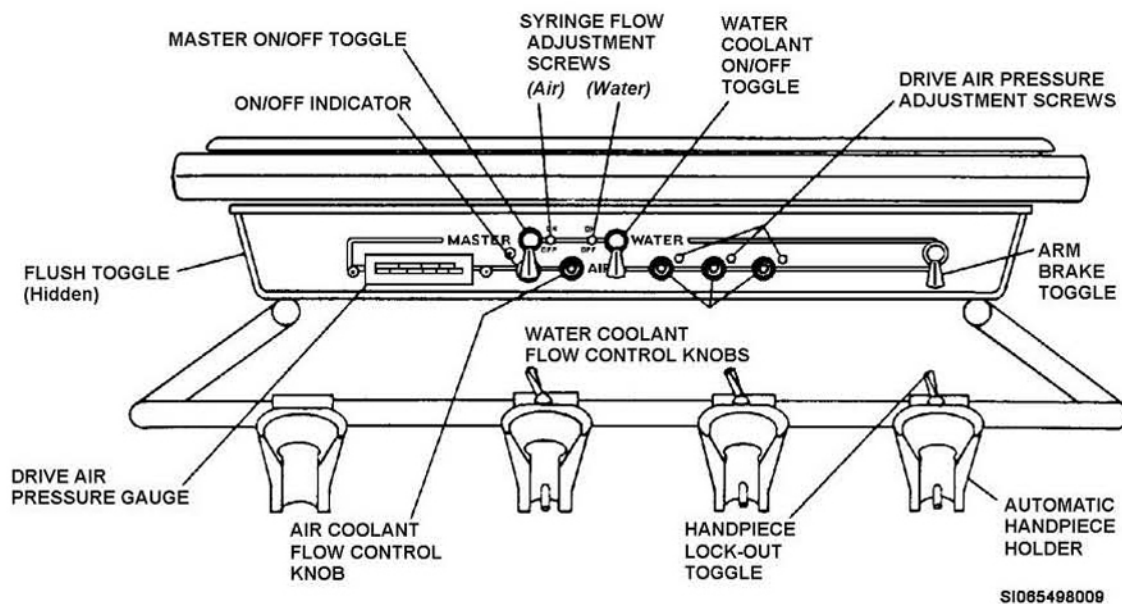


Figure 1-9. Handpiece control system (courtesy of ADEC).

Most units use the following international symbols:

- A blue dot identifies a water control.
- A yellow dot identifies an air control.
- A red dot identifies the ON or active position.

Every dental unit has a master ON-OFF toggle or switch (fig. 1-9). It turns on the air and water to the control system. When it is turned off, none of the items on the unit function. This switch should be OFF whenever the unit is *not* in use to prevent flooding in the event of a leak while the system is unattended. The ON/OFF indicator (fig. 1-9) provides a visual indication that the system is pressurized when the master switch is ON.

The water coolant ON/OFF toggle stops the flow of water coolant to *all* handpieces (fig. 1-9). The water coolant flow to each handpiece is adjusted using a separate water coolant flow control knob (fig. 1-10). For best results, turn the knob for the selected handpiece clockwise until you feel a slight resistance. As you operate the handpiece at medium speed, turn the knob counterclockwise until a fine mist is visible around the bur. It takes very little water to produce excellent cooling with fog spray. Repeat the process to adjust the other handpieces.

The air coolant flow control adjusts the air coolant flow to *all* handpieces and can completely shut off the air coolant (fig. 1-10). To make adjustments, first turn the wet/dry toggle on the foot control to the off position. As you operate the handpiece at medium speed, adjust the air coolant knob to the desired flow (strong flow is recommended). Air coolant is now set for all handpieces.

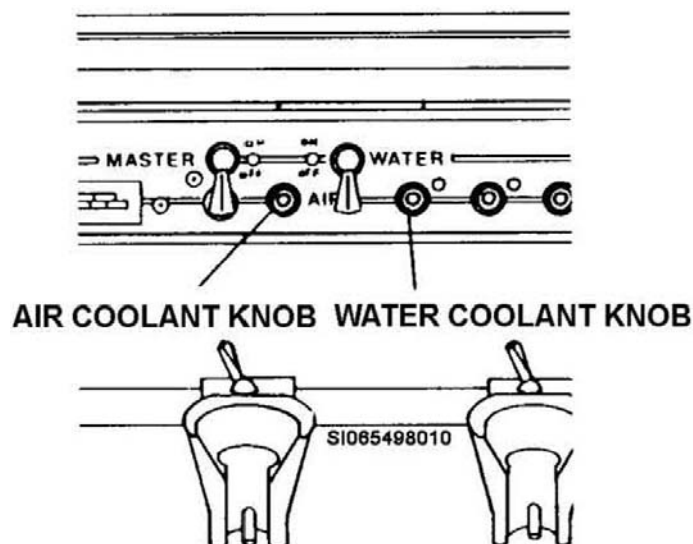


Figure 1-10. Air and water coolant flow adjustments (courtesy of ADEC).

The drive air pressure control adjusts the drive air pressure to the handpiece with a separate adjustment screw for each handpiece (fig. 1-11). Adjust the maximum drive air pressure to meet the handpiece manufacturer's specification listed in the instruction manuals. With the handpiece attached to the unit and a bur in the chuck, lift the handpiece from the holder and press the foot control. You can see a visual indication of the pounds per square inch (psi) to the handpiece on the drive air pressure gauge (fig. 1-11). Watch this gauge while turning the adjustment screw. Turn the screw *clockwise to decrease pressure*, or *counterclockwise to increase pressure*, until the handpiece runs at the specified maximum pressure when the foot control is fully pressed. Repeat the process for the other handpieces.

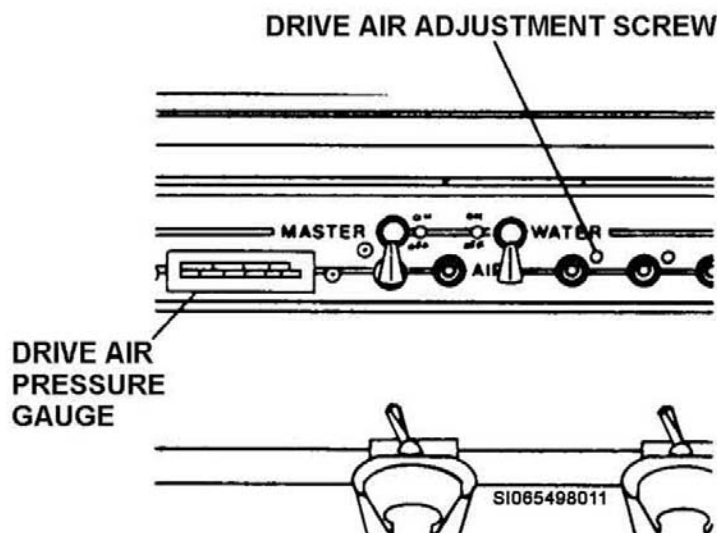


Figure 1-11. Drive air pressure adjustments (courtesy of ADEC).

The syringe flow control adjusts the air and water flow for the three-way syringe. Generally, two adjustment screws control the flow (fig. 1-12)—one for air and one for water. First, adjust the water flow by pressing the water button on the syringe and turning the adjustment screw clockwise to decrease, or counterclockwise to increase the flow. Next, press the spray button on the syringe and adjust by turning the air adjustment screw to obtain the desired spray.

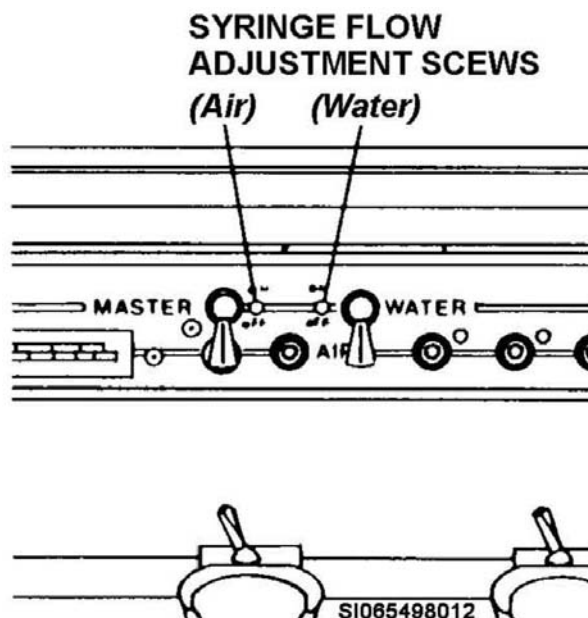


Figure 1-12. Syringe flow adjustments (courtesy of ADEC).

The automatic handpiece holder shuts off air and water to the handpiece when it is in the holder (refer again to fig. 1-9). When the handpiece is lifted from its holder, the valve inside the holder allows drive air and coolant to reach the handpiece. The automatic handpiece control function can be overridden with the handpiece lock-out toggle (fig. 1-9). This is used to lock-out a handpiece when two handpieces are out of their holders at the same time. Use this feature as a safety precaution whenever you are placing or removing burs.

The entire bracket tray is mounted to an arm with adjustable height. The arm brake toggle secures the arm at the selected height (fig. 1-9). Once you position the patient and tray for treatment, set the arm brake as a safety precaution in order to prevent the tray height from being accidentally moved during treatment.

#### *Foot control*

The provider operates all handpieces by using a foot control device (fig. 1-13). A valve inside the foot control regulates the handpiece speed and provides an air signal that activates the air and water coolant flow. The foot control is operated by light foot pressure applied to any part of the disk.

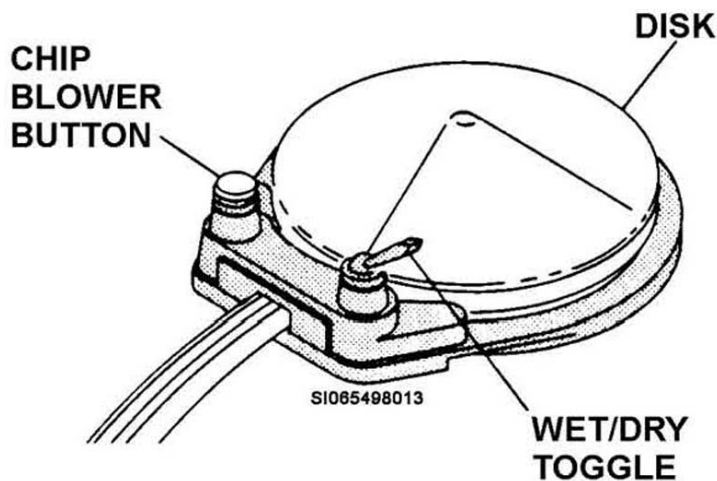
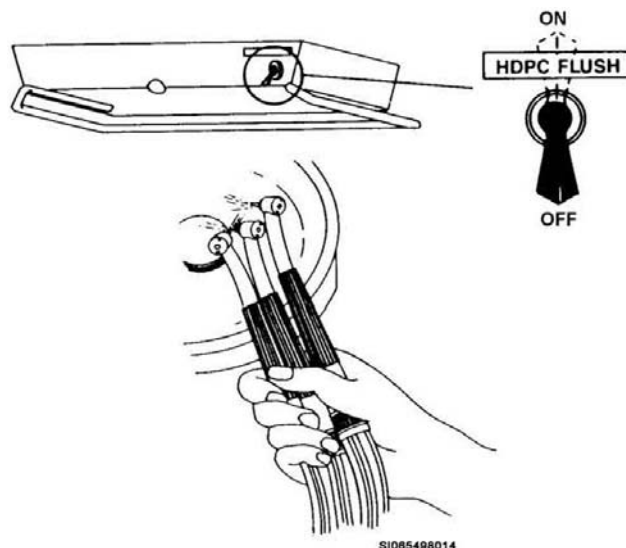


Figure 1-13. Foot control (courtesy of ADEC).

The foot control is also equipped with a wet/dry toggle and chip blower. The wet/dry toggle allows shutting off the water coolant to the handpiece without moving the hands from the oral cavity. To remove debris from the treatment site, a jet of air can be sent through the handpiece when it is not running by activating the chip blower.

### ***Handpiece tubing flush system***

Most dental units have a handpiece tubing flush system that can be used to quickly and thoroughly flush the tubing; washing away contaminants which may accumulate in the tubing (fig. 1-14). Use this system to flush the tubing at the beginning of each day and after every patient. To activate the system, hold the flush toggle and allow water to flow for the length of time required to meet infection control standards.



**Figure 1-14. Handpiece tubing flush system (courtesy of ADEC).**

### ***Syringes***

Each dental unit has *at least* one three-way syringe that provides air, water, or a combination spray. Syringes on newer units have a non-water retraction feature and disconnect easily from the unit for sterilization. The tip of the syringe rotates easily to spray in different directions and quickly disconnects to allow for sterilization. To remove the tip, simply loosen the tip nut and pull the tip straight out of the syringe head. When replacing the tip, notice that there are two small grooves in the end. These grooves must slide past the O-ring seals in the syringe nut. As you push the tip firmly into the syringe, you feel two “clicks” as the grooves slide over the O-rings. When you feel the second click, you know the tip is in completely. Finger-tighten the nut and press the syringe button to be sure the tip is secure. If you don’t properly install the tip, it could eject from the syringe.

If you have problems with the inner workings of any of these syringes, have a BMET repair or replace them.

## **005. Use and maintenance of dental lights**

Obviously, it is extremely difficult to see anything inside the mouth without proper light. Very quickly, dental health care personnel learn to appreciate and depend on dental lights. You must be familiar with the proper use and maintenance of the dental light to effectively see what you are doing.

### **Design and use**

The dental light illuminates the patient’s mouth. It may be a ceiling track-mounted light (fig 1-15), or mounted to the dental unit. The provider or assistant can easily adjust either type. When the light is

properly positioned, it illuminates the treatment site without projecting shadows from the provider's or assistant's hands onto the oral cavity.

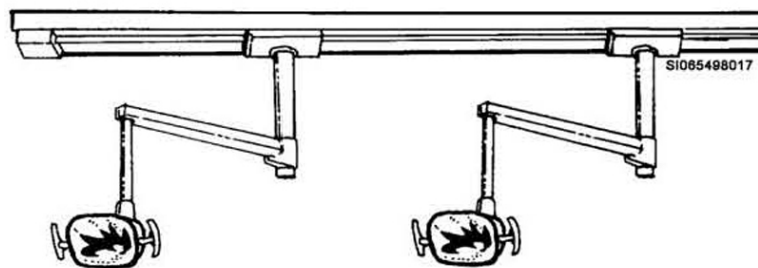


Figure 1-15. Ceiling track-mounting lights.

### Operation and maintenance

Because of their physical location most ceiling track-mounted lights maintenance is performed by BMET. Operationally, these lights are similar to the unit-mounted light.

The unit-mounted light consists of three major assemblies: the transformer and rigid arm, flex arm, and light head assembly (fig. 1-16). The ON/OFF switch located on the flex arm, behind the light head assembly, activates the light. Use the INTENSITY switch, located on the transformer housing, to set the intensity for low, medium, or high settings.

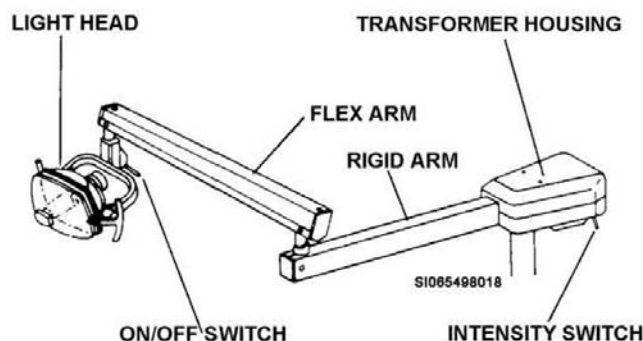


Figure 1-16. Components of a post-mounted dental light (courtesy of ADEC).

For ultimate positioning and flexibility, the light head rotates on three different axes (fig. 1-17). It can rotate horizontally, vertically, and diagonally from either side.

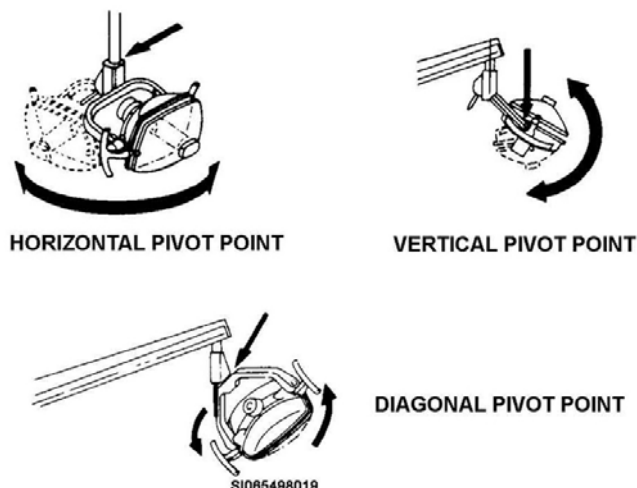


Figure 1-17. Positioning the dental light (courtesy of ADEC).

Although not by design, you often feel that the light bulb burns out at the most inconvenient time. Replacing the burned out bulb is a fairly easy process similar to replacing other light bulbs. Because there are some differences in the process, use the following steps when replacing the bulb:

1. Turn the light switch to the off position and allow the bulb to cool.
2. If you must replace the bulb immediately, use a gauze pad or cloth to protect your fingers when removing it.
3. Release the fastening devices on the light shield and place the shield aside.
4. Pull the old bulb from the socket and discard it.
5. Open the wrapper of the new bulb to expose the bulb pins, but do *not* remove the bulb from the wrapper (fig. 1-18). Use the wrapper to protect the bulb while installing it. This is necessary because finger oils limit bulb life and can affect light performance. If you inadvertently touch the bulb, gently clean it with cotton soaked in ethyl alcohol.
6. Insert the new bulb into the socket and remove the wrapper.
7. Replace the light shield and test the light.

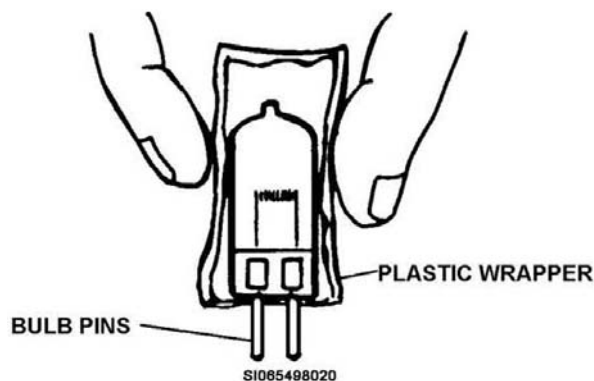


Figure 1-18. Bulb replacement (courtesy of ADEC).

A word of caution: *never* operate the light with the light shield removed. The shield is your protection against injury in the event the bulb shatters.

Because of the close proximity of the dental light during patient treatment, splatter and aerosols frequently soil it. To clean the light, follow these steps:

1. Be sure the light has cooled before cleaning it.
2. To thoroughly clean the light shield, remove by releasing the toggles on either side (fig. 1-19).
3. Immerse the shield in warm, soapy water, rinse in clear water and then wipe dry with a soft lint-free cloth.
4. Clean the inside surface of the reflector when dust or spots impair the efficiency of the light (fig. 1-20).
5. Use a soft, lint-free cloth to gently remove accumulated dust particles.
6. For a more thorough cleaning, dampen the cloth with isopropyl alcohol. Wipe the inside surface of the reflector in one direction only. Be sure the cloth is *not* so wet that it drips into the electrical part of the light.
7. *Never* use abrasives, chlorine, water, or any water-based cleaning solution on the inside surface of the reflector. These can damage or discolor the reflector surface, impairing the effectiveness of the light.

8. Do *not* rub heavily or clean the reflector when it is hot. *Never* soak the reflector in cleaning solution.

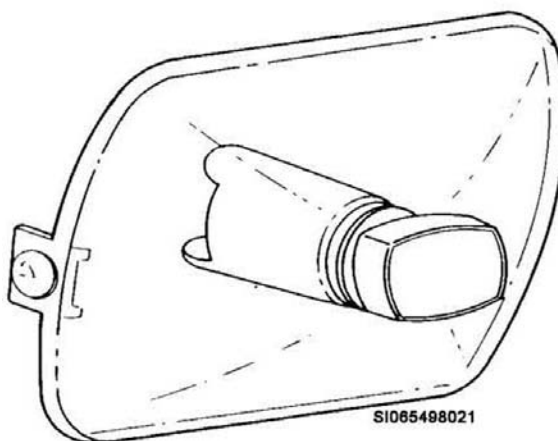


Figure 1-19. Light shield (courtesy of ADEC).

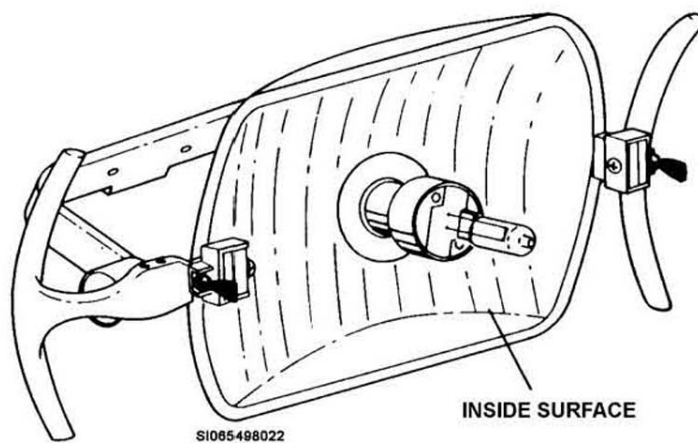


Figure 1-20. Light reflector (courtesy of ADEC).

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## Self-Test Questions

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

### 003. Operation and maintenance of the dental chair

1. Explain the desired design of the dental chair.
2. What powers and controls the dental chair?
3. Briefly explain the preposition switch and auto return switch.
4. How do you stop these switches once they are activated?

5. What can be done if the switches' preset positions are incorrect?
6. What is the safety stop plate?
7. As long as pressure is applied to the safety stop plate how does the chair operate?
8. What feature provides easier patient entry and exit?
9. What is the purpose of the swivel/brake device?
10. Explain how to use and position the headrest.
11. What do you do before seating your first patient of the day?

**004. Operation and maintenance of the dental unit**

1. What basic utilities does the dental unit provide for dental treatment?
2. What is the best source of complete maintenance procedures on dental operating units?
3. Summarize the dental unit maintenance that you perform prior to preparing for your first patient each day.
4. What items are affected by a malfunctioning water system?
5. What steps do you take when these items fail to work?
6. What are two causes of water leaks?



7. Because of the complexity of the electrical system, what should an operator do about electrical system problems?
8. What maintenance do you perform on the HVE and saliva ejector after each patient?
9. Name the filtering component of the central vacuum.
10. Explain the appropriate maintenance of the filtering component of the central vacuum.
11. What is the principle of the HVE?
12. What daily maintenance is required on the HVE?
13. When is the use of the saliva ejector effective?
14. Explain the maintenance required on the saliva ejector.
15. What is the purpose of the control system?
16. List the international symbols for units and what each identifies.

17. Match each item located on the handpiece control in column B with its description in column A. Items in column B may be used more than once.

*Column A*

- \_\_\_\_ (1) A visual indication of the psi to the handpiece.
- \_\_\_\_ (2) Must be adjusted to meet handpiece manufacturer's specification.
- \_\_\_\_ (3) Individually adjustable for each handpiece.
- \_\_\_\_ (4) Stops flow to all handpieces.
- \_\_\_\_ (5) Provides a visual indication that the system is pressurized.
- \_\_\_\_ (6) When turned off, none of the items on the unit function.
- \_\_\_\_ (7) Adjusts flow to all handpieces.

*Column B*

- a. Master ON-OFF toggle.
- b. ON/OFF indicator.
- c. Water coolant ON/OFF toggle.
- d. Water coolant flow control.
- e. Air coolant flow control.
- f. Drive air pressure control.
- g. Drive air pressure gauge.

18. Why should the master ON-OFF toggle or switch be OFF whenever the unit is not in use?

19. Explain how to adjust the water coolant flow.

20. Briefly explain how to adjust the air coolant flow.

21. How is the drive air pressure adjusted?

22. Explain how to use the syringe flow controls.

23. How does the automatic handpiece holder function?

24. How can the automatic handpiece control function be overridden?

25. How is the arm brake toggle used?

26. How does the foot control function?

27. Explain the two items located on the foot control.

28. What does the handpiece tubing flush system do?
29. When should the handpiece tubing flush system be used?
30. Explain how to remove and replace the 3-way syringe tip.

#### **005. Use and maintenance of dental lights**

1. What are the three major assemblies of the unit-mounted light?
2. Briefly explain how to remove and replace the light bulb in a dental light.
3. Why should the wrapper be used to protect the bulb while installing? What should you do if you inadvertently touch the bulb?
4. Explain how to properly clean the dental light.
5. What should never be done when cleaning the dental light?

### **1-3. Handpieces and Diagnostic Equipment**

With advances in dental technology, more and more procedures and techniques use dental equipment. It is not possible to cover all of the various dental equipment items in this volume. Therefore, we are only covering the basic types of dental equipment, their operation, and the user maintenance you perform on them. We'll begin with dental hand pieces, then cover some "miscellaneous" equipment, and conclude with some diagnostic equipment.

#### **006. Types, use, and maintenance of dental handpieces**

A dental handpiece is a precision-built mechanical device used in dental treatment. It is designed for use with rotary instruments such as burs, stones, wheels, and discs. Handpieces may be air-driven or electric and are classified according to the revolutions per minute (rpm) or speed at which they operate. There are two basic types: the low- or slow-speed, and the high- or ultra-speed contra-angle or, simply, ultra-speed.

Both the low- and ultra-speed handpieces are powered by an air system which operates several parts of the handpieces. The air supply rotates the air turbine or vane drive, making the air system the main power source for these handpieces.

Be sure that you read the manufacturer's instructions for cleaning and lubricating requirements for each handpiece. Some handpieces require using a lubricant/cleaner in the drive air tube of the handpiece. After using a lubricant/cleaner, operate all handpieces or attachment angles for 30 seconds or longer. This helps flush out debris on the inside of the handpiece or angle, and prevents gelling of the lubricant/cleaner during sterilization. Always use separate cans of lubricant/cleaner for before and after sterilization in order to prevent cross-contamination. *Never* sterilize a handpiece or angle with a bur installed. This could result in a corrosive bond between two different metallic surfaces. Some handpieces and angles require ultrasonic cleaning weekly to clean away debris and excessive lubricant that remain through normal maintenance. Check the manufacturer's instructions because *not* all handpieces and angles can be ultrasonically cleaned.

### Low- or slow-speed

The low- or slow-speed handpiece is used for removing caries, refining a cavity preparation, and performing a prophylaxis. It consists of a motor or power drive unit and various attachments. The air turbine or vane motor unit powers all of the attachments. Depending on the model, the motor speed can range from 0 to 5,000, or as high as 80,000 rpm.

Two low-speed handpieces are commonly used in Air Force dental clinics—the *Midwest Shorty* (fig. 1-21) and *Midwest Rhino XP* (fig. 1-22). Most low-speed handpieces have a directional rotation adjustment which controls the forward and reverse motion, and adjusts the speed (figs. 1-21 and 1-22). All models have some method of quickly connecting and disconnecting the motor and attachments. Some models have a quick ring disconnect, while others use a button or an indicator that is pressed to release attachments.

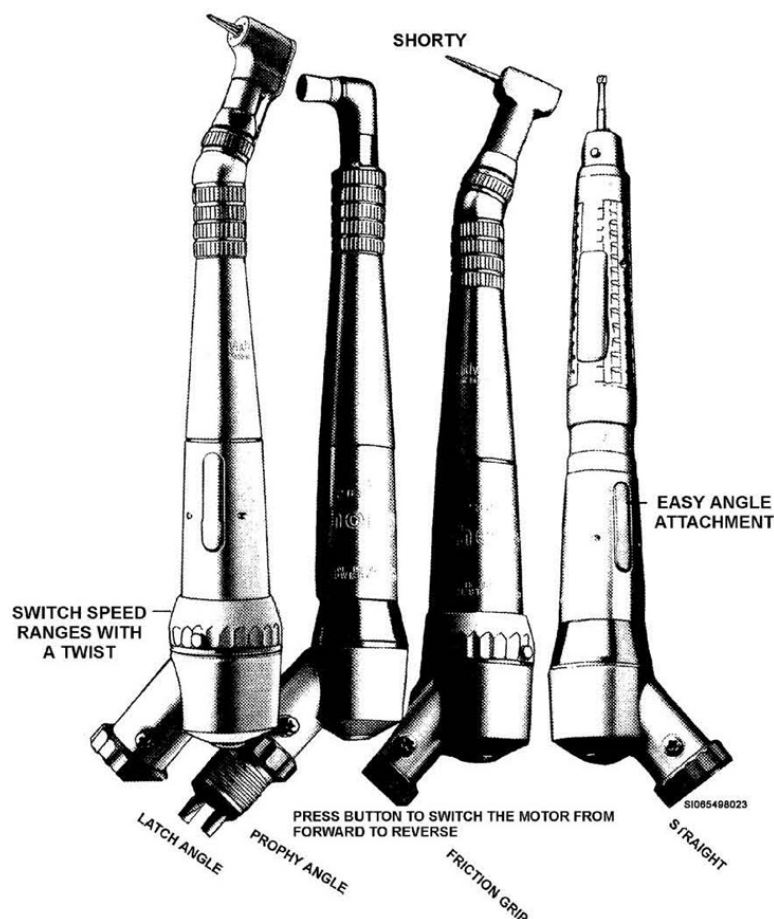


Figure 1-21. Midwest low-speed handpieces and attachments (courtesy of Midwest Dental).

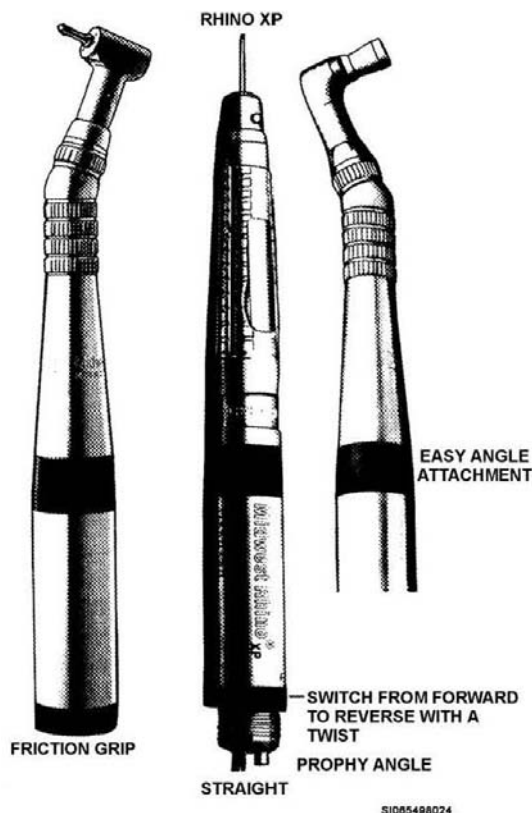


Figure 1-22. Midwest low-speed handpieces and attachments (continued) (courtesy of Midwest Dental).

The straight attachments (fig. 1-23) use burs, abrasive stones, and mandrels for discs with a smooth shank  $1\frac{1}{2}$  inches in length. A twist lock chuck secures the burs and other rotating instruments. The latch contra-angle (fig. 1-24) uses rotary instruments with notched, short shanks,  $\frac{1}{2}$ -inch in length. This is the only attachment that uses a latch to hold the rotary instruments in place. The low-speed friction grip (fig. 1-24) uses burs with a smooth short shank  $\frac{1}{2}$ -inch in length. A plastic or metal chuck is used to tighten the bur chuck which applies friction (pressure) to hold the bur in place. The prophy angle attachment (fig. 1-24) uses polishing cups or brushes with threaded ends that screw into the handpiece. Notice that all of the attachment heads assemble onto adapters or contra-angles (fig. 1-24) prior to attaching to the motor.

**NOTE:** Only *Midwest* attachments interchange with the *Shorty* and *Rhino XP* motors.

### STRAIGHT ATTACHMENT



Figure 1-23. Midwest low-speed handpiece attachment (courtesy of Midwest Dental).

Some of these low-speed handpieces and attachments require lubrication in certain areas, while others are lubrication-free. Always read the manufacturer's instructions before doing any maintenance or adjustments. Consult the manufacturer's instructions on the cleaning and sterilization required to meet infection control standards.

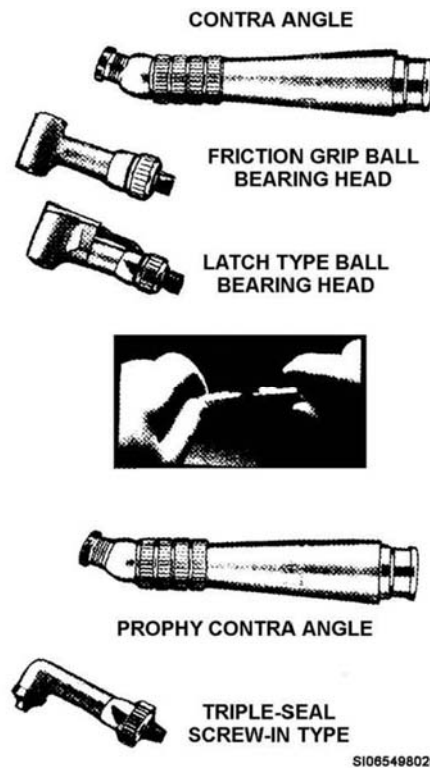


Figure 1-24. Midwest low-speed attachments (courtesy of Midwest Dental).

### High- or ultra-speed

The high- or ultra-speed handpiece (fig. 1-25) is used in cavity preparations to remove the bulk of enamel, dentin, and old metal restorations. It is also used to prepare retention grooves and bevels within a cavity preparation and the development of the cavity outline. The high-speed handpiece turns at a higher rate of speed than the low speed handpieces. Depending on the model, its speed ranges from 380,000 to 400,000 rpm. Ultra-speed handpieces are also operated by air pressure. Before you use one, consult the appropriate manufacturer's instructions.



Figure 1-25. High- or ultra-speed handpiece (courtesy of Midwest Dental).

Ultra-speed handpieces are designed to use smooth shank burs that are ½-inch in length. All models work on the same basic principle. Burs are inserted into a plastic or metal friction chuck and held tight in the handpiece either by manual tightening or a power lever lock. The bur is rotated when air is forced through the air ports into the head of the handpiece and to the air turbine.

Constant preventive attention is essential in caring for these handpieces. If they are *not* properly cleaned and lubricated, abrasives (such as finely ground tooth, metal, and other particles) cause excessive wear and undue vibration. The proper lubrication of handpieces is so important that it *cannot* be overstressed. Read and follow the manufacturer's instructions to make sure that you understand the lubrication, cleaning, and sterilization requirements. Perform the necessary maintenance as recommended. It takes only a few seconds to ruin a handpiece that has been improperly or insufficiently lubricated, cleaned, or sterilized.

The water system is used to keep the ultra-speed handpiece cool. The water system also produces a fine spray mist which aids in flushing debris from the treatment site.

### **Fiber optic accessories**

Fiber optic technology involves the transmission of light through long, thin fibers of glass or transparent material. The light travels, nonelectrically, through the fibers by reflecting from wall to wall without transmitting or generating heat. This makes fiber optics completely safe for use in the oral cavity.

Each individual fiber is approximately 25 microns in diameter, or about 1/3 the size of human hair. A cluster of fibers is called a fiber optic bundle. The bundles are enclosed inside the handpiece and positioned to direct the light along the same line as the bur. Because the light is focused along the shaft of the bur, it shines directly into deep recesses and cavity preps. Shadows or obstructions created by the side of the tooth, instruments, or hands are eliminated.

Fiber optics help dentists and assistants work more effectively and efficiently. It illuminates details and contours in deep recesses and posterior regions, allowing even fine detail procedures to be completed with ease and precision. Overhead light and mirror adjustments are minimized because the fiber optic light moves with the handpiece. Eye strain and fatigue are reduced because the eye does *not* have to constantly adjust to shadows, bright spots, and dark areas.

Most fiber optic systems are touch activated by picking up or touching the handpiece. Most systems also have an intensity control that permits adjusting the light intensity to suit individual preferences and needs.

Clean the fiber optic surfaces on both ends of the handpiece. To do this, wet a cotton swab with isopropyl alcohol and *clean both ends before the sterilization cycle*. This prevents residual debris and lubricant from baking onto fiber optic surfaces, which results in reduced light output. Read the manufacturer's instructions for additional care and maintenance requirements.

### **Electric handpiece**

This handpiece attaches directly to a small electric motor. It can be used in the dental treatment room, but is most commonly used in the dental laboratory. The electric handpiece (fig. 1-26) is portable, lightweight, and has variable speeds of 2,500 to 25,000 rpm. Units are initially activated by an ON/OFF switch and controlled by a foot switch. Another switch controls the left or right torque action similar to the forward and reverse of the low-speed handpiece. The electric handpiece uses long, smooth-shanked rotary instruments.

Electric handpieces require minimal maintenance and adjustments. Consult the manufacturer's instructions for specific requirements and guidelines.

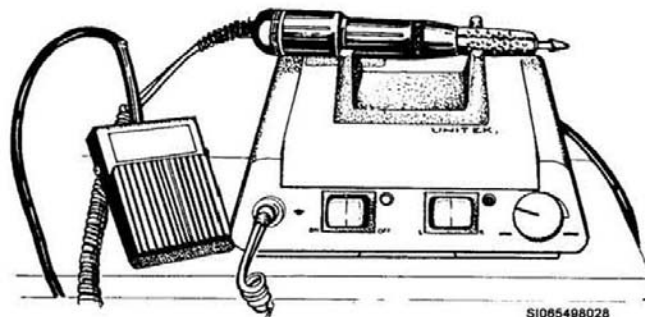


Figure 1-26. Electric handpiece.

### Surgical handpiece

A special handpiece designed for bone cutting procedures is often used in oral surgery. A common model in Air Force dental clinics is the pneumatic *Stryker* handpiece (fig. 1-27).



Figure 1-27. Surgical handpiece.

The attachments required to assemble the unit include a hose, foot switch (figs. 1-28 and 1-29), and a compressed dry nitrogen tank with a single stage regulator. The assembled unit should look similar to figure 1-30. Some models use a long, straight-shanked bur while others, such as the *Stryker*, use a special J-notch bur to eliminate outward migration. Always consult the manufacturer's instructions for proper care and required maintenance procedures. For example, when cleaning the handpiece after each use, scrub it with a soft-bristle brush, warm water, and mild detergent. Then rinse and dry completely. Do *not* immerse the handpiece or allow water to run into the hose connection end or the nose end. Many of these handpieces have lubrication-free motors, eliminating routine maintenance. For proper operation of the pneumatic handpiece, set the operating pressure in the 20 to 80 psi range while the handpiece is running. Operating at pressures above 80 psi results in increased motor speed, and may cause overheating.

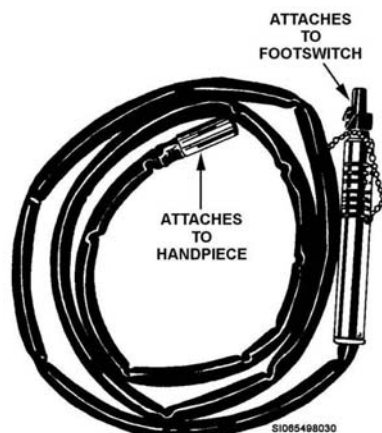


Figure 1-28. Hose connecting the handpiece and foot switch.



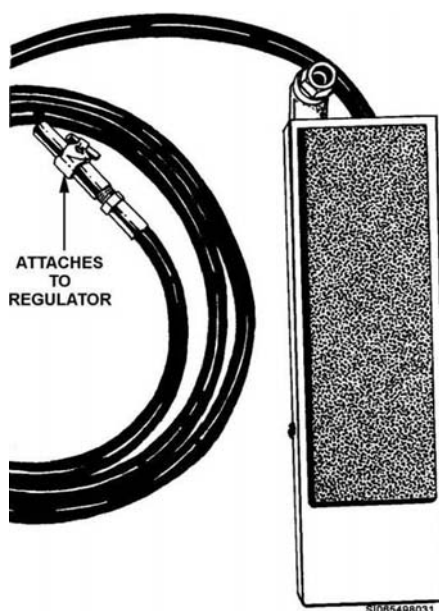


Figure 1-29. Foot switch with hose to attach to the regulator on the nitrogen tank.

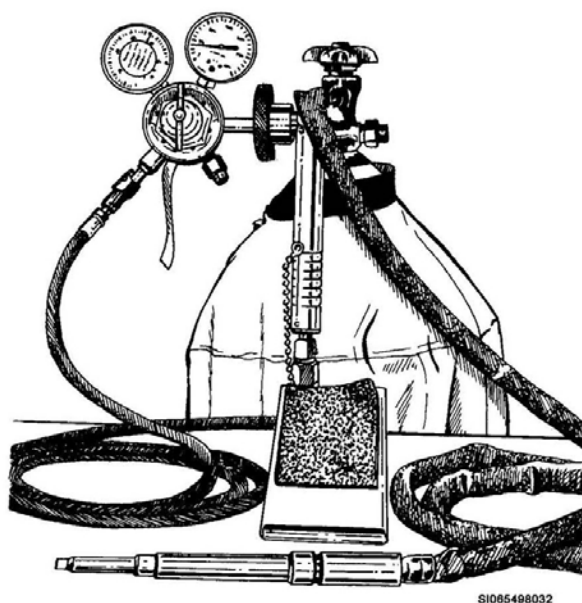


Figure 1-30. Assembled surgical handpiece apparatus.

### 007. Types, use, and maintenance of miscellaneous equipment

There are several pieces of equipment commonly used in many dental specialties. These items include provider and assistant mobile chairs, amalgamators, and visible curing light units. We'll look at each of these categories in this lesson, beginning with mobile chairs.

#### Provider and assistant mobile chairs

Provider and assistant chairs play an important role in the practice of dentistry due to techniques that require both to work from seated positions. The doctor's or provider's chair is designed with an adjustable backrest (fig. 1-31). The assistant's chair has an adjustable armrest that wraps around to the front of the chair (fig. 1-32). Both provider and assistant chairs should be well padded and comfortable. They must be mobile and have an adjustable seat height, as well as a broad base to give stability. Normally, chairs with at least four to five casters are preferred. The assistant's chair has a

foot-support ring so that users can keep their feet parallel to the floor, thereby maintaining comfort and proper posture.

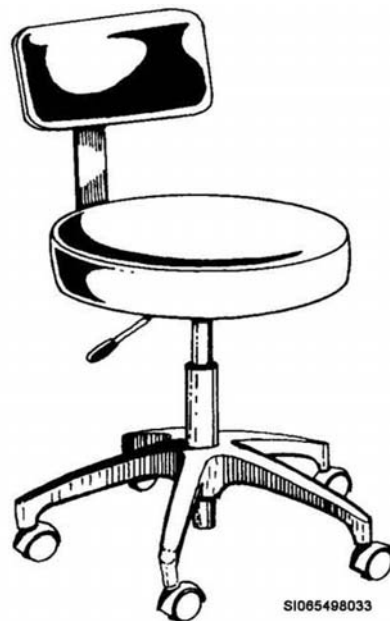


Figure 1-31. Provider's mobile chair.

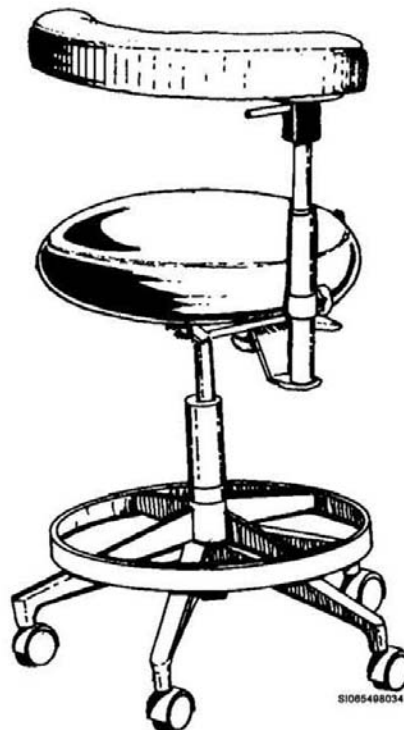


Figure 1-32. Assistant's mobile chair.

Mobile chair maintenance consists of making adjustments, lubricating the caster bearings, and cleaning. The adjustments involve the seat height, and backrest or armrest positions. Lubricate the caster bearings with lightweight machine oil monthly. *Never* lubricate the single-shaft on these chairs, because doing so would keep the locking mechanism from holding its adjusted position.

Be sure to routinely clean the chair seat and backrest or armrest, areas that often become soiled.

## Amalgamators

An amalgamator is used to triturate or mix mercury and amalgam alloy. It has a small electric motor that rotates an eccentric cam. A forked prong is attached to this cam. The capsule with alloy and mercury is securely placed in the forked prong and the cover closed before the amalgamator is activated to prevent mercury vapors from escaping. The cam rotates, causing the prong to move in a figure “8.” Amalgamators have variable speed controls, some with timer dials (fig. 1-33a); others with touch pad controls (fig. 1-33b). By using various capsules and settings, other materials in addition to different types of amalgam can be mixed. Refer to the manufacturer’s recommendations of the various materials for speed and timer settings.



Figure 1-33a. Vari-Mix II Amalgamator. (Courtesy of Dentsply).



Figure 1-33b. ProMix Amalgamator. (Courtesy of Dentsply).

It is important to keep this equipment clean. Remove any objects that fall into the case through the prong opening by unplugging the amalgamator and turning it upside down. Gently rotate it back and forth until the object falls out. Do not attempt to remove the case from this equipment. If you replace it incorrectly, you can damage the wiring or bearings.

## Visible light curing unit

Many dental materials are now cured or set by a visible light in the high intensity (blue) range. The visible light curing (VLC) (hardening) technique has varied applications in dental materials, including pit and fissure sealants, resins, impression materials, and surgical dressings, to name only a few. Most hand-held visible light curing units (fig. 1-34) contain a quartz-halogen lamp that produces a high-

intensity light to induce curing. This light allows the provider an unlimited amount of working time with the material. The light tip rotates to permit easy positioning. The high-intensity light radiation emitted from the unit is capable of retinal injury from chronic exposure. The light should *never* be directed toward the eyes. Staff and patients should use protective glasses that match the unit's radiation output. These units require minimal maintenance and adjustments. Clean the unit after each patient treatment following infection control guidelines. Read the manufacturer's instructions for specific requirements.

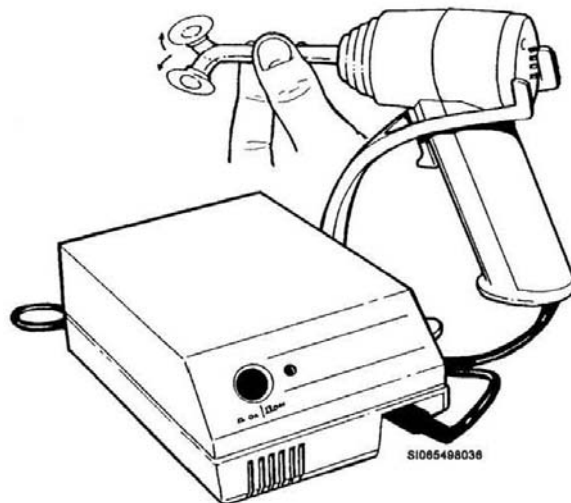


Figure 1-34. Visible light curing unit.

## 008. Types, use, and maintenance of diagnostic equipment

A variety of diagnostic equipment is used throughout the dental clinic, depending on the nature of the procedures performed and the patient's health history. Among the more common types are the electric pulp tester, noninvasive vital signs monitors, and thermometers. We'll look at each of these in this lesson, starting with the electric pulp tester.

### Electric pulp tester

The electric pulp tester (vitalometer) (fig. 1-35) is a device used to determine the reaction of the pulp and nerve tissues in teeth to electrical stimulus. The provider can start at zero and gradually increase the amount of current until there is a mild reaction from the patient. After the pulp test is completed, clean and disinfect the tip. Refer to the manufacturer's instructions for further details regarding cleaning, maintenance, and any adjustments.

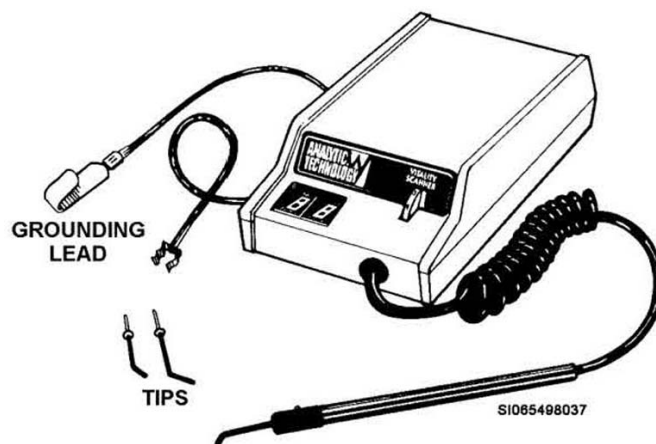


Figure 1-35. Electric pulp tester.

### Noninvasive vital signs monitors

Sometimes you have a dental patient with a medically compromised condition that requires additional precautions and monitoring. When intravenous sedations are used with these patients, vital signs must be taken and recorded throughout the procedure. Fortunately, advanced technology provides a solution to monitor pulse, respiration, temperature, blood pressure, and more through noninvasive vital signs monitors.

Equipment such as the *Datascope* or *Physio-Control VSM 2* (fig. 1-36), monitors the patient's blood pressure, temperature, heart rate, pulse, and electrocardiogram (ECG). Data is collected by attaching electrode patches and a blood pressure cuff to the patient. The patches and cuff transmit data to the monitor which displays it on a digital style screen while simultaneously recording it on a paper strip that includes the time and date. Some models, such as the *Pulse Oximeter* (fig. 1-37), monitor the saturated oxygen level and pulse rate using a finger clip attached to the patient's finger. This model only provides a screen display of the data collected. All noninvasive vital signs monitors have audio alarms that are activated when abnormal readings are detected.

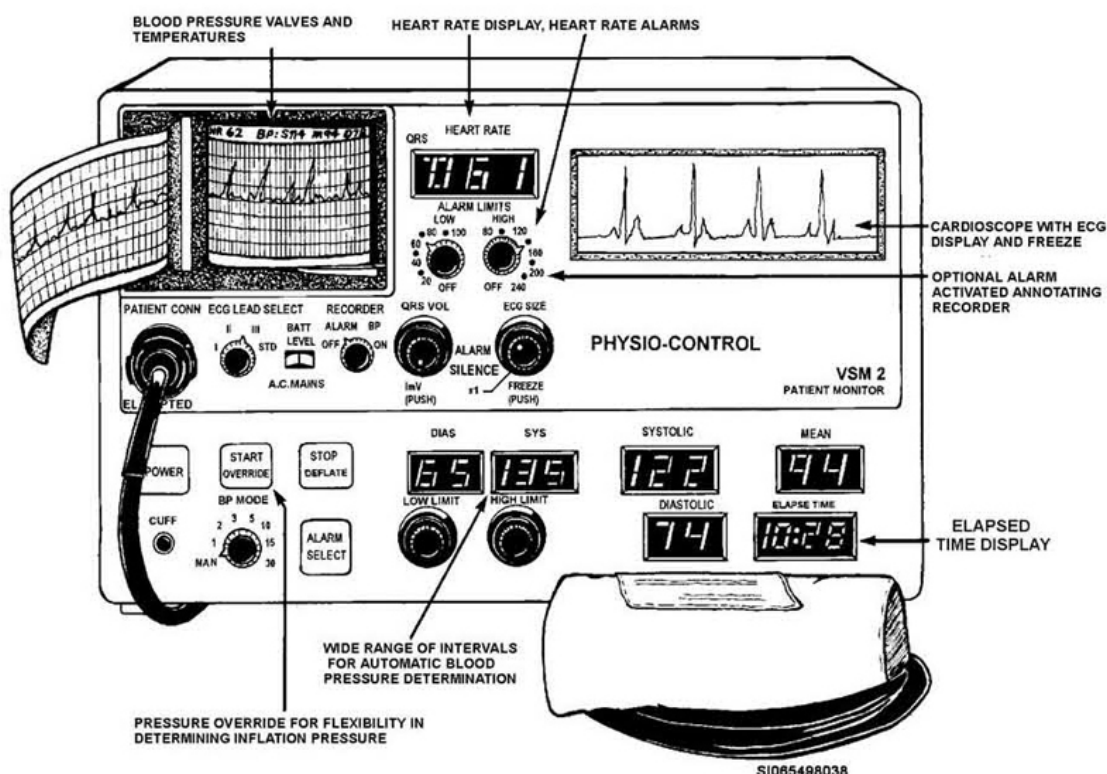


Figure 1-36. Noninvasive vital signs monitor.

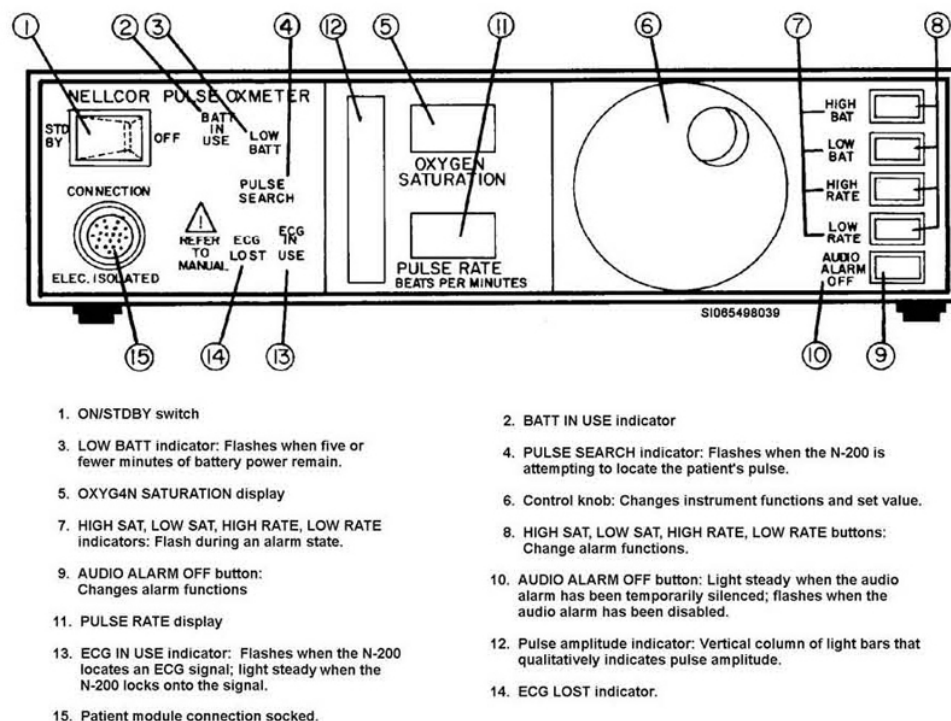


Figure 1-37. Pulse and saturated oxygen monitor.

Read and follow the manufacturer's instructions for specific use, care, and maintenance. Operator training for this equipment is normally provided by a BMET and includes aspects of cleaning, preventive maintenance, safety precautions, and unique operating features.

Remember, operator error and improper use of any equipment can potentially lead to the injury or death of a patient or staff member.

### Thermometers

The days of the old glass mercury thermometer are extinct. All thermometers used today are electronic with digital readings. The most commonly used systems are the *IVAC* oral thermometer, or an even newer *IVAC* tympanic thermometer (fig. 1-38). The tympanic thermometer's technology provides an accurate reading in seconds once it's placed in the patient's ear. Read the manufacturer's instructions to ensure proper use, cleaning, and maintenance.



Figure 1-38. Tympanic thermometer.

### Self-Test Questions

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

#### **006. Types, uses, and maintenance of dental handpieces**

1. What kind of system is used by both the low- and ultra-speed handpieces? What is its main function?
2. Where can you find the cleaning and lubrication requirements for each handpiece?
3. What should you do after using a lubricant/cleaner for all handpieces and angle attachments? Why?
4. Why should you always use separate cans of lubricant/cleaner for before and after sterilization?
5. Why should a handpiece or angle never be sterilized with a bur installed?
6. Why do some handpieces and angles require weekly ultrasonic cleaning?
7. What must you check to determine if handpieces and angles can be ultrasonically cleaned?
8. What is the low- or slow-speed handpiece used for?
9. What are the two styles of the low-speed handpiece commonly used in Air Force dental clinics?
10. Identify and describe the four attachments used with the slow-speed handpiece.
11. What are the uses of the high- or ultra-speed handpiece?
12. What type of burs do high- or ultra-speed handpieces use and how are the burs secured?

13. Why is the water system used with the ultra-speed handpiece?
14. What causes excessive wear and undue vibration to handpieces?
15. Explain how the technology of fiber optics helps the dentists and assistants.
16. What are the maintenance requirements of the fiber optics?
17. What does the maintenance on the fiber optics prevent?
18. How is the electric handpiece operated?
19. Where is the electric handpiece most commonly used?
20. What type of rotary instruments does the electric handpiece use?
21. What types of attachments are required to assemble a pneumatic surgical handpiece?
22. What types of burs are used on a pneumatic surgical handpiece?
23. How should the surgical handpiece be cleaned?
24. For proper operation, where should the operating pressure of the pneumatic handpiece be set?
25. What results if the operating pressure exceeds the recommended range for the pneumatic handpiece?



**007. Types, use, and maintenance of miscellaneous equipment**

1. What is the major difference in the designs of the provider and assistant chairs?
2. Explain the maintenance of mobile chairs.
3. Why should the single-shaft of mobile chairs never be lubricated?
4. What is an amalgamator?
5. Explain how the amalgamator operates.
6. Where can you find the recommended amalgamator speed and timer settings for various materials?
7. How do you remove objects that fall into the amalgamator case through the prong opening?
8. How is the VLC technique applied in dental materials?
9. Why should the light from VLC unit never be directed toward the eyes?
10. When using light from the VLC unit, what protective devices should be used and by whom?

**008. Types, use, and maintenance of diagnostic equipment**

1. What is the electric pulp tester or vitalometer?
2. Briefly explain how the vitalometer is used and its required maintenance.
3. What vital signs are monitored by *Datascope* or *Physio Control VSM 2*?

4. Briefly explain how the data is gathered and recorded by the *Datascope* or *Physio Control VSM* 2.
5. What does the *Pulse Oximeter* monitor?
6. How is the data collected and recorded by the *Pulse Oximeter* monitor?
7. What happens when abnormal readings are detected when using non-invasive vital signs monitors?
8. Where can you get information regarding use, care, maintenance, safety precautions, and unique operating features of monitors?
9. What is the most common thermometer systems used?
10. Where can you find information regarding the proper use, cleaning and maintenance of these thermometer systems?

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### Answers to Self-Test Questions

#### 001

1. Related actions include proper operation and use, daily inspections, cleaning, simple lubrication, and minor exterior repairs and operational adjustments. Equipment operator is responsible.
2. The dental assistant.
3. Reporting them to dental logistics.
4. Help identify user maintenance duties and provide literature and in-service training, if needed.
5. When there are occurrences of operator error and improper use of equipment. As part of departmental in-service training to prevent occurrences of operator error and improper use of equipment which can lead to the injury or death of a patient or staff member.
6. (a) Proper operation including features unique to the particular manufacture or model of equipment; (b) Safety precautions for operators and patients; (c) User preventive maintenance, cleanliness, and operational verification procedures; (d) Recognition and correction of common operational problems; (e) Proper reporting procedures for maintenance requests.
7. Frequent requests for repair service resulting from operator error or inadequate user maintenance.
8. Related actions include inspecting, servicing, lubricating, adjusting, repairing, calibrating, modifying, and replacing parts or assemblies and subassemblies. A trained BMET is responsible since he or she has tools and test equipment not available to the equipment operator.
9. Only under the direct supervision of a fully qualified BMET.

10. Related actions include support to organizational maintenance activities and maintenance actions which, due to the complexity of the job, require special skills, tools, or equipment not available at the organizational level. Medical equipment repair centers are responsible in support of multiple using organizations.
11. Intermediate.
12. Related actions include those normally limited to major repairs, overhauls, rebuilds of components and subassemblies, and manufacture of parts. Army depots and contract maintenance are responsible in support of organizational and intermediate level maintenance activities.
13. Depot.

## 002

1. To ensure optimum performance, safe operation, minimum downtime, and the maximum useful life of equipment.
2. Regular and systematic servicing, verification of performance and safety, and detection and replacement of worn or failing components before a serious problem develops.
3. (a) Preventive maintenance: systematic care, servicing, and inspection of equipment for the purpose of maintaining it in a safe and serviceable condition, and detecting and correcting all minor faults before they develop into major defects; (b) Calibration/certification: measurement and adjustment of various equipment parameters to ensure the accuracy is within prescribed standards.
4. PM is the joint responsibility of equipment operators and maintenance personnel.
5. Trouble-shooting to isolate the cause of equipment malfunction and replacement or adjustment of components or subsystems to restore normal function, safety, performance, and reliability of medical equipment. It is the responsibility of the BMET.
6. To repair or rebuild dental handpieces.

## 003

1. It should have a thin, narrow back, provide complete body support for the recumbent patient, and have independently powered back (tilt) and seat (lift) controls. The chair design should permit rotation for better patient positioning.
2. An electric motor drives the hydraulic pumps to enable the back of the chair to tilt and the base of the chair to lift. These movements are controlled by switches located on the back of the chair or by foot controls.
3. Preposition switch places the chair into a preset treatment position; auto return switch returns the chair to the patient entry/exit position.
4. Press any other switch or the safety stop plate.
5. Consult the manufacturer's instructions to make adjustments.
6. A safety feature which immediately stops the chair movement if a foot or piece of equipment becomes lodged under the chair.
7. The base-up function is the only chair position which functions.
8. Movable armrests which either slide back or raise up.
9. Allows the dental chair to rotate to approximately 45 degrees either side of the center and then lock in position.
10. To adjust higher or lower, pull up or push down on the headrest. To tilt backward, press and hold the headrest lock release button then tilt to the desired position. Release the button to lock the headrest against backward pressure. To move forward, push headrest to the desired position.
11. Always perform a visual inspection and an operational check of the chair. Look for oil leaks and broken or missing parts. Ensure the exterior surface is clean and the upholstery in good repair, with no tears or other damage.

## 004

1. Water, compressed air, electricity, and vacuum.
2. Manufacturers' manuals.
3. Make a visual inspection for obvious problem areas and follow it with an operational check of each system.

4. The three-way syringe and handpiece water spray.
5. Make sure that the necessary valves and switches are on. If you can't solve the problem at this point, read the manufacturer's instructions before going on.
6. Loose connections or defective washers and valves.
7. Turn them over to a BMET unless you have had special training and have special electrical test equipment.
8. Draw clean water through the HVE and saliva ejector to clear any debris; then draw air through the system for a few seconds to clear all water from the hoses.
9. Solids separator.
10. Remove and clean the strainer daily. If this cannot be achieved, clean the strainer at least once a week or if a decrease in vacuum is experienced.
11. Low pressure and high volume.
12. (1) At the end of each day, remove the control valve by pressing the valve out of the HVE body from the back side of the handpiece. (2) Wash, disinfect, and thoroughly dry the HVE housing and valve. (3) Apply a light coating of silicone lubricant to the O-ring seals of the valve and then reassemble. (4) Check the operation of the HVE to ensure that it functions properly.
13. When there is a limited amount of fluids, such as saliva, to remove from the patient's mouth. It can also be used to hold the tongue away from the working site and keep an area dry for placement of material that takes a long period to set.
14. Remove the rubber tip and rotary valve to clean and disinfect. Pull the rotary valve straight out to clean and apply a light coat of silicone lubricant before pushing it back in place. Reassemble by pressing and twisting the tip until it snaps into place.
15. To automatically deliver the drive air and coolant to whichever handpiece is lifted.
16. A blue dot is for water control; a yellow dot, air control; and a red dot, ON or active position.
17. (1) g.  
(2) f.  
(3) d and f.  
(4) c.  
(5) b.  
(6) a.  
(7) e.
18. To prevent flooding in the event of a leak while the system is unattended.
19. For best results, turn the water coolant flow control knob for the selected handpiece clockwise until you feel a slight resistance. As you operate the handpiece at medium speed, turn the knob counterclockwise until a fine mist is visible around the bur. Repeat the process to adjust the other handpieces.
20. Turn the wet/dry toggle on the foot control to the off position. Operate the handpiece at a medium speed and adjust the air coolant knob to the desired flow (strong flow is recommended). Air coolant is now set for all handpieces.
21. (1) With the handpiece attached to the unit and a bur in the chuck, lift the handpiece from the holder and press the foot control. (2) Watch the drive air pressure gauge while turning the individual adjustment screw for the handpiece. (3) Turn the screw clockwise to decrease pressure, or counterclockwise to increase pressure, until the handpiece runs at the specified maximum pressure when the foot control is fully pressed. (4) Repeat for the other handpieces.
22. First, adjust the water flow by pressing the water button on the syringe and turning the adjustment screw clockwise to decrease or counterclockwise to increase the flow. Next, press the spray button on the syringe and adjust by turning the air adjustment screw to obtain the desired spray.
23. It shuts off air and water to the handpiece when it is in the holder. When the handpiece is lifted from its holder, the valve inside the holder allows drive air and coolant to reach the handpiece.
24. With the handpiece lock-out toggle.
25. Secures the arm at the selected height. Once you have positioned the patient and tray for treatment, set the arm brake as a safety precaution to prevent the tray height from being accidentally moved during treatment.

26. A valve inside the foot control regulates the handpiece speed and provides an air signal that activates the air and water coolant flow and is operated by light foot pressure applied to any part of the disk.
27. The wet/dry toggle allows the water coolant to the handpiece to be shut off without moving the hands from the oral cavity. The chip blower removes debris from the treatment site by sending a jet of air through the handpiece when it is not running.
28. Flushes the tubing to wash away contaminants which accumulate in the tubing.
29. The beginning of each day and after every patient for the required length of time.
30. To remove the tip, loosen the tip nut and pull the tip straight out of the syringe head. When replacing the tip, slide the two small grooves in the end past the O-ring seals in the syringe nut. Push the tip firmly into the syringe; you'll feel two clicks as the grooves slide over the O-rings. When you feel the second click, you know the tip is in completely. Finger-tighten the nut and press the syringe button to be sure the tip is secure.

### 005

1. (1) Transformer and rigid arm assembly; (2) Flex arm assembly; (3) Light head assembly.
2. First, turn the light switch off and allow the bulb to cool. If you must replace the bulb immediately, use a gauze pad or cloth to protect your fingers when removing the bulb. Release the fastening devices on the light shield and move the shield aside. Carefully pull the old bulb from the socket and discard it. Open the wrapper of the new bulb to expose the bulb pins, but do not remove the bulb from the wrapper. Use the wrapper to protect the bulb while installing the bulb. Carefully insert the new bulb into the socket and remove the wrapper. Replace the light shield and test the light.
3. Finger oils limit bulb life and can affect light performance. Gently clean it with cotton soaked in ethyl alcohol.
4. (1) After cooling, remove the light shield by releasing the toggles on either side. (2) Immerse the shield in warm, soapy water, rinse in clear water, and then wipe dry with a soft, lint-free cloth. (3) Clean the inside surface of the reflector if necessary. (4) Use a soft, lint-free cloth to gently remove accumulated dust particles. For a thorough cleaning, dampen the cloth with isopropyl alcohol. Wipe the inside surface of the reflector in one direction only. Be sure the cloth is not too wet that it drips into the electrical part of the light. (5) Do not rub heavily or clean the reflector when it is hot or ever soak it in cleaning solution.
5. Never use abrasives, chlorine, water, or any water-based cleaning solution on the inside surface of the reflector; such things can damage or discolor the reflector surface and impair the effectiveness of the light.

### 006

1. An *air* system. Rotates the air turbine or vane drive which means the air system is the main power source for these handpieces.
2. In the manufacturer's instructions.
3. Operate all handpieces for 30 seconds or longer. This helps flush out debris on the inside of the handpiece or angle, and prevents gelling of the lubricant/cleaner during sterilization.
4. To prevent cross-contamination.
5. Could result in a corrosive bond between two different metallic surfaces.
6. To clean away debris and excessive lubricant that remains as a result of normal maintenance.
7. The manufacturer's instructions.
8. Removing caries, refining a cavity preparation, and performing a prophylaxis.
9. Midwest Shorty and Midwest Rhino XP.
- 10.

#### ***Attachment***

#### ***Description***

- |                        |  |
|------------------------|--|
| 1. Straight attachment | Uses burs, abrasive stones, and mandrels for discs with a smooth shank 1 ½ inches in length. A twist lock chuck is used to secure burs and other rotating instruments. |
|------------------------|--|

<i>Attachment</i>	<i>Description</i>
2. Latch contra-angle	Uses rotary instruments with a notched short shank ½ inch in length and is the only attachment which uses a latch to hold the rotary instruments in place.
3. Low-speed friction grip	Uses burs with a smooth short shank ½ inch in length. A plastic or metal chuck tightener is used to tighten the bur chuck which applies friction (pressure) to hold the bur in place.
4. Prophy angle attachment	Uses polishing cups or brushes with threaded ends which screw into the handpiece.
11. In cavity preparations to remove the bulk of enamel, dentin, and old metal restorations; also to prepare retention grooves and bevels within a cavity preparation, and development of the cavity outline.	
12. Smooth shank burs that are ½ inch in length. Burs are inserted into a plastic or metal friction chuck and held tight in the handpiece by either manual tightening or a power lever lock.	
13. Keeps the handpiece cool and produces a fine spray mist which aids in flushing debris from the treatment site.	
14. Improper cleaning, lubricating, and failing to remove abrasives, such as finely ground tooth, metal, and other particles.	
15. Helps them work with greater effectiveness and efficiency. It illuminates details and contours in deep recesses and posterior regions, allowing even fine detail procedures to be completed with ease and precision. Overhead light and mirror adjustments are minimal. Eye-strain and fatigue are lessened.	
16. Clean the fiber optic surfaces on both ends of the handpiece with a cotton swab wet with isopropyl alcohol before the sterilization cycle.	
17. Residual debris and lubricant from baking onto fiber optic surfaces which results in reduced light output.	
18. Attaches directly to a small electric motor that is activated by an on/off switch and controlled by a foot switch. Another switch controls the left or right torque action similar to the forward and reverse of the low-speed handpiece II.	
19. In the dental laboratory.	
20. Long, smooth-shanked rotary instruments.	
21. Hose, footswitch, and a compressed dry nitrogen tank with a single stage regulator.	
22. Some models use a long, straight-shanked bur while others use a special J-notch bur to eliminate outward migration.	
23. Scrub after each use with a soft bristle brush, warm water, and a mild detergent. Then rinse and dry completely. Do not immerse the handpiece or allow water to run into the hose connection end or the nose end. Consult the manufacturer's instructions for additional maintenance procedures.	
24. In the 20 to 80 psi range while the handpiece is running.	
25. Increased motor speed and may cause overheating of the handpiece.	

**007**

1. The assistant's chair has an adjustable armrest that wraps around to the front of the chair.
2. Adjustments of the seat height, backrest, or armrest positions; monthly lubrication of the caster bearings; and routine cleaning of the chair seat, backrest, or armrest.
3. Doing so would keep the locking mechanism from holding its adjusted position.
4. A device used to triturate or mix mercury and amalgam alloy.
5. A small electric motor rotates an eccentric cam with a forked prong attached to the cam. The capsule is securely placed in the forked prong and the cover closed before the amalgamator is activated to prevent mercury vapors from escaping. The cam rotates, causing the prong to move in a figure "8."
6. In the manufacturer's instructions.
7. Unplug the amalgamator, turn it upside down, and gently rotate it back and forth until the object falls out. Don't attempt to remove the case from this equipment.

8. In materials like pit and fissure sealants, resins, impression materials and surgical dressings.
9. The high intensity light radiation emitted from the unit is capable of retinal injury from chronic exposure.
10. Staff and patients should use protective glasses or shield that match the unit's radiation output.

**008**

1. A device to determine the reaction of the pulp and nerve tissues in teeth to electrical stimulus.
2. The provider starts at zero and gradually increases the amount of current until there is a mild reaction from the patient. After the pulp test is completed, clean and disinfect the tip. Refer to the manufacturer's instructions for further details.
3. The patient's blood pressure, temperature, heart rate, pulse, and ECG.
4. Electrode patches and a blood pressure cuff are attached to the patient to gather the data. The data is transmitted to the monitor, which is visible on a digital style screen and recorded on a paper strip with the time and date.
5. Saturated oxygen level and pulse rate.
6. A finger clip attaches to the patient's finger to collect the data. Only a visible screen record of the data collected.
7. Audio alarms are activated.
8. Reading and following the manufacturer's instructions and BMET provided equipment operator training.
9. The *IVAC* oral thermometer or *IVAC* tympanic thermometer.
10. In the manufacturer's instructions.

**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. 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) The level of maintenance that includes actions relating to proper operation, daily inspection, cleaning, simple lubrication, and minor exterior repair and operational adjustment of equipment is called
  - a. user.
  - b. depot.
  - c. intermediate.
  - d. organizational.
2. (001) Inspecting, servicing, lubricating, adjusting, repairing, calibrating, modifying, and replacing parts of assemblies and subassemblies are included in what level of maintenance?
  - a. User.
  - b. Depot.
  - c. Intermediate.
  - d. Organizational.
3. (001) Major repairs, overhauls, rebuilding of components and subassemblies, and manufacture of parts are *normally* limited to what level of maintenance?
  - a. User.
  - b. Depot.
  - c. Intermediate.
  - d. Organizational.
4. (002) What level of maintenance includes the systematic care, servicing, and inspection of equipment, and detection and correction of all minor faults *before they develop into major defects*?
  - a. Certification.
  - b. Calibration.
  - c. Preventive.
  - d. Contract.
5. (002) What type of maintenance involves troubleshooting to isolate the cause of equipment malfunction, and replacing or adjusting components or subsystems to restore normal function, safety, performance, and reliability of medical equipment?
  - a. Contract.
  - b. Scheduled.
  - c. Preventive.
  - d. Unscheduled.



6. (003) How can you stop a dental chair once the preposition or auto return switch is activated?
  - a. Cannot be stopped.
  - b. Press another switch.
  - c. Press the safety stop plate.
  - d. Press any other switch or the safety stop plate.
7. (003) What *must* you do if the preset positions of the preposition or auto return switches on the dental chair are not correct for treatment?
  - a. Request a BMET perform preventive maintenance.
  - b. Consult the manufacturer's instructions and adjust them.
  - c. Discontinue using these switches.
  - d. Nothing; they cannot be changed.
8. (003) What feature allows the dental chair to rotate to approximately 45 degrees from either side of the center and then lock in position?
  - a. Chair control switches.
  - b. Foot control switches.
  - c. Safety stop plate.
  - d. Swivel/brake.
9. (003) Repairing or replacing the inner workings of the dental chair's hydraulic and electrical systems is done by the
  - a. BMET.
  - b. dental assistant.
  - c. clinic NCOIC.
  - d. dentist.
10. (004) What dental unit system is affected by a *malfunctioning water system*?
  - a. 3-way syringe only.
  - b. Tubing flush systems only.
  - c. 3-way syringe and handpiece water spray only.
  - d. Tubing flush systems and handpiece water spray only.
11. (004) The central vacuum system requires what maintenance action be done after each patient?
  - a. Draw clean water or air through the HVE only.
  - b. Draw clean water through the HVE and saliva ejector.
  - c. Draw air or water through the HVE and saliva ejector.
  - d. Draw clean water through the HVE and saliva ejector to clear any debris, rinse with water, and then draw air through the system for a few seconds to clear all water from the hoses.
12. (004) The dental unit's HVE works on the principle of
  - a. low pressure and high volume.
  - b. low pressure and low volume.
  - c. high pressure and low volume.
  - d. high pressure and high volume.

13. (004) The air and water to the dental unit's control system is turned on by the
  - a. foot control.
  - b. handpiece control.
  - c. ON/OFF indicator.
  - d. master ON-OFF switch.
14. (004) A visual indication of the pressure to the handpiece in psi is displayed on the
  - a. drive air pressure control.
  - b. drive air pressure gauge.
  - c. air coolant flow control.
  - d. ON/OFF indicator.
15. (004) When burs are being placed or removed which item is used as a safety precaution to *control drive air and coolant*?
  - a. Master ON/OFF toggle.
  - b. Handpiece lock-out toggle.
  - c. Automatic handpiece holder.
  - d. Water coolant ON/OFF toggle.
16. (004) What step *does not* apply when *removing and replacing* the 3-way syringe?
  - a. Unscrew the tip nut completely to remove the tip.
  - b. Two clicks are felt as the grooves slide over the O-rings.
  - c. Properly install tip so that it *cannot* be ejected from the syringe.
  - d. Finger-tighten the nut and press the syringe button to be sure that the tip is secure.
17. (005) When the light is properly positioned, it will illuminate the
  - a. treatment site without projecting shadows.
  - b. provider's handpiece in the oral cavity.
  - c. provider's hands in the oral cavity.
  - d. treatment site projecting shadows.
18. (005) Always use the wrapper to protect the bulb when installing it into the dental light in order to
  - a. meet infection control standards.
  - b. avoid finger injury if the bulb shatters.
  - c. prevent the fingers from getting burned after the bulb is installed.
  - d. guard the bulb from collecting finger oils that can affect performance and bulb life.
19. (006) Which low-speed handpiece attachment uses rotary instruments with a smooth shank 1 ½ inches in length?
  - a. Friction grip attachment.
  - b. Straight attachment.
  - c. Contra-angle.
  - d. Latch angle.
20. (006) Which low-speed handpiece attachment uses a notched, short shank, ½-inch rotary instrument?
  - a. Prophyl angle.
  - b. Latch contra-angle.
  - c. Straight attachment.
  - d. Friction grip attachment.

21. (006) Which handpiece is used in cavity preparations to remove the bulk of enamel, dentin, and old metal restorations?
- a. Belt driven.
  - b. High speed.
  - c. Low speed.
  - d. Electric.
22. (006) Which statement does *not* apply to the proper maintenance of the high-speed handpiece?
- a. If a handpiece is not properly cleaned and lubricated, abrasions will cause excessive wear and undue vibration.
  - b. The manufacturer's instructions contain information on lubrication requirements only.
  - c. Always use separate cans of lubricate/cleaner for before and after sterilization.
  - d. Improper or insufficient lubrication, cleaning, or sterilization can ruin a handpiece.
23. (006) Which statement about using fiber optics in dentistry does *not* apply?
- a. Eye strain and fatigue are increased.
  - b. Overhead light and mirror adjustments are minimized.
  - c. It helps to identify the smoothness of crown preparations.
  - d. It helps to identify and diagnose interproximal caries, stains, and decay.
24. (006) How do you clean the handpiece's fiber optic surfaces?
- a. Wet a cotton swab with isopropyl alcohol and use it on both ends of the handpiece before sterilization.
  - b. Wet a cotton swab with any kind of alcohol and use it on both ends of the handpiece after sterilization.
  - c. Submerge both ends of the handpiece in isopropyl alcohol after sterilization.
  - d. Submerge only the bur end of the handpiece in isopropyl alcohol before sterilization.
25. (006) Which handpiece is portable, lightweight, and has variable speeds of 2,500 to 25,000 rpm?
- a. Ultra speed.
  - b. Low speed.
  - c. Fiber optic.
  - d. Electric.
26. (007) How often should mobile chair caster bearings be lubricated?
- a. Weekly.
  - b. Monthly.
  - c. Semiannually.
  - d. Annually.
27. (007) To remove objects that have fallen through the prong opening of an amalgamator,
- a. remove the case and gently shake it.
  - b. turn the unit on its side and vigorously shake it.
  - c. unplug the unit, remove the case, and vigorously shake the unit.
  - d. unplug the unit, turn it upside down, and gently rotate it back and forth.

28. (007) When using the VLC unit, the high-intensity light radiation emitted requires
- a. patients to wear safety glasses.
  - b. staff to wear glasses with protective lens.
  - c. patients and staff to wear protective glasses of any type.
  - d. patients and staff to wear protective glasses that match the unit's radiation output.
29. (008) Where is the *tympanic thermometer* placed in order to record a patient's temperature?
- a. Under the arm.
  - b. In the mouth.
  - c. In the rectum.
  - d. In the ear.

**Please read the unit menu for unit 2 and continue ➔**

## Unit 2. Basic Clinical Procedures: Part A

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**D**URING your career you may assist several dentists. You also may assist in several or all of the dental specialties. In doing so, you will find that dentists do not always carry out procedures in the same way. Generally, dentists follow a similar pattern, but because of individual preferences and variations in professional training, each works differently. To be successful, you must learn the preferred instruments, medications, and procedural routines of each dentist. You may perform many of these basic clinical procedures as a provider rather than an assistant. These include such areas as preventive dentistry or radiology. Although there are variations in treatment routines, there are basic procedures you need to know to be an effective dental assistant, regardless of which patient treatment area you may work in. This unit is the first of two in which you will focus on basic procedures found in all dental facilities. As you can see from the table of contents above, we'll begin with initial preparations and conclude with lessons on rotary instruments. In the following unit we'll cover four-handed dentistry, basic treatment procedures, and post-treatment procedures.

### 2–1. Initial Preparation

Preparation for dental treatment is essential for effective use of appointment time. Initially, you prepare the dental treatment room (DTR) first, and then receive and prepare the patient. Preparing the DTR before seating the patient is critical from an infection control aspect. From the patient management standpoint, a well prepared DTR can reduce patient apprehension and stress. When you bring patients into the treatment room to seat and drape them, the appearance of the room is generally equated to the quality of care they will receive. Therefore, the appearance of the DTR makes a lasting impression on the patient.

#### 009. Dental treatment room preparation

Some patients are apprehensive when they arrive for their appointment. The way you prepare the treatment room can ease their fears. Make sure that the dental unit, dental cabinets, work surfaces, arms of chairs, and dental light are clean and disinfected. Use an approved disinfectant and protective barriers to prepare the treatment room according to established infection control standards. Neatly arrange all medications, materials, and instruments required for treatment. Two procedures are of utmost importance in preparing for patients:

- Reviewing the patient record.
- Selecting and arranging instruments.

### **Reviewing the patient record**

Prior to the patient's appointment, you and the dentist should screen your patient's AF Form 696, Dental Patient Health History, or dental health record to:

- Determine what procedures to perform during patient treatment.
- Review AF Form 696 for positive entries.
- Check the record for radiographs required for the procedure.
- Check currency of information.
- Check for record completeness.
- Verify that you have the correct record for the patient being treated.

Make sure you inform the dentist or provider about positive responses to any question on the patient's AF Form 696. Do this before the patient is seated. If you find the folder contents are incomplete, not current, or incorrect, correct the problem if possible.

Place the record and all paperwork in a cabinet or desk, unless reference to these items is necessary during treatment. In such cases, place the items in a clear, plastic, protective barrier in order to maintain infection control.

### **Selecting and arranging instruments**

To do your job proficiently, you must know the instruments each procedure requires, instruments each dentist prefers, and the sequence of the procedure. By arranging the instruments in the order of use, you will eliminate the need to search through your instruments during the procedure. The patient's confidence towards you, the dentist, and the quality of treatment can be greatly diminished if your arrangement of instruments is disorganized and you appear uncertain in searching for the correct instrument.

Since apprehensive patients do not like to see the instruments, medications, and materials required for treatment, neatly arrange and cover them. Use the patient drape to cover the arranged instruments. In an effort to display as few items as possible to the patient, also cover medications and materials placed on other work surfaces. A smooth, quick method of selecting and arranging instruments for patient treatment is accomplished by using a system of packs and trays.

#### ***Packs***

Instrument packs are commonly used in all areas of patient care. The pack consists of a series of instruments and supplies placed in cloth, paper, plastic, or a combination wrapper and sterilized as a unit. The contents of the pack are planned so that almost everything needed for a specific procedure is available in the pack. Using packs saves time and energy because you do not have to gather the needed instruments and supplies one at a time.

#### ***Trays***

Like packs, trays have most of the supplies and instruments required for a given procedure. Trays are different in that they let you prearrange instruments in their order of use. A typical tray is a corrosion-resistant, sterilizable tray that is sometimes compartmented. The tray's contents are usually covered with a cloth towel, surgical wrapper, or suitable metal cover or lid. The entire tray, contents, and cover are then sterilized as a unit.

#### ***Preparation***

When preparing packs or trays, be sure that all the instruments you place in a pack or on a tray are in good condition. Severely scratched mouth mirrors, broken instruments, and forceps or scissors with

stiff operating hinge joints should be tended to or replaced before being placed in a pack or tray. Often, more than one assistant is assigned to a specialty section. Because of this, a standardized selection and arrangement system for instrument packs is very helpful.

**NOTE:** An itemized file card or listing of the contents of instrument packs or trays helps prevent any misconceptions of the contents.

## 010. Receiving and preparing the patient

Your rapport with your dental patients is critical. Always keep in mind that your actions and reactions give patients a certain impression. A good impression aids in patient treatment; a bad impression hinders dental treatment. In all you do, try to exert a positive influence that aids each patient's treatment. When you initially review a patient's record and prepare the DTR for the procedure, you are actually preparing to receive the patient. When you receive the patient, immediately begin to establish a rapport. This usually involves these four procedures:

- Greeting the patient.
- Seating the patient.
- Draping the patient.
- Positioning the patient.

### Greeting

Okay, the treatment room is prepared and you are ready to receive the patient. Establishing a good rapport with your patient can begin now. Whenever possible, walk to the waiting room and greet the patient pleasantly by name and rank. Do your best to call out the correct rank, and state the patient's name correctly. Failure in either instance can irritate the patient and embarrass you. After you greet your patient by name and rank, introduce yourself if this is your first encounter with the patient.

**NOTE:** Whenever there is a possibility that treatment may not begin at the scheduled time, always be sure to let the patient know. Failure to do so may anger the best of patients.

Whether you walk to the waiting room to call the patient, or your patient is referred to another area in the clinic, escort your patient to the designated place. When doing so, use light conversation to relieve the patient of any apprehension. The weather or the patient's hobbies are good noncontroversial subjects. Avoid subjects that could cause a controversy between you and the patient. For example, a controversial subject might be the patient's dental treatment.

### Seating the patient

To seat a patient, follow the steps outlined here:

Seating a Patient	
Step	Action
1	Lower the treatment chair to its lowest position, move the arm of the chair out of the way, and swing the bracket tray and dental light away from the chair.
2	Adjust the headrest for an average patient to make further adjustments easier and more accurate.
3	Ask the patient to remove anything that might interfere with the treatment. An example is the patient's coat.
4	Provide the patient with the required safety glasses or eye protection.
5	If a female is wearing lipstick, give her a tissue and politely ask her to remove the lipstick before the treatment begins.
6	Have the patient rinse with a recommended mouth rinse.
7	Position the patient with the occlusal plane of the patient's mandibular teeth parallel to the floor

Seating a Patient	
Step	Action
	when the patient's mouth is open.
8	Except for patients with certain medical conditions, position the chair so that the patient's feet are slightly higher than the head.
9	Adjust the overall height of the treatment position so that the patient's head is level with the provider's elbow when the dentist is seated in the provider's chair.

**NOTE:** If you are in doubt about the correct patient position, ask your dentist.

### **Draping the patient**

The two types of patient drapes are routine and surgical. The type of drape selected depends on the procedure and the dentist's preference.

#### ***Routine drape***

The primary purpose of the routine drape is to protect the patient's clothing. It is used when there is little chance of contamination. Place the routine drape on the patient before placing the patient in the treatment position. The most common patient drapes are linen, paper, and plastic-backed paper. Most are held in position by a towel chain placed around the back of the patient's neck. Other drapes may have adhesive tabs that secure the drape. When using the plastic-backed paper, be sure the paper side faces outward. This way the paper side absorbs spilled liquids, and the plastic side protects the patient's clothing.

#### ***Surgical drape***

The surgical drape is used when there is a good chance of contamination. Its use serves three main functions:

1. It prevents apprehensive patients from seeing instruments that might further aggravate their tension.
2. It protects the patient's eyes from the bright operating light and instruments that may be passed near the eyes.
3. Since the Mayo, or instrument stand, is customarily placed behind the patient, the surgical drape prevents the patient's hair from contaminating the instruments.

Before placing the surgical drape, lower the patient to the treatment position. Wash your hands and don a pair of sterile surgical gloves. You will need to use sterile towels to apply the surgical drape. First, ask the patient to lift his or her head from the headrest. Next, place a hand towel across the headrest, taking care not to contaminate your gloves. Then, ask the patient to lay the head back on the headrest. Drape a second sterile towel naturally around the patient's neck and shoulders to cover the chest. Secure this towel at the back of the neck with a towel clamp. After the dentist sedates the patient, crisscross the towel under the patient's head, across the eyes and head, and secure it in place with a towel clamp. When you have properly draped a patient, everything in the treatment field is covered except the nose, mouth, and chin.

### **Positioning the dental light**

After the patient is seated and draped, you must position the dental light for treatment. To avoid shining the light in the patient's eyes, position the light toward the area beneath the patient's chin before turning it on. Then, turn the light on and adjust it toward the appropriate arch. Be sure to position the light within your reach from the seated position so that you can make any adjustments required during treatment. Once the light is positioned, turn it off until the dentist is ready to begin treatment.



After you receive and prepare your patient, don appropriate personal protection equipment (PPE). You will be able to finish most of the preparation procedures before the dentist enters the room.

Before the dentist arrives, keep up a light conversation with the patient; however, there are some cautions you need to keep in mind. If the patient asks questions about the treatment, you may answer if it is within your responsibility. However, be careful that you don't commit the dentist to a treatment plan that cannot be fulfilled. Do not attempt to impress patients with your knowledge about dental professional matters; instead, refer any questions about the professional aspects of patient treatment to the dentist.

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### **Self-Test Questions**

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

#### **009. Dental treatment room preparation**

1. What is the purpose of screening a patient's dental health record? How is it accomplished?
2. When should you inform the dentist or provider of any positive responses on the patient's AF Form 696?
3. What must you know to select the instruments for a specific procedure?
4. How should you arrange instruments for use? Why is this important?
5. What can you do so that patients do not see the instruments, medications, and materials required for treatment?
6. What is included in instrument packs?
7. Why does using packs save time and energy?
8. How do trays differ from packs?
9. Describe the typical tray.

**010. Receiving and preparing the patient**

1. Whenever possible, how should you greet the patient?
2. What should you do whenever there is a possibility that treatment may not begin at the scheduled time? Why?
3. If your patient is referred to another area in the clinic, what should you do?
4. What topics are acceptable for conversation when escorting a patient?
5. How should you position the treatment chair before seating the patient?
6. When positioning the patient, how should the patient's occlusal plane be positioned?
7. Except for those patients with certain medical conditions, how should the patient be reclined in the chair?
8. Name the two draping techniques used for dental patients.
9. What is the primary purpose of the routine drape?
10. How are most routine drapes held in position?
11. If plastic-backed paper is used for the routine drape, which side faces outward? Why?
12. When is the surgical drape used?
13. List purposes of the surgical drape.

14. Describe how the surgical drape is applied.
15. Explain how to position the dental light properly after the patient is seated and draped.
16. What do you do after you have completed the preparation procedures and are waiting for the dentist to enter the treatment room?

## **2-2. Evaluating the Patient for Contraindications**

Initial evaluation of the patient for contraindications to dental treatment begins with the patient's completing a current AF Form 696. Keep in mind that all dental patients must be evaluated on their medical history before the course of treatment begins. A dentist is required to review and sign this form.

A complete health history helps the dental health care provider identify precautions the provider and patient should observe and prevents medical emergencies during dental treatment. It is not difficult to imagine what could happen if medically compromised patients were treated without proper assessment of their health status. Interviewing the patient, observing responses during treatment, and hypertension screening are all aspects of evaluating the dental patient.

### **011. Interviewing the patient**

Any medical history, no matter how complete, is only as good as the person who uses it. As the dental assistant, make a first review of the patient's medical health history. When you make this initial screening of the patient's dental health record, you are doing an important part of the treatment preparation. Additionally, each time a patient receives dental treatment the medical health history requires a second review. This is done by interviewing the patient or reviewing the health history with the patient before beginning treatment. When the medical health history form is fairly current, interviewing the patient determines if there are any changes since the patient was last treated.

Figure 2-1 is an example of the AF Form 696. Discuss each of the questions shown with the patient. Keep in mind that it is not always easy for the patient to share highly private, personal information. Listen and accept the patient's attitudes and perceptions without judging. As the interviewer, sit at approximately the same eye level as the patient. When talking, maintain eye contact with the patient, and use a vocal tone that reassures the patient. Avoid "why" questions that make the patient account for behavior. When it is necessary to clarify a meaning, restate or reflect the patient's response. Expand all positive responses on the patient's medical health history form further to include what, when, where, how much, and how long.

There are 10 important areas on the form:

1. Heart diseases or conditions.
2. Other illness and conditions.
3. Under the care of a physician.
4. Medications or drugs.
5. Allergies.
6. Reactions to local anesthetics.
7. Complications or illness following dental treatment.

8. Ineligible blood donor.
9. Use of tobacco.
10. Pregnancy.

In addition to these areas, it is important that you observe the patient's response. Refer to figure 2-1 as we discuss the areas of the form.

<b>COMPLETE IN INK</b> <b>DENTAL PATIENT MEDICAL HISTORY</b> <small>(This Form is Subject to the Privacy Act of 1974 - Use Blanket PAS - DD Form 2005)</small>																																																				
NAME (Last, First, Middle Initial) <b>Smith, Jane K</b>		SPONSOR'S SSN <b>123-45-6789</b>		AGE <b>42</b>		ACTIVE DUTY ONLY (Circle correct responses)																																														
ORGANIZATION (Active Duty) OR HOME ADDRESS <b>381 TRS/SGD</b>		DUTY PHONE <b>767-7843</b>		HOME PHONE <b>223-8765</b>		Currently on: Flying Status? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO SDP (PRP, SCI, or PS)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO																																														
The answers to the following questions will assist the dentist in evaluating your general health prior to providing your dental treatment. <b>PLEASE READ CAREFULLY AND ANSWER EACH QUESTION AS ACCURATELY AS POSSIBLE</b>																																																				
1. WHAT IS YOUR IMPRESSION OF YOUR PRESENT HEALTH? <b>Excellent</b>				2. YEAR LAST MEDICAL PHYSICAL? <b>1996</b>																																																
3. PLEASE DRAW A CIRCLE AROUND ANY OF THE FOLLOWING WHICH YOU HAVE HAD OR HAVE AT PRESENT <table style="width: 100%; font-size: small;"> <tr> <td>Heart Disease or Condition</td> <td>Rheumatic Fever</td> <td>Asthma</td> <td>Hepatitis</td> <td>Venereal Disease (Syphilis, Gonorrhea)</td> </tr> <tr> <td>Angina Pectoris</td> <td>Stroke</td> <td>Hay Fever</td> <td>Thyroid Disease</td> <td>Drug Addiction</td> </tr> <tr> <td>Frequent Chest Pains</td> <td>Hemophilia</td> <td>Emphysema</td> <td>Glaucoma</td> <td>Psychiatric Treatment</td> </tr> <tr> <td>High Blood Pressure</td> <td>Bruise Easily</td> <td>Tuberculosis (TB)</td> <td>Epilepsy or Seizures</td> <td>Cancer</td> </tr> <tr> <td>Shortness of Breath</td> <td>Prolonged or Unusual Bleeding</td> <td>Diabetes</td> <td>Fainting or Dizzy Spells</td> <td>Radiation Therapy</td> </tr> <tr> <td>Swollen Ankles</td> <td>Anemia</td> <td>Ulcers</td> <td>AIDS or AIDS Related Complex</td> <td>Chemotherapy</td> </tr> <tr> <td>Artificial Heart Valve</td> <td>Blood Transfusion</td> <td>Kidney Trouble</td> <td>HIV Positive</td> <td>Implant Prosthesis</td> </tr> <tr> <td>Congenital Heart Disease</td> <td>Sickle Cell Disease</td> <td>Liver Disease</td> <td>Cold Sores</td> <td>Unexplained Weight Loss</td> </tr> <tr> <td>Heart Murmur</td> <td>Arthritis</td> <td>Jaundice (Other than at birth)</td> <td>Genital Herpes</td> <td></td> </tr> </table>								Heart Disease or Condition	Rheumatic Fever	Asthma	Hepatitis	Venereal Disease (Syphilis, Gonorrhea)	Angina Pectoris	Stroke	Hay Fever	Thyroid Disease	Drug Addiction	Frequent Chest Pains	Hemophilia	Emphysema	Glaucoma	Psychiatric Treatment	High Blood Pressure	Bruise Easily	Tuberculosis (TB)	Epilepsy or Seizures	Cancer	Shortness of Breath	Prolonged or Unusual Bleeding	Diabetes	Fainting or Dizzy Spells	Radiation Therapy	Swollen Ankles	Anemia	Ulcers	AIDS or AIDS Related Complex	Chemotherapy	Artificial Heart Valve	Blood Transfusion	Kidney Trouble	HIV Positive	Implant Prosthesis	Congenital Heart Disease	Sickle Cell Disease	Liver Disease	Cold Sores	Unexplained Weight Loss	Heart Murmur	Arthritis	Jaundice (Other than at birth)	Genital Herpes	
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<b>CIRCLE YES OR NO FOR THE FOLLOWING QUESTIONS. (If IN DOUBT, CIRCLE YES.)</b> <b>(If YES, please give details.) CONTINUE COMMENTS ON BACK IF NECESSARY</b>																																																				
4. ARE YOU PRESENTLY, OR HAVE YOU BEEN UNDER THE CARE OF A PHYSICIAN DURING THE PAST YEAR?						YES	<input checked="" type="checkbox"/>																																													
5. ARE YOU PRESENTLY TAKING ANY MEDICINE OR DRUGS?						YES	<input checked="" type="checkbox"/>																																													
6. ARE YOU ALLERGIC TO ANY MEDICINE OR MATERIALS?						YES	<input checked="" type="checkbox"/>																																													
7. HAVE YOU EVER HAD A REACTION TO A LOCAL ANESTHETIC?						YES	<input checked="" type="checkbox"/>																																													
8. HAVE YOU EVER EXPERIENCED ANY COMPLICATION OR ILLNESS FOLLOWING DENTAL TREATMENT?						YES	<input checked="" type="checkbox"/>																																													
9. DO YOU HAVE ANY DISEASES OR CONDITIONS NOT LISTED ABOVE?						YES	<input checked="" type="checkbox"/>																																													
10. HAVE YOU EVER BEEN TOLD YOU WERE NOT ELIGIBLE TO BE A BLOOD DONOR?						YES	<input checked="" type="checkbox"/>																																													
11. DO YOU USE TOBACCO? (If YES, please circle and give frequency) SMOKE: Cigarettes   Cigars   Pipe   SMOKELESS: Chewing Tobacco   Snuff or "Dip"   FREQUENCY: _____						YES	<input checked="" type="checkbox"/>																																													
12. WOMAN: ARE YOU PREGNANT? (If YES, please circle trimester block)						YES	<input checked="" type="checkbox"/>																																													
PATIENT COMMENTS <small>(Check this box if you have added comments on the back of this form)</small> <input type="checkbox"/>		SIGNATURE OF PATIENT (or legal guardian if patient is a minor) <i>Jane K. Smith</i>				DATE <b>17 Aug 98</b>																																														
DENTIST'S COMMENTS																																																				
(If necessary, continue on reverse and check this box) <input type="checkbox"/>																																																				
BLOOD PRESSURE <b>120/72</b>		DATE <b>17 Aug 98</b>		BLOOD PRESSURE		DATE																																														
DENTIST'S SIGNATURE <i>John J. Doe</i>		DATE <b>17 Aug 98</b>		REVIEWER		DATE																																														

Figure 2-1. Sample, AF Form 696.

### Heart diseases or conditions

Certain diseases, illnesses, or conditions that the patient presently has or has ever had can have significant impact. For example, patients with a history of *heart disease or condition*, such as *artificial heart valves*, *congenital heart disease*, *rheumatic fever*, or *heart murmur*, may require antibiotic treatment prior to dental treatment. Antibiotic prophylaxis is used to prevent bacterial endocarditis caused by *bacteremia* produced during dental procedures.

**NOTE:** *Bacteremia* refers to the presence of viable bacteria in the circulating blood. If there is any question if a patient requires antibiotic prophylaxis, request a medical consultation with a physician prior to dental treatment.

Prior to treating patients' with pacemakers, avoid using electronic devices such as ultrasonic scalers or pulp testers. These devices could cause a pacemaker to malfunction with serious consequences for the patient.

Other cardiovascular conditions are briefly described in the following table.

Cardiovascular Conditions	
Condition	Description
Congestive heart failure	Patients with congestive heart failure may experience <i>shortness of breath</i> after light physical exertion and <i>swollen ankles</i> . Also, these patients may not tolerate the supine position used for most dental procedures.
Coronary artery disease	Early signs of patients with coronary artery disease could include a pale ashen skin color, heart palpitations (rapid irregular heartbeat), and syncope or <i>fainting</i> .
Angina pectoris	Patients with <i>angina pectoris</i> experience <i>chest pain</i> of a squeezing or tightness nature in the midchest area that can radiate to the extremities and/or mandible. Always be sure patients with angina have their nitroglycerin medication with them at the time of dental treatment. These patients are at greater risk of a heart attack.
Myocardial infarction	Patients with a history of <i>myocardial infarction</i> (heart attack) require limited use of vasoconstrictors and stress reduction protocol, which could include premedication to reduce anxiety, good pain control, and short morning appointments. Excessive bleeding should be considered for patients on anticoagulants (blood thinners). Additionally, myocardial infarction patients are at greater risk for cardiac arrhythmia (irregular heart beat) and recurrent heart attacks.
Stroke	Patients who suffered a <i>stroke</i> or cerebrovascular accident (CVA) require good stress management to reduce pain and control anxiety. These patients may experience excessive bleeding from anticoagulants. They may exhibit some degree of paralysis, slurred speech, and difficulty expressing themselves. Should a patient with a stroke history indicate an episode of light-headedness or dizziness, it is important to inform the dentist because of the possibility of an impending stroke.

### Other illness and conditions

There are many other illness and conditions listed on the AF Form 696. They are covered in the following table.

Other Medical Conditions	
Condition	Description and Precautions
Hemophilia	Patients with <i>hemophilia</i> have an inherited defect in the blood's ability to clot. These patients require a consultation with a hematologist prior to dental treatment.
Bruising or prolonged or unusual bleeding	Patients who indicate they have a tendency to <i>bruise easily</i> may experience large bruises that are unexplained. Patients who indicate <i>prolonged or unusual bleeding</i> may have a history of extensive or abnormal bleeding following surgical procedures or root planing.  In either case, these incidences could be clues to an underlying systemic disorder that

Other Medical Conditions	
Condition	Description and Precautions
	would require follow-up blood tests to rule out an acquired bleeding disorder. Keep in mind that patients who bruise easily or have prolonged or unusual bleeding may be on anticoagulants.  If a patient is on anticoagulants and the dosage must be reduced for dental treatment, it must be done by a physician.
Anemia	Some patients may indicate a history of <i>anemia</i> . In these cases, it is important to know the cause or type of anemia. Infection, diabetes, and certain drugs (aspirin) may cause an acute anemia, depending on the type of deficiency.
Blood transfusions	It is important to know why and when patients have had <i>blood transfusions</i> . These patients may have a greater risk for exposure to the acquired immunodeficiency syndrome (AIDS) and hepatitis B or C.
Sickle cell disease	Patients with <i>sickle cell disease</i> have red blood cells that are distorted (sickle-shaped). Infections should be treated aggressively and excessive medications (e.g., narcotics, barbiturates, salicylates) avoided.  Most patients who indicate sickle cell disease on their AF Forms 696 have only sickle cell traits and do <i>not</i> require special precautions. It is important to distinguish between patients who only have sickle cell traits and those who manifest true sickle cell disease.
Arthritis	Patients who indicate a history of <i>arthritis</i> suffer from an inflammatory disease of the joints. Some patients may have difficulty keeping their mouth open for long appointments. These patients also may have difficulty with dental hygiene and may require modification of home care techniques.  <b>NOTE:</b> Long-term aspirin therapy can cause significant thinning of blood, and increased bleeding during dental procedures could be a result.
Asthma	For patients with <i>asthma</i> , stress and pain can precipitate an attack.  During treatment, prevent solutions and/or particles from stimulating gag reflexes that could cause an attack. Prior to beginning dental treatment on these patients, ensure that they have their bronchodilator readily available for use.
Hay fever	Patients with <i>hay fever</i> suffer from an allergic response to seasonal pollens or spores. This response is characterized by sneezing, a runny nose, and nasal congestion.  Appointments for these patients may need to be rescheduled when these symptoms are severe enough to impair respiration.
Emphysema	Patients with <i>emphysema</i> have difficulty with expiration due to an increased airway resistance. In severe cases, supplemental oxygen should be readily available. These patients also may experience respiratory distress in a supine treatment position.
Tuberculosis	Transmission of <i>tuberculosis</i> (TB) is primarily from aerosols. Because of this, a patient with active TB should only be provided emergency treatment in specialized areas until cleared by Public Health. These patients should have an AF Form 570, Notification of Patient's Medical Status, in their records indicating a communicable disease.  Patients with a past history of tuberculosis should give a history of periodic medical evaluations and chest x-rays to rule out reactivation.  To rule out disease, patients with a recent conversion to positive tuberculin skin test should have been evaluated by a physician. These patients may be taking isoniazid (INH) medication prophylactically and can be treated as a normal patient.
Diabetes mellitis	Patients with <i>diabetes mellitis</i> are either insulin dependent or noninsulin dependent. Prior to beginning dental treatment on patients who are noninsulin dependent, ensure they have taken their medications as prescribed.  Insulin dependent diabetics are the <i>most</i> serious type. For these patients, the risk of insulin shock during procedures is a consideration. Always make sure these patients have taken their insulin as prescribed. For patients with morning appointments, ensure they have eaten prior to their treatment. In the event of insulin shock, quickly give these

Other Medical Conditions		
Condition	Description and Precautions	
	<p>patients a source of sugar.</p> <p>Patients with poorly controlled diabetes mellitus are more prone to infection and slower healing. They are more likely to develop gingivitis and periodontal disease. Healing of surgical wounds may be delayed for several weeks and closer follow-up treatment is indicated. Poorly controlled diabetic patients may require prophylactic antibiotics to avoid infection in surgical procedures.</p>	
Thyroid disease	Patients with <i>thyroid disease</i> may suffer from either hyperthyroidism or hypothyroidism.	
	Hyperthyroidism	<p>In patients with hyperthyroidism, excess thyroid hormones are produced. Stress and infection in untreated patients can cause severe shock (thyroid storm), which is a life-threatening emergency.</p> <p>Prior to dental treatment, be sure the patient is taking the daily medications as prescribed.</p>
	Hypothyroidism	<p>Patients with hypothyroidism do not produce enough thyroid hormones. Some signs of hypothyroidism are a slow heart rate, decreased sweating, and cold intolerance. Untreated patients do not tolerate stress very well and are at an increased risk for a coma.</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>NOTE:</b> In patients who are controlled under hypothyroid treatment, there are no contraindications to dental treatment.</p> </div>
Glaucoma	For patients with certain forms of <i>glaucoma</i> , drugs that increase the intraocular (eye) pressure should be avoided (e.g., antisialagogues which are used to reduce saliva).	
Epilepsy or seizures	<p>For patients with a history of <i>epilepsy or seizures</i>, try to reduce stress as much as possible. It is important to know the following information:</p> <ul style="list-style-type: none"> <li>• When the last seizure occurred.</li> <li>• Frequency of seizures.</li> <li>• Intensity and duration of seizures.</li> <li>• Type of seizures the patient experiences.</li> <li>• Medications.</li> <li>• Degree of control.</li> <li>• Precipitating factors.</li> </ul> <p>Before dental treatment, make sure these patients have taken their anticonvulsive medication as prescribed.</p>	
Fainting or dizzy spells	<p>There are many causes for patients experiencing <i>fainting or dizzy spells</i>. A few of the main causes are as follows:</p> <ul style="list-style-type: none"> <li>• Hypoxia (lack of sufficient oxygen from compromised respiration).</li> <li>• Hypoglycemia (low blood sugar).</li> <li>• Hypotension (low blood pressure).</li> <li>• Anemia.</li> </ul> <p>If the cause is unknown and the patient has frequent episodes, a consultation to the patient's physician is indicated.</p>	
HIV positive	<p>Patients who are <i>human immunodeficiency virus (HIV) positive</i> are considered infectious and usually asymptomatic. Patients with <i>AIDS or AIDS related complex</i> become progressively more symptomatic.</p> <p>Intraoral manifestations include:</p> <ul style="list-style-type: none"> <li>• Hairy leukoplakia.</li> </ul>	

Other Medical Conditions	
Condition	Description and Precautions
	<ul style="list-style-type: none"> <li>• Candidacies.</li> <li>• Herpes simplex.</li> <li>• Kaposi's sarcoma.</li> </ul>
Ulcers	Patients with gastrointestinal <i>ulcers</i> may be taking antacids or tranquilizers. These medications could have potential drug interactions with medications such as antibiotics prescribed by the dentist. Also, active ulcers may make patients nauseated, and rescheduling of the appointment may be indicated.
Kidney trouble	<p>Many patients who indicate a history of <i>kidney trouble</i> have minor urinary tract infections that normally do not contraindicate routine dental treatment.</p> <p>However, it is important to identify patients with kidney transplants, severe renal disease, and dialysis patients. These patients have a compromised ability to detoxify or excrete certain drugs and may have high blood pressure.</p> <p>Patients with severe renal (kidney) disease may have anemia. Dialysis patients are at greater risk for hepatitis, and the heparin from dialysis could cause bleeding problems. Patients with kidney transplants may require antibiotic premedication to prevent infection.</p>
Liver disease	<p>Patients with a history of <i>liver disease</i> should be considered for potential bleeding problems because of a shortage of blood clotting factors.</p> <p>Liver disease may be the result of chronic hepatitis or cirrhosis in alcoholics.</p>
Jaundice	Patients who have experienced <i>jaundice (other than at birth)</i> usually can be associated with liver disease (hepatitis). An accumulation of bilirubin occurs because the liver is unable to break down the bilirubin. Thus, the excess bilirubin causes the skin and eyes to turn yellow, creating the jaundice appearance.
Hepatitis	<p>Patients who indicate a history of <i>hepatitis</i> (inflammation of the liver) are generally tested to determine the type of hepatitis and if they are a carrier. There are three types:</p> <ul style="list-style-type: none"> <li>• Hepatitis A (HAV).</li> <li>• Hepatitis B (HBV).</li> <li>• Hepatitis C (HCV).</li> </ul> <p>HAV is transmitted by fecal contamination of food and water and poor personal hygiene. It has no carrier state. Both HBV and HCV are transmitted by viruses and have carrier states.</p> <p>These viruses can be transmitted from contact with contaminated body fluids including possible saliva.</p>
Cold sores	<p>Patients who experience <i>cold sores</i> have a type of herpetic lesion that is very contagious until healing is complete. The oral lesions are usually very painful and last from 7 to 14 days.</p> <p>Standard-universal precautions are adequate to protect yourself; however, if a patient with an active case is uncomfortable, consider rescheduling the treatment for a time after the healing is complete.</p>
Genital herpes	<p>Patients who indicate a history of <i>genital herpes</i> (type II herpes) may eventually transmit this virus to the oral mucosa.</p> <p>Avoid elective care if oral lesions are present; however, standard-universal precautions, if strictly adhered to, provide adequate protection.</p>
Venereal disease	Some patients may have a history of <i>venereal disease</i> , such as syphilis, gonorrhea, Chlamydia, or others. In these cases, it is important to know that the patient was successfully treated and follow-up tests were negative. Most types of venereal disease can develop infectious intraoral lesions that can be transmitted to a provider by unprotected contact with the lesions.



Other Medical Conditions	
Condition	Description and Precautions
	Again, standard-universal precautions protect the provider and must be adhered to for all patients since some patients may have undiagnosed venereal disease.
Drug addiction	<p>Some patients may indicate a history of <i>drug addiction</i> (substance abuse). In these cases, the use of narcotics for pain control may be contraindicated. These patients are also at higher risk of hepatitis from the use of contaminated needles.</p> <p>Some patients who indicate a history of drug addiction could also be recovering alcoholics and may have liver disease. Alcoholic patients tend to have a greater amount of plaque, calculus, and gingival inflammation. This is related to poor oral hygiene. Increased gingival bleeding is commonly observed in these patients. They tend to exhibit impaired healing after oral surgery and have an increased risk for oral cancer.</p>
Psychiatric treatment	For patients who indicate a history of <i>psychiatric treatment</i> , good stress management by the dental team is important. Many of these patients take mood stabilizing drugs, which have potential drug interactions with drugs used in dentistry to control pain and anxiety.
Radiation therapy	<p>Patients who have been treated with <i>radiation therapy</i> for head and neck cancer may exhibit the following complications:</p> <ul style="list-style-type: none"> <li>• Inflamed oral mucosa.</li> <li>• Dry mouth (xerostomia).</li> <li>• Increased dental caries (radiation caries).</li> <li>• A susceptibility to infections from oral surgery.</li> </ul>
Chemotherapy	<p>Patients treated with <i>chemotherapy</i> for cancer may require antibiotic premedication, and have increased bleeding.</p> <p>During the chemotherapy, only emergency dental treatment must be performed. Leukemia patients may exhibit a purplish-red swelling of the gingiva.</p>
Implant prosthesis	<p>Patients with <i>implant prosthesis</i> (e.g. hip, knee, etc.) require antibiotic prophylaxis to prevent infection of the prosthesis.</p> <p>A consultation with the patient's physician is necessary to select an appropriate antibiotic regimen.</p>
Unexplained weight loss	<p>There are many disorders and systemic diseases that can cause an unexplained weight loss.</p> <p>A medical consultation with a physician is indicated for a patient who circles an unexplained substantial weight loss on the health history.</p>

**NOTE:** All patients, regardless of their health status, must be treated using universal precautions.

**NOTE:** Standard-universal precautions must be strictly adhered to for all patients since you may often treat undiagnosed hepatitis patients.

### Under the care of a physician

It is important to know if patients are presently or have been under the care of a physician during the past year. This helps the dental provider determine if the medical care could contraindicate or complicate the dental care. To determine the extent of a problem, expand the patients' responses further to what, when, where, how much, and how long.

### Medications or drugs

It is important to note clearly the medications that the patient is currently taking. This includes over-the-counter drugs or preparations, such as vitamins, aspirin, and weight control pills, and prescribed medications including birth control pills.

**Allergies**

If a patient is allergic to any medicines or materials, find out what it is specifically. Ask about aspirin, local anesthetics, and penicillin. Find out what type of reaction the patient experienced and how long it lasted. Record all the information the patient gives, and make the appropriate entries to drug allergies in the dental record.

**Reactions to local anesthetics**

There are various types of reactions to local anesthetics. Toxic (poison) reactions and anaphylactic reactions are both rare, but could be fatal. If a patient experiences a reaction to local anesthetic, expand the response to determine what type of reaction occurred, how soon after the administration it occurred, and how long the reaction lasted.

**Complications or illnesses following dental treatment**

If a patient indicates he or she experienced complications or illness after dental treatment, find out what, when, and why. Try to find out the complications that relate to dentistry, such as infection, nausea, fainting, and bleeding. A patient with a history of infections may have a lowered resistance, increased susceptibility, and slowed healing. The patient's past complication or illness may indicate what to expect in the future.

**Ineligible blood donor**

Ask patients who indicate a positive response to this item why and when they were ineligible. If the reason relates to anemia or clotting disorders, it could impact on dental procedures where bleeding is likely to occur. If the reason is related to a communicable disease, such as hepatitis, HIV, or AIDS, practice of standard-universal precautions is critical.

**Use of tobacco**

For patients who use tobacco, it is important to identify the type and frequency because of the correlation to oral cancer.

**Pregnancy**

It is important to determine if female patients are pregnant, and if so, what trimester they are in. This information is critical due to contraindications and complications to drugs, radiographs, and even some dental procedures. Regardless of the response indicated by female patients, review this question with them and stress the importance of this information. *The second trimester is considered the best time to treat pregnant patients*; however, consideration should be given to deferring elective treatment until after the pregnancy. Oral prophylaxis procedures are considered safe and may need to be scheduled more frequently should the patient have pregnancy gingivitis.

**Observing patient response**

From the time you seat the patient to begin dental treatment, until the treatment is complete and the patient is dismissed, never leave the patient unattended. A member of the dental health team must be available to observe the patient for responses that may reveal a contraindication, complication, or an emergency. Throughout the dental treatment, be alert to the signs and symptoms the patient may exhibit physically or express verbally. Be familiar with the signs, symptoms, and treatment of emergencies covered in the unit on general emergency procedures.

**012. Hypertension screening**

Hypertension (elevated blood pressure) has significant impact on the health and welfare of Air Force personnel. We, in the Dental Services, support the medical objectives of early detection, evaluation, and treatment of hypertension. This is accomplished by screening active duty personnel for hypertension during their periodic dental examination appointment. Hypertension screening should precede the actual examination.

In addition to the hypertension screening program for active duty AF members, high blood pressure could easily be a contraindication to dental treatment for any patient. Therefore, blood pressure should be routinely checked as part of recording a current health history on a dental patient.

Enter the patient's blood pressure reading and the date on AF Form 696. The AF Form 696 has provisions for multiple entries of blood pressure readings. When necessary, this allows for the recording of multiple readings during the same course of treatment. The blood pressure readings are also recorded on the following forms:

- AF Form 644, Record of Dental Attendance.
- SF 603, Health Record - Dental, or SF 603A, Health Record - Dental - Continuation.

If the initial blood pressure recording is a systolic reading of 140 and/or a diastolic reading of 90 or greater, retake the blood pressure after 10 to 15 minutes. It is possible that the patient's blood pressure is temporarily high due to anxiety related to the dental appointment. By waiting 10 to 15 minutes to retake the blood pressure, the patient's anxiety is usually reduced.

*If repeated recordings do not fall below the 140 systolic and/or 90 diastolic, a medical consultation is required.* The referring dentist sends the patient to the proper medical clinic, with an SF 513, Medical Record - Consultation Sheet, or other approved forms, for further evaluation. The dentist also records the abnormal pressure in item 10, of SF 603 or SF 603A. Include a statement to the effect that the patient has been referred for further evaluation. When the consultation is returned, record the findings in item 10 of SF 603 or SF 603A. Keep a suspense file of consultation requests to ensure that they are returned and properly recorded.

Patients with a systolic blood pressure reading of 200 or greater, or a diastolic of 115 or greater, should be referred for an immediate evaluation (*stat*). Some patients diagnosed with hypertension who are under treatment may continue to have blood pressure readings that do not go below 140/90. For these patients, consult with the patient's physician to identify what is an acceptable blood pressure level for providing elective care.

Because of the possible side effects and drug interactions, it is always important to know what blood pressure medications patients are taking. The use of vasoconstrictors should be limited. When performing surgical and root planing procedures on patients with hypertension, watch for excessive bleeding. For hypertension patients, it is always important to reduce pain and anxiety during dental treatment. Avoid setting hypertension patients upright too rapidly from the treatment position, since this could cause postural hypotension.

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## Self-Test Questions

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

### **011. Interviewing the patient**

1. If the medical health history form is fairly current, why is it necessary to interview the patient before beginning treatment?
  
2. Since it is not always easy for the patient to share highly private, personal information, how should you discuss each question on the AF Form 696 with the patient?
  
3. When interviewing a patient, what do you do when it is necessary to clarify a meaning?

4. How should you expand all positive responses on a patient's medical health history form?
5. Match the diseases in column B with the related items of significance in column A. Some items in column A have more than one response; some items in column B will be used more than once.

*Column A*

- \_\_\_\_ (1) May not tolerate the supine position used for most dental treatment.
- \_\_\_\_ (2) Requires the limited use of vasoconstrictors and stress reduction protocol.
- \_\_\_\_ (3) May experience shortness of breath after light physical exertion and swollen ankles.
- \_\_\_\_ (4) May require antibiotic treatment prior to and after dental treatment.
- \_\_\_\_ (5) May exhibit some degree of paralysis, slurred speech and difficulty expressing themselves.
- \_\_\_\_ (6) Early signs, such as pale ashen skin color, heart palpitations, and syncope or fainting.

*Column B*

- a. Artificial heart valves.
- b. Congestive heart failure.
- c. Myocardial infarction.
- d. Congenital heart disease.
- e. Coronary artery disease.
- f. Rheumatic fever.
- g. Heart murmur.
- h. Cerebrovascular accident.

6. What is the purpose of antibiotic prophylaxis?
7. What is required if there is any doubt as to whether or not a patient requires antibiotic prophylaxis?
8. What should you always be sure of when treating patients with angina pectoris?
9. Why is it important to inform the dentist if a patient with a history of strokes indicates an episode of light-headedness or dizziness?
10. What must be accomplished before dental treatment to patients with hemophilia?
11. What is the significance of patients who experience large bruises that are unexplained or have a history of extensive or abnormal bleeding following surgical procedures or root planing?
12. What is required if the patient is on anticoagulants?

13. What difficulties related to dentistry may patients with arthritis experience?
14. What is of significance when treating patients with asthma?
15. What should be available for patients with severe emphysema? What treatment position could cause respiratory distress for these patients?
16. Until cleared by Public Health, what type of dental treatment should be provided for patients with active tuberculosis? Why?
17. What should you ensure before beginning dental treatment on patients with diabetes mellitis?
18. What should you administer in the event of insulin shock?
19. What is of significance with poorly controlled diabetes mellitis patients?
20. What is important when treating a patient with *hyperthyroidism*?
21. What are some signs of *hypothyroidism*?
22. What is important in patients with *hypothyroidism* who are untreated?
23. What information is important to know for patients with epilepsy or seizures?
24. What information should you ensure that you have before beginning dental treatment on patients with epilepsy or seizures?
25. What is important to remember when treating patients with gastrointestinal ulcers?

26. It is important to identify which patients that indicate a history of kidney trouble?
27. What is required for patients who have had kidney transplants?
28. What do you consider when treating a patient with liver disease and why?
29. What is jaundice (other than at birth) usually associated with?
30. What is significant for those patients who indicate a history of hepatitis?
31. What is important to know about the patient with a history of venereal disease? Why?
32. What must be avoided for patients with a history of drug addiction?
33. What is of significance for patients with a history of psychiatric treatment?
34. What complications could a patient treated with radiation therapy exhibit?
35. What may be required for the patient treated with chemotherapy for cancer?
36. During chemotherapy what dental treatment can be performed?
37. What is necessary when treating patients with implant prosthesis?
38. What is indicated if a patient annotates an unexplained weight loss on the health history?
39. Why is it important to know if patients are presently or have been under the care of a physician during the past year?

40. If a patient indicates a positive response regarding allergies, what information is needed?
41. What type of medications or drugs is it important to know if the patient is taking?
42. If a patient experiences a reaction to local anesthetic, what information is needed?
43. Why is it important to know if patients experience complications or illness after dental treatment?
44. What impact could a patient who is an ineligible blood donor have on dental treatment?
45. How does the use of tobacco relate to dentistry?
46. Why is it important to know if female patients are pregnant?
47. When should the pregnancy question be reviewed with the patient?
48. When is the best time to treat pregnant patients?
49. Why must dental patients never be left unattended from the time they are seated to begin treatment until they are dismissed?
50. Throughout the dental treatment, what should you be alert to?

**012. Hypertension screening**

1. What medical objectives does the dental service support regarding hypertension?
2. How are these objectives accomplished?

3. Why should blood pressure be routinely checked as part of recording a current health history on dental patients?
4. Where is the blood pressure reading recorded?
5. How is the blood pressure reading recorded?
6. What should you do if the initial blood pressure recording is a systolic reading of 140 and/or a diastolic reading of 90 or greater? Why?
7. What is required if repeated recordings do not fall below the 140 systolic and/or 90 diastolic? Explain how this is accomplished.
8. Patients with what blood pressure readings should be referred for an immediate or stat evaluation?
9. What should you do if a patient is diagnosed with hypertension and under treatment, yet continues to have blood pressure readings that do not go below 140/90?
10. Why is it important to know what blood pressure medications patients are taking?

## 2-3. Basic Dental Instruments

There is no doubt that the dental treatment facility has a variety of instruments in large numbers. For this reason, a system for distinguishing one instrument from another was developed.

Instruments are classified or identified through a combination of several factors. For example, some instruments are considered primarily diagnostic instruments. Others are classed as diagnostic aids to make or confirm the dentist's diagnosis. Other dental items can be directly or primarily associated with a particular dental specialty; however, some cannot. Some items may be used in several specialty areas; therefore, some items are combined into a class called *miscellaneous instruments*. We'll begin by taking a look at the basic characteristics of dental instruments. Then we'll move on to diagnostic instruments and aids and conclude the section with the lesson on miscellaneous instruments.



### 013. Characteristics of dental instruments

The characteristics of dental instruments can be categorized into these three areas:

- Instrument parts.
- Classification names.
- Instrument numbers.

#### Instrument parts

There are three main parts of a dental hand instrument (fig. 2-2):

- Handle.
- Shank.
- Working end.

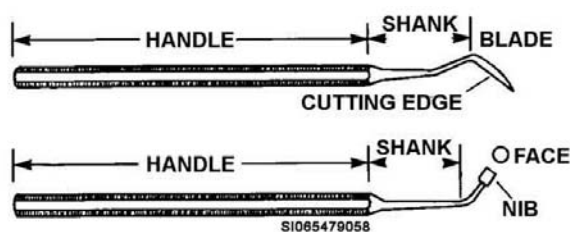


Figure 2-2. Parts of dental hand instruments.

The handle is held in the operator's hand. Some instruments, such as the mouth mirrors, have detachable handles. This lets you replace the shank and working end without purchasing a new handle. The shank is the tapered connection between the handle and the working end. The working end is the part designed to perform a certain operation. It can be either a blade or nib. The blade is the cutting end of cutting instruments; whereas the nib is the working part of condensing instruments.

#### Classification names

The names of dental hand instruments are derived from association with one or more of the following classification factors:

- The purpose of the instrument—excavating, scaling, or condensing.
- The manner of use—hand condenser, air impact condenser, or push scaler.
- The shape of the working end—file, chisel, spoon, or hatchet.
- The angle of the working end in relation to the handle—biangle.

An example of a combination using these classification factors is the biangled chisel.

#### Instrument numbers

In addition to the classification names, instruments are also numbered. Normally, two different numbers appear on the handle of most dental hand instruments. One is an identification number; the other is a formula number. Also, the instruments may carry an abbreviation (Bl, Wds, Hol). These abbreviations are references to the instrument's designers (Black, Woodson, Hollenbeck). These references also help to identify the instrument.

#### Identification numbers

On single-ended instruments, the numbers are normally on the portion of the handle farthest from the working end. On double-ended instruments, the numbers are near the center. As their name implies, they identify the instrument. For instance, there are five Black's condensers of various sizes and shapes. The identification makes it possible to distinguish one from another when the dentist requests an instrument or you are ordering one from Logistics.

### Formula numbers

Because of their length, formula numbers are not generally used for identification purposes; instead, they are used to fully describe the instrument. Actually, the formula number is a group of numbers. On most dental hand instruments, they are located on the handle near the working end. The numbers describe the width, length, angle, and sometimes the angle or curvature of the instrument blade.

## 014. Diagnostic instruments and aids

The basic diagnostic set-up is commonly referred to as the BDS. It consists of these items: mouth mirror, explorer, cotton/dressing forceps, and periodontal probe. In addition to these instruments, you will briefly study dental radiographs as diagnostic aids. Each of the diagnostic instruments you study has a specific use. They are placed on the bracket table before almost all dental procedures.

### Mouth mirror

The typical mouth mirror is shown in figure 2-3. These mirrors are used to view the hard-to-see areas in the mouth, retract tissues, and reflect light into dark areas of the mouth. Mouth mirrors often become scratched and clouded; therefore you should inspect them often and replace them when necessary. The mouth mirror has a detachable handle. To replace the mirror, simply unscrew the shank and mirror portion, and screw a new mirror into the handle. The three types of mouth mirrors are described below.

Type Mouth Mirror	Explanation
Front reflective surface (plain glass)	Produces the most accurate image of the item being reflected.  Handle these mirrors with extra care because the reflective surface is on the top of the glass, and it is easily marred and scratched.
Glass-covered reflective surface (plain glass)	Produces a “ghost” image that is a disadvantage of this type of mirror.
Magnifying mirror	Produces an enlarged image.  This is used when minute detail is required in a dental treatment procedure.

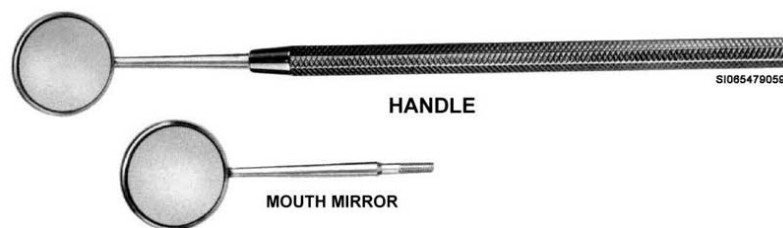


Figure 2-3. Mouth mirrors (courtesy of Hu-Friedy).

### Explorer

Explorers have sharp-pointed working ends and are used in many dental procedures. Because they are used to detect minute breaks in the pits and fissures, find defective margins or restorations, and check the depth of cavities explorers are usually considered diagnostic instruments. The dentist also uses explorers to probe for foreign bodies and detect calculus.

Explorers are available in various sizes and shapes. In addition, they are also available as single- or double-ended (DE) instruments. Two common, single-ended explorers are #23 and #17 (fig. 2-4). As you can see, the #23 has a sickle shape, while the #17 has a bent angle with a small hook on the end. Another type of explorer is the #5DE explorer (fig. 2-5). This explorer combines the #23 and #17 as a DE instrument. You may find several kinds, or all of one kind, in the dental treatment room you maintain. Be sure to replace explorers with broken or bent tips.



Figure 2-4. Singled-ended explorers (courtesy of Hu-Friedy).



Figure 2-5. Double-ended explorers (courtesy of Hu-Friedy).

### Cotton/dressing forceps

Cotton/dressing forceps are usually in the diagnostic group. They are angled, tweezer-like instruments. Two examples (#17 and #18) are shown in figure 2-6. The #17 and #18 are the *most* commonly used type. The only difference is a slight angle above the working ends of the #18.

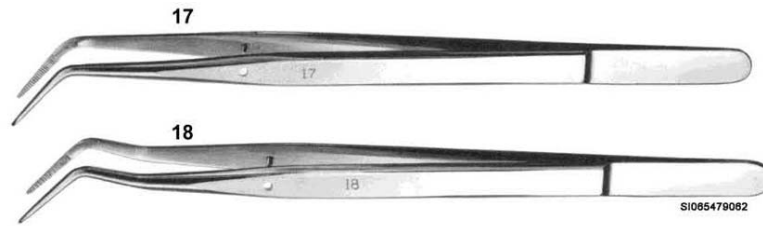


Figure 2-6. Cotton/dressing forceps (courtesy of Hu-Friedy).

The cotton/dressing forceps are used in many dental treatment rooms. In the examination section, the dentist uses dressing forceps to carry cotton pellets for drying teeth or cavities. Used in this way, they are diagnostic instruments. Since they are used to carry cotton pellets, they are often referred to as cotton forceps. In addition to placing cotton pellets, cotton/dressing forceps are sometimes used to apply medications and dressing.

### Periodontal probe

The periodontal probe is shown in figure 2-7. It is used to determine the depth of periodontal pockets. As you can see, it has a long blunt working end which is calibrated from 1 to 10 millimeter (mm). Different probes mark only certain calibrations, and some are color coded as well. As a cost saver, probes are also available with identical DE working ends because the markings tend to wear off. This instrument is frequently used in a basic examination as well as in periodontics. In fact, the dentist often uses a DE explorer and probe combination. Several examples are shown in figure 2-8.



Williams DE  
Offset

Figure 2-7. Double-ended periodontal probe (courtesy of Hu-Friedy).

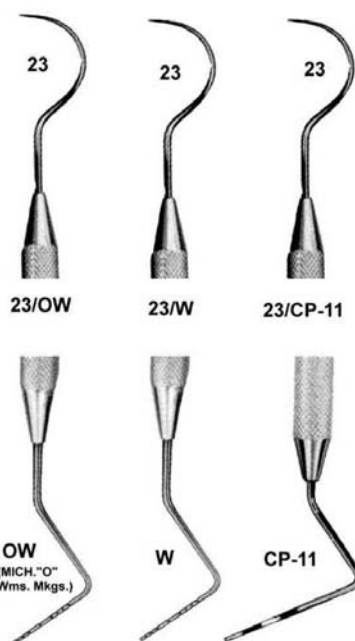


Figure 2-8. Double-ended explorer and probe combinations (courtesy of Hu-Friedy).

### Dental radiographs

In day-to-day operations, dentists use other items to make a proper diagnosis. Dental radiographs are an example. Dental radiographs, also known as dental x-rays, are very valuable as diagnostic aids. They are similar to small photographic negatives. In this respect, a radiograph is a shadow image of a substance or body projected on radiographic film. The dentist views a dental radiograph as a negative image of the tissues of the mouth and is able to diagnose oral conditions that would otherwise be invisible. Dental radiology is covered in greater detail later.

### 015. Miscellaneous instruments

As you would expect, there are many miscellaneous instruments used in the dental clinic setting. In this lesson, you will study a few of them, including:

- Aspirating syringes.
- Anesthetic carpules.
- Disposable syringes.
- Disposable needles.
- Rubber dam instruments.
- Boley gauge.
- Iwanson spring caliper.
- High-volume evacuation suction tip.
- Saliva ejector hose.
- Napkin holder.

### Aspirating syringe

This syringe is used in dentistry to inject a local anesthetic. The aspirating syringe differs from most syringes in that it is designed to inject anesthetic from a carpule. The following parts of an aspirating syringe are shown in figure 2-9.

- Thumb ring.
- Finger grip.
- Piston rod (plunger).
- Barrel.
- Threaded tip.

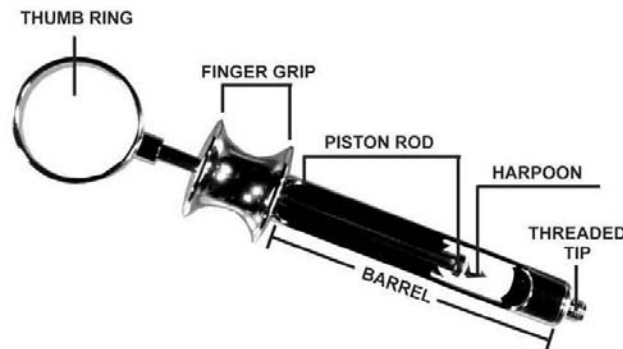


Figure 2-9. Parts of an aspirating syringe.

The thumb ring and finger grip allow the dentist to control the syringe firmly and to aspirate effectively with one hand. The piston rod has a harpoon with a sharp hook that locks into the rubber stopper of the anesthetic cartridge. Once the harpoon is engaged in the rubber stopper, the dentist can apply inward and outward pressure on the stopper by exerting pressure on the thumb ring. By pulling back, the piston rod retracts the stopper, making aspiration possible. The piston rod pushes the rubber stopper of the anesthetic cartridge and forces the anesthetic solution out through the needle. The barrel of the syringe holds the anesthetic cartridge firmly in place. The cartridge is loaded through the open side of the barrel. The threaded tip is where the hub of the needle is attached to the syringe. The cartridge end of the needle passes through the small opening in the center of the threaded tip, puncturing the rubber diaphragm of the anesthetic cartridge.

The aspirating syringe is designed to allow the provider to check the placement of the needle and determine whether or not the needle has entered or penetrated a blood vessel. If the needle has penetrated a blood vessel, a slight amount of blood may appear in the cartridge solution. Should this occur, the needle is withdrawn, redirected, and tested again until there is evidence that the needle is no longer in the blood vessel. This assures the provider that anesthetic solutions are *not* injected into blood vessels. The injection is then completed. An aspirating syringe is used for the safety and comfort of the patient.

### Anesthetic carpules (cartridges)

Local anesthetic solutions are supplied in glass carpules (fig. 2-10). These cartridges have a rubber or silicone stopper at one end and an aluminum cap with a rubber diaphragm at the other end. Store cartridges at room temperature and protect them from direct sunlight. The heat and sun may cause the solution to deteriorate and be less effective. Never use a cartridge that has been frozen. An extruded rubber stopper and a large air bubble are signs that the solution may have been frozen. Also, a cartridge with an extruded stopper and no bubble(s) indicates that it has been stored too long in a chemical disinfectant and that some of the solution has entered the cartridge, discard this cartridge; if it is used the patient may have a burning sensation upon injection as a result of the contamination. Do not use a cartridge if it is cracked, chipped, or damaged in any way. The glass may shatter under the pressure of injection. Never use a solution that is discolored or cloudy or has passed the expiration date shown on the package; the solution may no longer be effective. Do not leave the syringe preloaded with the needle attached for an extended period of time. The metal ions from the needle may be released into the solution, which may cause swelling and edema after the injection of the

solution. Once the needle and syringe have been assembled, the cartridge must be either used or discarded. Never save a cartridge for reuse.



Figure 2-10. Anesthetic solution glass carpules.

### Disposable syringes

There are two types of disposable syringes: sterile Luer lock and nonsterile, curved, plastic-tipped syringe. Both styles are shown in figure 2-11. Both have two parts consisting of a translucent plastic barrel with finger grips at one end and a plunger.



Figure 2-11. Comparison of disposable syringes.

### Luer lock style

The Luer lock style has a constricted opening at one end of the barrel. This opening is designed to attach a sterile Luer lock disposable needle. The Luer lock style syringe has several uses, depending on its cubic centimeter (cc) size. Several sizes are shown in figure 2-12. The 1 cc syringe is often referred to as an insulin syringe. It is also frequently used to administer local anesthetic at the initial

site of an intravenous (IV) sedation. The 3 and 5 cc sizes are commonly used to administer drugs into the IV setup. Most often, the 10 and 35 cc sizes are used as irrigating syringes to flush pus and debris from tooth sockets, bone cavities, and inflamed gingival flaps (pericoronitis). Irrigating syringes are also used to direct sterile water onto a surgical bur to flush bone chips and blood from the dentist's field of vision.

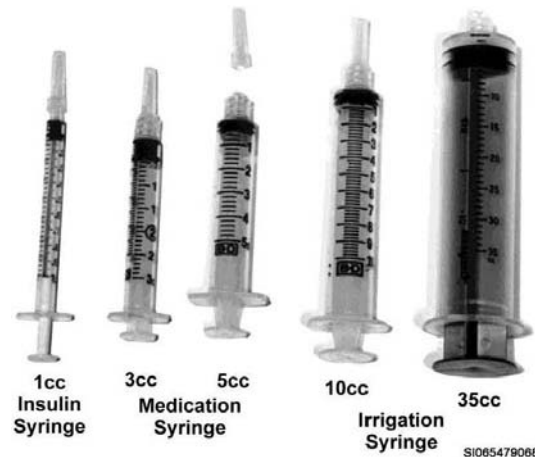


Figure 2-12. Disposable sterile Luer lock syringe.

### ***Nonsterile plastic tipped syringe***

A nonsterile plastic tipped syringe is shown in the top view in figure 2-11. The #412 syringe shown is a multi-purpose syringe. This syringe is often given to patients to use to irrigate post-op areas and promote healing. It is also used to store and apply lubricant and inject light bodied impression material.

### **Disposable needles**

All needles used in dental treatment arrive sterile and are disposable. They are designed for a single use and available in different gauges and lengths as well as different types. The gauge of a needle refers to the diameter of the hollow shaft of the needle. There are two basic types of needles: aspirating syringe needle and the Luer lock style needle.

### ***Aspirating syringe needle***

The parts of an aspirating syringe needle are shown in figure 2-13. These needles arrive sterile in individually sealed, plastic capsule-like containers. *Do not use the needle if the seal is broken.* The tip of the needle is beveled (angled). Before the injection turn the needle so that the bevel angle is toward the bone. This angle enables the dentist to deposit the solution next to the bone without actually contacting the bone. Needles are available in a variety of different gauges and lengths; those used in dentistry range from 25 to 30 gauge. The larger the gauge number, the smaller in diameter the needle. Needles are available in two lengths—long ( $1\frac{5}{8}$  in.) and short (1 in.) The long needle is indicated when the injection requires the penetration of several thicknesses of soft tissue, such as with a nerve block. Short needles are used for injections that require the penetration of only the surface soft tissue (infiltration).

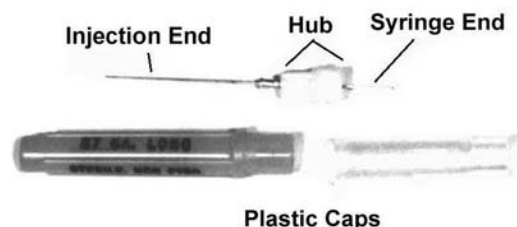


Figure 2-13. Parts of the aspirating syringe needle.



Each needle has either a plastic or metal hub designed to screw onto the threaded end of the syringe. This hub is positioned so that the needle extends inward to penetrate the rubber seal portion of a loaded anesthetic cartridge, and outward for injection into the patient. The plastic caps covering the sterile needle are easily removed from both ends. When placing the needle onto the syringe, remove only the cap that covers the syringe portion of the needle. This maintains the sterility of the needle portion that will be used to inject the patient.

### ***Luer lock style needle***

Figure 2-14 is a comparison of the aspirating syringe needle and the Luer lock style needle. This Luer lock needle differs from the aspirating needle because the needle extends from the plastic hub in only one direction—outward; whereas the needle of the aspirating syringe extends inward to penetrate the rubber seal portion of a loaded anesthetic cartridge, and outward for injection into the patient. It arrives in a sterile, individually sealed package, and is available in a variety of different gauges and lengths. The bevel of the needle is available in either standard or short lengths.



Figure 2-14. Comparison of two needle styles.

### **Rubber dam instruments**

These instruments are designed to prepare and maintain the position of thin sheets of latex rubber. The rubber dam itself is used to isolate a designated tooth or teeth in the mouth before certain restorative or endodontic procedures. The rubber dam actually keeps mouth fluids, tissues, and the tongue away from the operation site. There are four types of rubber dam instruments:

- Rubber dam punch.
- Rubber dam clamps.
- Rubber dam clamp forceps.
- Rubber dam frame.

### ***Rubber dam punch***

A rubber dam punch is shown in figure 2-15. It is used to make the spaced holes in a rubber dam that are needed to expose the teeth to be isolated. The working end is designed with a plunger on one side and a wheel on the other side. This wheel has five or six different sized holes on the flat surface facing the plunger. The position of the wheel is rotated to produce holes of different sizes. When the wheel is turned, a slight click may be heard as the wheel falls into position. Exercise care when aligning the plunger and make sure that it is directly over the hole on the wheel to prevent nicking the wheel holes and breaking or dulling the plunger's point. In addition, the holes may not be punched cleanly if the

alignment is off. If the holes have ragged edges, they may tear easily as the dam is placed and may allow leakage of moisture around the tooth.





Figure 2-15. Two styles of rubber dam punches (courtesy of Hu-Friedy).






### ***Rubber dam clamps***

The rubber dam clamp is the primary means of anchoring and stabilizing the rubber dam. Once the required holes are punched in the rubber dam, it is stretched to fit over each designated tooth. A rubber dam clamp is used to maintain a snug fit around the neck of the tooth. Several of these clamps are shown in the table below. They are made of chrome or nickel plated steel in various sizes to fit the general contours of the different teeth.

It is important that you can identify the bow and jaws parts of the clamp. The bow is the rounded portion of the clamp that extends through the rubber dam. The clamp is always positioned on the tooth so the bow is located on the distal aspect. The jaws encircle the tooth and are shaped into four prongs. A hole is located on each side of the jaw of the clamp. The beaks of the rubber dam forceps fit into these holes to allow placing and removing the clamp.

To be proficient, you need to know some of the commonly used clamps and their area of use. Refer to the following table showing the clamps and their uses.

Rubber Dam Clamps		
Clamp	Designed For	Illustration
#0	Primary teeth	 0 Fig. 2-16a
#2	Small bicuspid	 2 Fig. 2-16b
#W3	Bicuspid and small molars	Not shown

Rubber Dam Clamps		
Clamp	Designed For	Illustration
#7	Mandibular molars	 7 Fig. 2-16e
#8	Maxillary molars	 8 Fig. 2-16g
#W8A	For partially erupted molars	 W8A Fig. 2-16f
#9	Anterior teeth	 9 Fig. 2-16c
#103		 103 Fig. 2-16d

Clamps commonly used in pediatric dentistry include the #00, #W00, and #2.

Clamps with *W* prefixes, such as the #W8A or #W3, indicate that the clamps are *without wings* on the outer portions opposite the holes. The space between the gripping edges of the clamp is narrower than the diameter of the corresponding tooth. In order to place this clamp around the tooth, the gripping edges must be spread wider than the tooth's diameter.

**NOTE:** To prevent the patient from aspirating or swallowing the clamp, always tie dental floss to the clamp before placing it in the patient's mouth.

### ***Rubber dam clamp forceps***

The rubber dam clamp forceps (fig. 2-17) are designed to carry the rubber dam clamp to and from the tooth. When the handles are squeezed together, the working ends spread apart. Small projections on the working ends fit into two corresponding holes on the rubber dam clamps. The area between the working end and the handle has a sliding lock device that locks the handles in position while the dentist moves the rubber dam clamp around the tooth.



Figure 2-17. Rubber dam clamp forceps (courtesy of Hu-Friedy).

### ***Rubber dam frame***

Placing and clamping a rubber dam around the tooth is not enough. The dentist still needs something to hold the loose outer edges of the rubber dam sheets so that the area is visible and provides access to the tooth being treated. This need is met with an instrument called the rubber dam frame (fig. 2-18). Most rubber dam frames used today are U-shaped. One of the most popular is the *Young's frame*, which is available in adult and pediatric sizes (fig. 2-18). This frame style is also available in a radiolucent plastic which is commonly used in endodontic treatment. When the edges of the rubber dam are connected to the small, sharp projections on this U-frame, there is adequate access to, and visibility of the area of treatment.

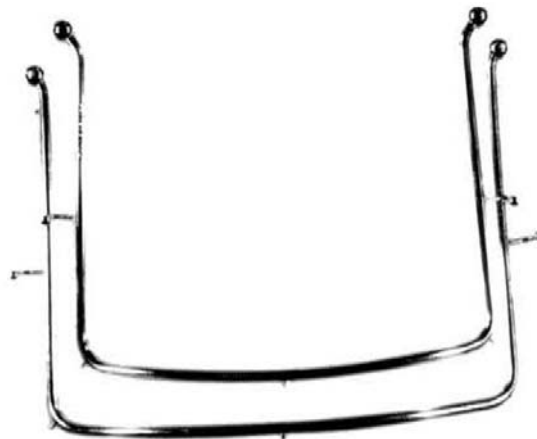


Figure 2-18. Adult and pediatric rubber dam frame.

### **Boley gauge**

The *Boley gauge* (fig. 2-19), also known as a *Vernier caliper*, is an instrument with calipers or points for measuring the width of the tooth or other dental object. The gauge is calibrated in millimeters and used for precision measuring in endodontics and prosthodontics, as well as the dental laboratory. You can measure with the curved or straight calipers.

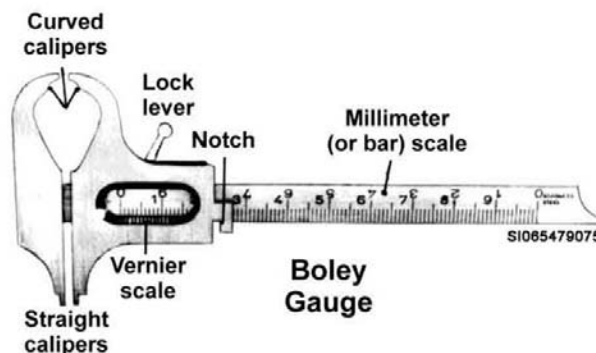


Figure 2-19. Boley gauge (courtesy of Hu-Friedy).

### Iwanson spring caliper

Another common type of gauge is the *Iwanson* spring caliper (fig. 2-20). It is used in prosthodontics and the dental laboratory to measure the thickness of crowns before and after casting in  $\frac{1}{10}$  mm scale. This caliper is available with sharp points for porcelain and metal, and rounded points for wax and plastic.

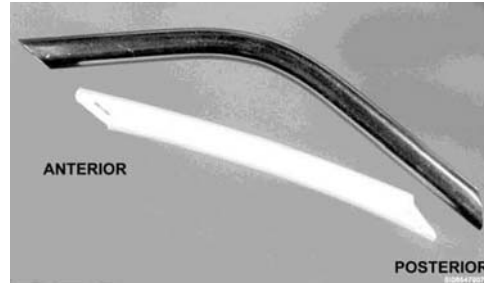


Figure 2-20. Iwanson spring caliper (courtesy of Hu-Friedy).

### High volume evacuation suction tip

The high volume evacuation (HVE) suction tip (fig. 2-21) is located on the dental unit. It uses either a disposable plastic or sterilizable metal tip to remove large quantities of water and debris from the patient's mouth. The HVE has three main purposes:

1. To keep the mouth free of saliva, blood, water and debris.
2. To retract the tongue and cheek away from the field of operation.
3. To reduce the bacterial aerosol caused by the high-speed handpiece.



**Figure 2-21. Metal and plastic high volume suction tips.**

The HVE may be held in the thumb-to-nose grasp or the pen grasp. Either method allows the assistant to control the tip, which is necessary for patient comfort and safety. The tip is contoured with a slanted opening at each end so that it adapts to the anterior and posterior areas of both arches. For proper placement, use the opening slanted at an angle greater than 90 degrees in anterior areas, and the end slanted at less than 90 degrees for posterior areas.

### **Saliva ejector hose**

The saliva ejector hose is also located on the dental unit. The hose uses a disposable plastic tip, commonly referred to as the saliva ejector. It is contoured by hand and placed under the patient's tongue to remove and control excess saliva, small particles of debris, and to hold the tongue away from the field of operation. It may also be used to maintain a dry environment during placement of restorative materials. In this manner, the area being treated remains fairly free of obstructing fluids, which lets the provider work continuously.

### **Napkin holder**

The napkin holder is commonly called a towel chain. It is a chain with small alligator clips on each end. It holds a towel that drapes around the patient's neck during dental treatment procedures.

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## **Self-Test Questions**

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

### **013. Characteristics of dental instruments**

1. What are the three main parts of a dental hand instrument?
2. What names apply to the working ends of condensing and cutting instruments?
3. What factors are associated with an instrument's classification name?
4. What two numbers appear on the handles of most instruments and where are they located?
5. What is the purpose of each?

**14. Diagnostic instruments and aids**

1. What are the uses of the mouth mirror?
2. What are the three types of mouth mirrors and the advantages or disadvantages of each?
3. What are the uses of an explorer?
4. Explain the difference in the shape of the #23 and #17 explorers.
5. What are cotton/dressing forceps used for?
6. Describe the periodontal probe and explain its use.
7. What diagnostic aid produces a negative image of the tissues of the mouth and enables the diagnosis of oral conditions otherwise invisible?

**015. Miscellaneous instruments**

1. How does an aspirating syringe differ from most syringes?
2. Describe the parts of an aspirating syringe.
3. Briefly explain how the aspirating syringe operates.
4. What requirement does the aspirating syringe allow the dentist to fulfill?
5. What are the two types of disposable syringes? Describe the use of each.
6. How are all needles used in dental treatment designed?

7. What is meant by the term *gauge of a needle*?
8. When placing a needle onto an aspirating syringe, how is the sterility of the needle portion maintained?
9. How does the Luer-lock style needle differ from the aspirating needle?
10. What is the purpose of the rubber dam?
11. What features of the rubber dam punch allows you to select the desired diameter of the hole punched in the rubber dam?
12. Name the commonly used clamps and describe their area of use.
13. What clamps are commonly used in pediatric dentistry?
14. What is the significance of clamps with W prefixes?
15. How can you prevent the patient from aspirating or swallowing the clamp?
16. How are the rubber dam clamp forceps designed to work?
17. What is the purpose of the rubber dam frame?
18. What is the most commonly used rubber dam frame?
19. What is another name for the Boley gauge?



20. What are the uses of the Iwanson spring caliper?
21. What is the significance of the sharp or rounded points on the Iwanson spring caliper?
22. Explain the proper placement of the high volume evacuation suction tip?

## 2-4. Rotary Instruments

Rotary instruments are used in conjunction with dental handpieces. The rotary instrument group includes a number of small, separate items. These instruments are made from many materials and combinations of materials ranging from diamonds to very finely detailed steel. Rotary instruments have many uses from preparing cavities, finishing restorations, trimming dentures, to polishing teeth. Rotary instruments are a vital part of most dental treatment procedures and are classed as burs, disks, wheels and points, and polishers. We'll begin this section with a lesson on basic rotary instruments and follow up with a lesson that covers other rotary instruments.

### 016. Basic rotary instruments

As you can see in the top view of figure 2-22, rotary instruments, such as burs, have these three basic parts:

- Head.
- Neck.
- Shank.

The head of the bur is the working or cutting portion and is made in many sizes and shapes. The neck, which is the narrow portion of the bur, connects the shank and head. The shank is the part of the bur that fits into the handpiece. The length of the shank depends on the specific use of the bur, whereas the shape of the shank is designed to fit into a specific handpiece.

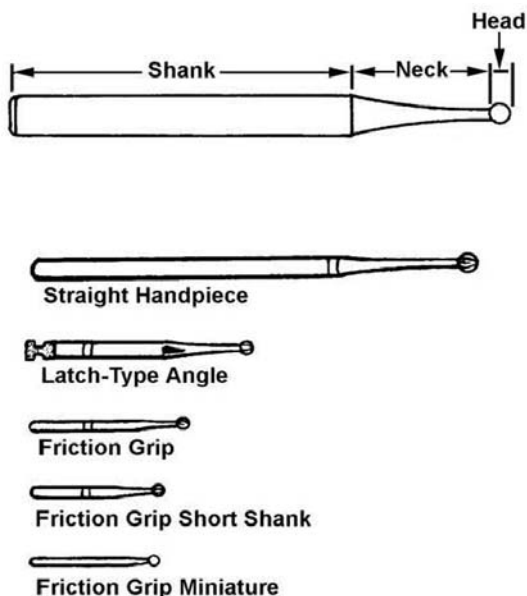


Figure 2-22. Bur parts and basic shank designs.

## Handpieces

Earlier you learned about the several types of handpieces used in dentistry. Each rotary instrument is used in a particular handpiece. Rotary instruments are classified into three types according to the handpieces they are used with:

- Friction grip.
- Straight handpiece.
- Latch contra-angle handpiece.

These are shown in the above view of figure 2-22.

Handpieces for Rotary Instruments	
Handpiece	Description
Friction grip	<p>The friction grip instruments are abbreviated FG. They are used in ultra-speed handpieces and friction grip slow-speed contra-angles.</p> <p>These burs have small, smooth shanks that are held in the handpiece either by friction against a metal or plastic chuck, or by a wrench-tightened metal chuck.</p> <p>Friction grip burs are available in short shank and miniature (pediatric), as well as the commonly used standard length.</p>
Straight	<p>The straight handpiece rotary instruments are abbreviated SHP. They are used in electric straight handpieces and slow-speed, air-driven straight handpieces.</p> <p>The shank on SHP instruments is larger in diameter than the FG shank and at least twice as long.</p>
Latch contra-angle	<p>The latch contra-angle handpiece instrument is abbreviated as the AHP or LA type. This instrument is used in conventional latch contra-angle handpieces.</p> <p>Common AHP rotary instruments have the same diameter as SHP instruments but are about half the length. However, some AHP instruments are made with short or long shanks.</p>

## Dental bur shapes

Dental burs (fig. 2-23) are available in many shapes. Also, figure 2-24 and the following table provide some of the basic bur heads and their descriptions.

BUR HEAD-SHAPES	
Type	Description
Round	Shape of sphere on a shank.
Pear	Shape of a pear or stretched-out round bur.
Straight fissure - Plain and crosscut	Small cylinder with semi-spiral grooves machined lengthwise into their outer walls.
Taper fissure – Plain and crosscut	Small tapering cylinder with grooves machined into their outer walls.
Inverted cone	Small cone inverted on the shank.
End cutting	Small cylinders with the tip of the cylinder designed to cut tooth structure.

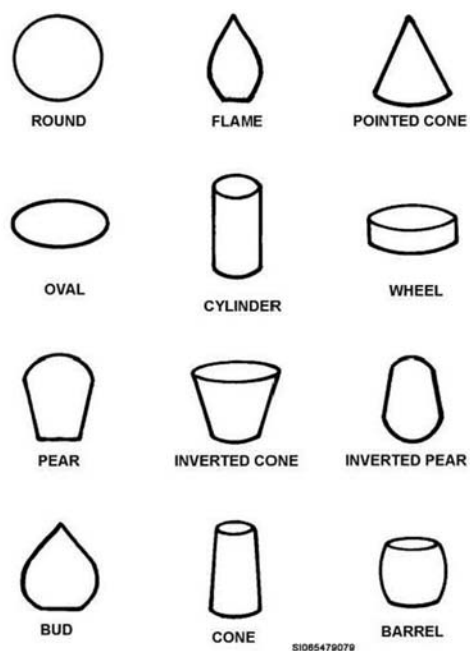


Figure 2-23. Basic bur head-shapes.

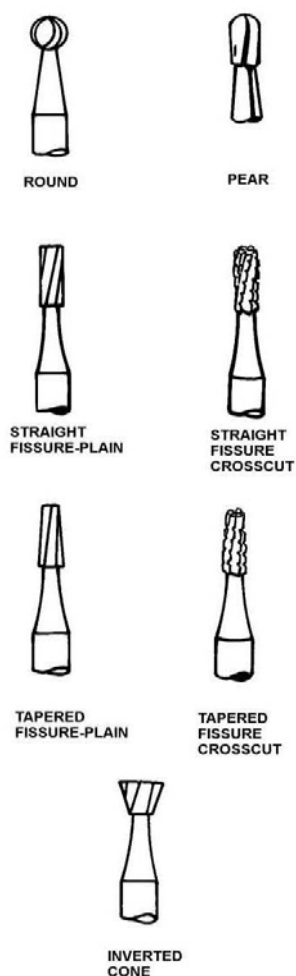


Figure 2-24. Various bur head-shapes.

## Dental bur materials

Burs are made of either steel or carbide.

Dental Bur Materials	
Material	Description
Steel	<p>Steel burs dull after only one use in cutting the enamel of teeth and should be discarded after using them. They are used only on dentin or in some procedures which use the low-speed handpiece.</p> <p>Also, under low speed, the steel bur often generates heat in the tissues of the tooth, causing patient discomfort.</p>
Carbide	<p>High-speed handpieces use a carbide bur. A large number of carbide burs shapes and uses are shown in figure 2-25.</p> <p>Because of its hardness, the carbide bur can be used many times to cut hard enamel tooth structure without becoming dull. However, carbide burs are brittle and have a tendency to fracture under pressure. Because of this, avoid sideways pressure on a carbide bur.</p> <p>Carbide burs operate most efficiently at high speeds and with light pressure.</p>

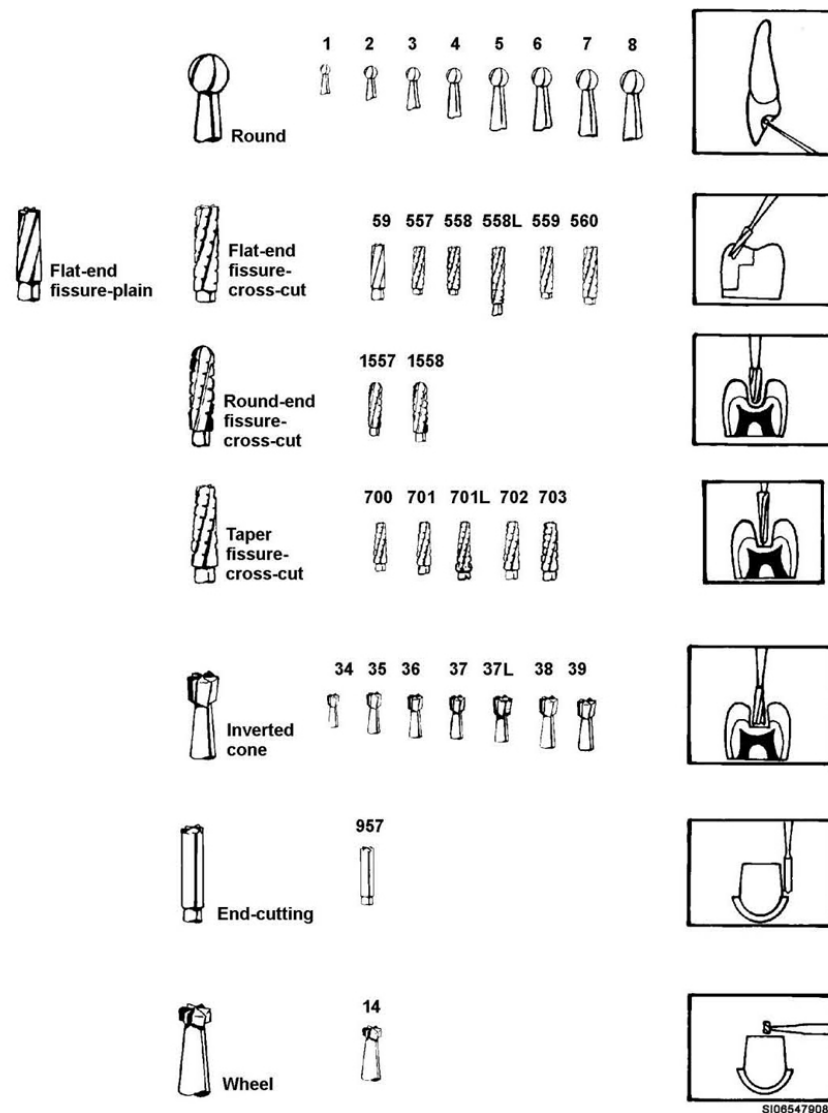


Figure 2-25. Carbide burs.

### Dental bur sizing and classification

Dental burs are used in nearly all sections of the dental clinic and are available in a variety of sizes for the different handpieces. Burs are further classed as excavating, finishing, and diamond.

#### *Excavating burs*

The burs dentists use to prepare cavities are known as excavating burs. They are designed for specific functions ranging from removing decay to making undercuts. Excavating bur designs are as follows:

- Round.
- Pear.
- Inverted cone.
- Straight fissure.
- Taper fissure.
- End cutting.

The types, sizes, and uses of excavating burs are listed in the following table. In addition, refer to figures 2-24 and 2-25.

EXCAVATING BURS		
<i>Type</i>	<i>Sizes</i>	<i>Use</i>
Round	¼, ½, 1, 2, 3, 4, 5, 6, 7, 8	Gain entrance into tooth structure, retention grooves, remove decayed tooth structure.
Pear	¼P, 1P, 2P, 3P, 4P, 330, 331, 332, 332L	Allows for undercuts for retention of filling materials.
Straight plain fissure	56, 57, 59 Round End 1156, 1157, 1158	Smooth and shape cavity walls.
Straight crosscut fissure	556, 557, 558, 558L, 559, 560 Round end 1557, 1558	Smooth and shape cavity walls.
Taper fissure	Cross cut – 699, 700, 701, 701L, 702, 703 Plain – 169, 169L, 170, 170L Round end plain – 1170, 1171	Smooth and shape the walls of a cavity preparation particularly useful in preparing teeth for inlay and full crown restorations.
Inverted cone	33 1/2, 34, 35, 37, 37L, 38, 39	Best suited to make undercuts in the cavity preparation for proper retention of filling materials.
End cutting	957	Shape and finish the gingival floor for crown and fixed partial denture preparations without the risk of removing more tooth structure from prepared cavity walls.

#### *Finishing burs*

Finishing burs (fig. 2-26) are used to smooth and shape tooth-restoring materials. They are available in various shapes to enable the dentist to recreate, as closely as possible, the original shape of the tooth. Finishing burs are easily differentiated from excavating burs by the fineness of the cutting blades on the working ends.

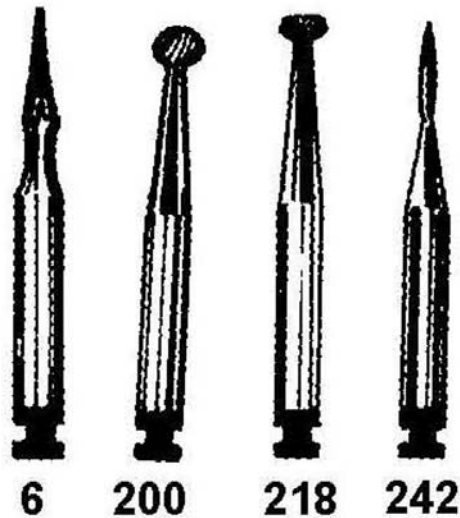


Figure 2-26. Finishing burs.

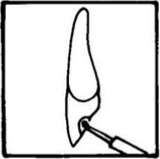
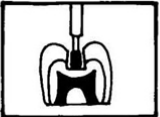




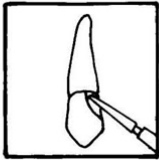
Finishing burs for use in contra-angle handpieces are numbered 6, 200, 218, 224, and 242. The shapes of finishing burs are easily described. Notice in figure 2-26 the #6 bur is a concave, tapered fissured shape; the #200 is round and often mistaken for a round excavating bur. Bur #218 is oval shaped; #224 is bud (flowerbud) shaped (not shown); and #242 is flame shaped.

#### ***Diamond burs***

Diamond burs are similar in design to the burs previously discussed; however, the metal surfaces are impregnated with bits of diamonds and are available in various grits. These burs may be used as excavating and finishing burs. Figure 2-27 shows the available shapes listed below and describes their use.

- Round.
- Inverted cone.
- Cylinder.
- Cone.
- Flame.
- Wheel.

Special diamond burs are also available for use on composite materials. Composite diamond burs are available in round, cone, or flame shapes. Like other burs, each of the shapes of the diamond burs is available in a wide variety of sizes and grits.

TYPES		USES
Round		Preparation of single surface cavities Interproximal cavities in incisors Opening the pulp chamber for root canal treatment of anterior teeth Removal of caries on pulpal floor of extensive caries
Inverted Cones		Undercuts at the junction of the pulpal floor and lateral walls in occlusal surfaces Gross reduction of incisal edge
Cylinders		Straight parallel sides and flat floor Reduction of enamel Access to carious dentin Preparation of retention locks
Cones		Bulk reduction for preparation of shoulders for crowns
Flames		Beveling or gingival margins preparation Preparation of finish lines and fine detail work
Wheels		Creation of retention grooves Opening of occlusal surfaces Gross reduction of incisal edges
Composites		Finishing of composite material (Round, cone and flame shapes)

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Figure 2-27. Diamond bur shapes and uses.

### 017. Other rotary instruments

In addition to the drill burs discussed in the last lesson, you will encounter a wide variety of abrasive and polishing rotary instruments. They are available in disk, wheel, point, and cup shapes as well as various compositions. They may be composed of abrasives bonded to paper or plastic, stones, diamonds, or rubber. In this lesson, you will study the basic shapes and a few of the many compositions.

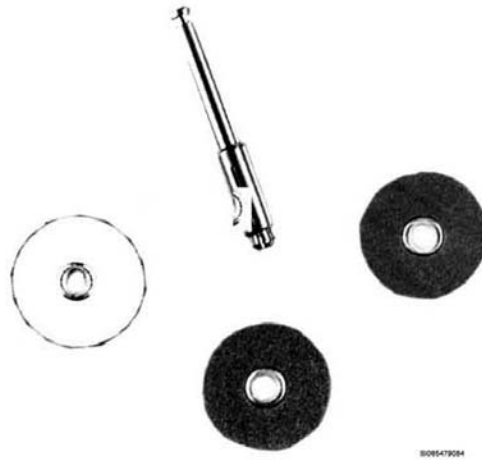
**NOTE:** A more complete and detailed description of the various types, uses, and compositions of these rotary instruments is available in any commercial dental supply catalog.

#### Abrasive disks

Abrasive disks are designed for use in contra-angle (latch) and straight handpieces. These are circular-shaped cutting instruments available in a wide variety of sizes, shapes, and abrasive grit. Coarse grits are used for gross reduction and contouring. Intermediate grits are usually used for finishing margins, and fine grits are used to polish the surface.

Manufacturers provide the disks either mandrel mounted or unmounted. A *mandrel* is a shaft with a disk mounted at one end and the other end is designed to insert into a handpiece. Mandrels are available for both contra-angle and straight handpieces.

Some mandrels, such as the Moore's mandrel, and snap-on mandrel (fig. 2-28) are designed to hold disks in place by spring tension. They are plastic-backed and used with a snap-on style mandrel in the latch angle. These disks are designed for intra-oral use on composite restorations and are available without the metal center.



**Figure 2-28. Plastic-backed disks with snap-on latch mandrel.**

Other disks (fig. 2-29) are primarily used on acrylic material when fabricating temporary crowns and fixed partial dentures. They are paper-backed and designed for use with the straight and latch-style Moore's mandrels.



**Figure 2-29. Paper-backed disks with straight and latch-type Moore's mandrels.**

Other mandrels are designed with a small screw in one end to secure the disk (fig. 2-30). This type of mandrel is used with the sharp carbide disk known as the Jo Dandy. This thin, very brittle disk is designed to cut hard substances such as metal restorations or castings.



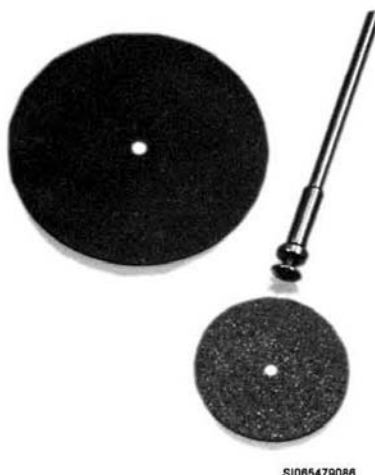


Figure 2-30. Jo Dandy disks with screw-on straight mandrel.

Some mandrels, such as certain types of diamond disks, are permanently mounted to disks. Small diamond chips bonded to a metal base make these disks very effective for cutting enamel. The surface plane on diamond disks ranges from flat to concave to convex. Usually one side is covered with abrasive chips, while the other side is free of abrasives. Such disks are called safe-sided disks.

### Points and wheels

Points and some wheels are similar to disks in the manner they are supplied—mandrel mounted or unmounted. The greatest difference is in the shape of the working surfaces. Generally speaking, disks are thinner and usually have abrasives on one side only. In contrast, wheels and points have abrasives on both sides as well as the outer edges. Wheels are shaped with either a square or knife edge, with the knife edge style sometimes referred to as a disk. Some wheels and points are available for use in ultra-speed handpieces, whereas disks are designed for use in conventional speed contra-angle or straight handpieces.

The various uses of points and wheels depend upon the composition. Abrasive stone wheels (fig. 2-31) are used to finish metal prosthetic devices. In contrast, wheels composed of rubber impregnated with pumice or silicon carbide and glass (fig. 2-32) are designed to polish porcelain or metal castings.



Figure 2-31. Abrasive stone wheels with screw on straight mandrel.



Figure 2-32. Abrasive rubber wheels and points.

Some abrasive rubber polishing points (fig. 2-33) come as a kit with a polishing cup.

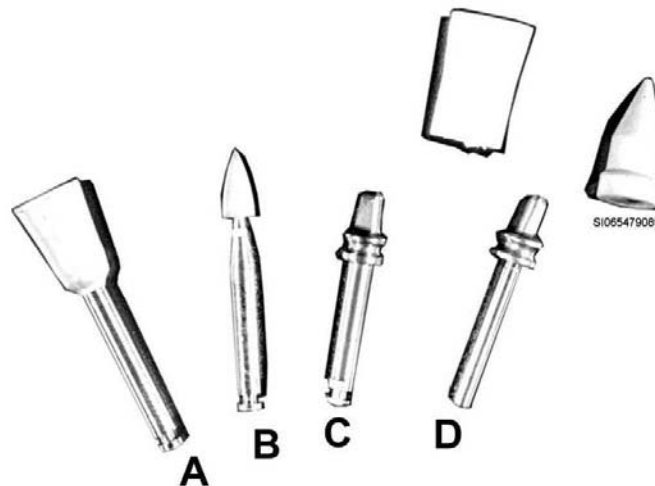


Figure 2-33. Abrasive rubber points and cups.

Key to Views in Figure 2-33	
View	Shows
A	A mounted, latch style amalgam polishing cup.
B	A mounted, latch style amalgam polishing point.
C	An unmounted, snap-on, latch style composite polishing cup.
D	An unmounted, snap-on, friction grip composite polishing point.

Individual kits are designed to polish amalgam or composite restorations. The point is usually used first, followed with the cup to reach the areas with limited access; such as the proximal and cervical surfaces. Two types of points commonly used to finish and polish amalgam restorations are Brownie points and Greenie points. Points are also available in abrasive stone compositions to finish restorations.

**IMPORTANT:** Once a wheel, point, or cup is used on metal (gold, amalgam, or otherwise), it must *not* be used on porcelain or composite.

As figure 2-34 shows, there are other types of wheels made of chamois, felt, cloth, and fiber bristles. These are primarily designed for dental laboratory use for polishing dentures and other prosthodontic appliances. These wheels are *not* impregnated with any abrasive and, therefore, must be used in conjunction with an abrasive to polish dental appliances. They range in diameter from  $\frac{3}{4}$  inch to 4 inches.



Figure 2-34. Polishing wheels used in the dental laboratory.

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## Self-Test Questions

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

### 016. Basic rotary instruments

1. Name and explain each of the three basic parts of rotary instruments (such as burs).
2. Describe friction burs.
3. Describe straight handpiece burs.
4. Describe latch contra-angle burs.
5. What are the basic shapes of bur heads?
6. What are the four disadvantages of steel burs?

7. What are the advantages and disadvantages of carbide burs?
8. List the use and numbered sizes of each of the following excavating bur shapes.
  - a. Round.
  - b. Pear.
  - c. Straight fissure.
  - d. Taper fissure.
  - e. Inverted cone.
  - f. Endcutting.
9. How can you easily differentiate finishing burs from excavating burs?
10. Identify the shape of each of the following numbers of finishing burs:
  - a. #6.
  - b. #200.
  - c. #218.
  - d. #224.
  - e. #242.
11. Describe the surface, shapes, and basic uses of diamond burs.
12. Describe the basic shapes of the diamond composite burs.

**017. Other rotary instruments**

1. What are disks?
2. Describe the three basic types of grits and the use of each.
3. What type of handpieces can be used with abrasive disks?
4. What is a mandrel?
5. What types of mandrels are designed to hold disks in place by spring tension?
6. What is the name of the sharp, thin and very brittle disk designed to cut hard substances, such as metal restorations or castings? What type of mandrel does it use?
7. What is the name of the disk that has one side covered with abrasives and the other side free of abrasives?
8. What is the general difference between abrasive disks and wheels and points?
9. What do the uses of points and wheels depend upon?
10. Describe the use of the following:
  - a. Abrasive stone wheels.
  - b. Rubber wheels impregnated with pumice or silicon carbide and glass.

- c. Abrasive rubber polishing points.
  - d. Abrasive stone points.
11. What two types of points are commonly used to finish and polish amalgam restorations?
  12. What is an important note regarding the use of wheels, points, or cups?
  13. What are the uses of wheels made of chamois, felt, cloth, and fiber bristles?
  14. What must wheels made of chamois, felt, cloth, and fiber bristles be used in conjunction with and why?

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## Answers to Self-Test Questions

### 009

1. To determine what procedures will be performed. You review the AF Form 696 for positive entries, check for radiographs required for the procedure, check currency of information, check for record completeness, and verify you have the correct record for the patient being treated.
2. Before the patient is seated.
3. The instruments the procedure requires, the instruments the dentist prefers, and the sequence of the procedure.
4. In their order of use. The patient's confidence toward you, the dentist, and perception of quality of treatment can be greatly diminished if your arrangement of instruments is disorganized and you appear uncertain in the search for the correct instrument.
5. Use the patient drape to cover the arranged instruments. Also, cover medications and materials placed on other work surfaces.
6. A series of instruments and supplies placed in cloth, paper, plastic, or a combination wrapper, and sterilized as a unit.
7. Since the contents of the pack are planned so that almost everything needed for a specific procedure is available in the pack, you will not have to gather the needed instruments and supplies one at a time.
8. Trays let you prearrange instruments in their order of use.
9. A corrosion-resistant, sterilizable tray with the contents usually covered with a cloth towel, surgical wrapper, or suitable metal cover or lid.

### 010

1. Walk to the waiting room and greet the patient pleasantly by name and rank.
2. Always let the patient know. Failing to do so may anger the best of patients.
3. Escort your patient to the designated place.
4. Noncontroversial subjects like the weather or the patient's hobbies.

5. Lower the treatment chair to its lowest position, move the arm of the chair out of the way, and swing the bracket tray and dental light away from the chair. If the chair has an adjustable headrest, adjust it beforehand for an average patient to make further adjustments easier and more accurate.
6. The occlusal plane of the patient's mandibular teeth should be parallel to the floor when the patient's mouth is open.
7. So that the patient's feet are slightly higher than the patient's head.
8. Routine and surgical drape.
9. To protect the patient's clothing.
10. By a towel chain which is put around the back of the patient's neck.
11. The paper side faces outward because it absorbs spilled liquids, and the plastic side protects the patient's clothing.
12. When there is a good chance of contamination.
13. (1) It prevents apprehensive patients from seeing instruments.  
(2) Protects the patient's eyes from the bright operating light and instruments passed near the eyes.  
(3) Prevents the patient's hair from contaminating the instruments.
14. Recline the patient in the treatment position. Wash your hands and don a pair of sterile surgical gloves. Ask the patient to lift his or her head from the headrest. Place a hand towel across the headrest, taking care not to contaminate your gloves. Ask patient to lay his or her head back on the headrest. Drape a second sterile towel naturally around the neck and shoulders to cover the patient's chest. Secure it at the back of the neck with a towel clamp. After the dentist sedates the patient, crisscross the towel under the patient's head, across the eyes and head, and secure it in place with a towel clamp.
15. Position the light toward the area beneath the patient's chin before turning the light on, to avoid shining the light in the patient's eyes. Turn the light on and adjust the light toward the appropriate arch. Position the light within your reach from the seated position to permit any adjustments required during treatment. Turn the light off until the dentist is ready to begin treatment.
16. Maintain a light conversation with the patient, but be extremely careful not to commit the dentist to a treatment plan that cannot be fulfilled.

## 011

1. To determine if there are any changes since the patient was last treated.
2. Listen and accept the patient's attitudes and perceptions without judging, be at approximately the same eye level as the patient, and maintain eye contact with the patient, use a vocal tone that reassures the patient, and avoid "why" questions that make the patient account for behavior.
3. Restate or reflect the patient's response.
4. Include what, when, where, how much, and how long.
5. (1) b, (2) c, (3) b, (4) a, d, f, g, (5) h, (6) e.
6. To prevent bacterial endocarditis caused by bacteremia produced during dental procedures.
7. A medical consultation with a physician is requested before dental treatment.
8. That these patients have their nitroglycerin medication with them at the time of dental treatment.
9. Because of the possibility of an impending stroke.
10. A consultation with a hematologist.
11. They may be clues to an underlying systemic disorder that would require follow-up blood tests to rule out an acquired bleeding disorder, or the patient may be on anticoagulants.
12. If the dosage must be reduced, it must be done by a physician.
13. Some may have difficulty keeping their mouth open for long appointments. They also may have difficulty with dental hygiene that may require modification of home care techniques. Long-term aspirin therapy can cause significant thinning of blood and increased bleeding during dental procedures could result.
14. Stress and pain can precipitate an attack. During treatment, prevent solutions and/or particles from stimulating gag reflexes that could cause an attack. Before beginning dental treatment, ensure that patients have their bronchodilator available for use.

15. Supplemental oxygen; a supine position.
16. Emergency in specialized areas; transmission is primarily from aerosols.
17. Ensure they have taken their medications or insulin as prescribed. For morning appointments, ensure they have eaten before their treatment.
18. Sugar.
19. They are more prone to infection and slower healing, more likely to develop gingivitis and periodontal disease. Closer follow-up treatment is indicated, and they may require prophylactic antibiotics to avoid infection in surgical procedures.
20. Be sure the patient is taking his or her daily medications as prescribed. Stress, infection, or failure to take antithyroid medication can cause severe shock (thyroid storm) and is a life-threatening emergency.
21. A slow heart beat, decreased sweating, and cold intolerance.
22. Untreated patients do not tolerate stress very well and are at an increased risk for a coma.
23. When the last seizure occurred, frequency of seizures, intensity and duration of seizures, type of seizures the patient experiences, medications, degree of control, and precipitating factors.
24. That the patient has taken his or her anticonvulsive medication as prescribed.
25. Antacids and tranquilizers may have potential drug interactions with medications, such as antibiotics, prescribed by the dentist and active ulcers may make patients nauseated.
26. Patients with kidney transplants, severe renal disease, and dialysis patients.
27. Antibiotic premedication to prevent infection.
28. Potential bleeding problems because of a shortage of blood clotting factors.
29. Liver disease.
30. They are generally tested to determine the type of hepatitis and if the patient is a carrier.
31. That the patient was successfully treated and follow-up tests are negative. Most types of venereal disease develop infectious intraoral lesions that can be transmitted to the provider by contact with the lesions.
32. The use of narcotics for pain control.
33. Good stress management by the dental team is important. Mood stabilizing drugs have potential drug interactions with drugs used in dentistry to control pain and anxiety.
34. Inflamed oral mucosa, dry mouth (xerostomia), increased dental caries (radiation caries), and a susceptibility to infections from oral surgery.
35. Antibiotic premedication.
36. Only emergency dental treatment.
37. A consultation with the patient's physician is necessary to select an appropriate antibiotic regimen to prevent infection.
38. A medical consultation with a physician.
39. To determine if the medical care may contraindicate or complicate the dental care.
40. Find out what it is specifically; then what type of reaction the patient experienced and how long it lasted.
41. Over-the-counter drugs or preparations and prescribed medications.
42. Expand the response to determine what type of reaction occurred, how soon after the administration it occurred, and how long the reaction lasted.
43. Patients with a history of infections are likely to have a lowered resistance, increased susceptibility, and slowed healing. The patient's past complication or illness indicates what to expect in the future.
44. If the reason relates to anemia or clotting disorders, it could impact on dental procedures where bleeding is likely to occur. If the reason is related to a communicable disease, such as hepatitis, HIV, or AIDS, practice of standard-universal precautions is critical.
45. It is important to identify the type and frequency because of the correlation to oral cancer.
46. Pregnancy and trimester are critical due to contraindications and complications to drugs, radiographs, and even some dental procedures.
47. Regardless of the response indicated by female patients, review this question with the patient and stress the importance of this information.



48. Second trimester.
49. A member of the dental health team must be available to observe the patient for responses that could reveal a contraindication, complication, or an emergency.
50. Signs and symptoms that the patient may exhibit physically, or express verbally.

**012**

1. Early detection, evaluation, and treatment of hypertension.
2. By screening active duty personnel for hypertension during their periodic dental examination.
3. High blood pressure could easily be a contraindication to dental treatment.
4. On AF Form 696.
5. The multiple entry capability of AF Form 696 is to record multiple readings during the same course of treatment when necessary.
6. Retake the blood pressure after 10 to 15 minutes. The patient's blood pressure may be temporarily high due to anxiety related to the dental appointment. By waiting 10 to 15 minutes to retake the blood pressure, the patient's anxiety is usually lessened.
7. A medical consultation is required. The referring dentist sends the patient to the proper medical clinic with an SF 513, or other approved forms, for further evaluation, and record the abnormal pressure in item 10 of SF 603 or SF 603A with a statement to the effect that the patient has been referred for further evaluation. When the consultation is returned, record the findings in item 10 of SF 603 or SF 603A. Keep a suspense file of consultation requests to ensure that they are returned and properly recorded.
8. Those patients with a systolic blood pressure reading of 200 or greater or a diastolic of 115 or greater.
9. Consult with the patient's physician to identify what is an acceptable blood pressure level to provide elective care.
10. Because of the possible side effects and drug interactions.

**013**

1. Handle, shank, and working end.
2. The blade is the cutting end of cutting instruments, whereas the nib is the working part of condensing instruments.
3. Purpose of the instrument, position or manner of use, shape of the working end, and angle to the working end in relation to the handle.
4. An identification number and a formula number. Identification numbers are normally on the portion of the handle farthest from the working end of single-ended instruments, and near the center on double-ended instruments. Formula numbers are normally located on the handle, near the working end.
5. Identification numbers identify various sizes and shapes of the instrument. Formula numbers fully describe the instrument. They describe the width, length, angle, and sometimes the angle or curvature of the instrument blade.

**014**

1. To view hard-to-see areas, retract soft tissue, and reflect light into dark areas of the mouth.
2. (1) The plane glass with a front reflective surface produces the most accurate image of the item reflected; the reflective surface is on the top of the glass and is easily marred and scratched. (2) The plane glass with a glass-covered reflective surface produces a "ghost" image. (3) The magnifying mouth mirror produces an enlarged image useful when minute detail is required in a dental treatment procedure.
3. To detect minute breaks in the pits and fissures, find defective margins or restoration, check the depth of cavities, probe for foreign bodies, and detect calculus.
4. The #23 has a sickle shape, while the #17 has a bent angle with a small hook on the end.
5. To carry cotton pellets to dry the teeth, and apply medications and dressings.
6. It has a long blunt working end which is calibrated from 1 to 10 mm. It is used to determine the depth of periodontal pockets.
7. Dental radiographs.

**015**

1. It is designed to inject anesthetic from a carpule.
2. A thumb ring, a finger grip, a piston rod (plunger) with a harpoon attached, a barrel where the carpule is placed, and a threaded tip where the needle attaches.
3. Once the harpoon is engaged into the rubber stopper of the carpule, pulling the thumb ring back pulls the plunger back making aspiration possible. Pushing inward forces the anesthetic solution through the needle.
4. It ensures that anesthetic solutions are not injected into blood vessels.
5. (1) The sterile Luer lock and (2) the nonsterile, curved, plastic tipped (#412). The Luer lock style syringe use differs with the size: a 1-cc syringe is used to administer local anesthetic at the initial site of an IV sedation; the 3- and 5-cc sizes are used to administer drugs into the IV setup; the 10- and 35-cc sizes are used as irrigating syringes to flush pus and debris from tooth sockets, bone cavities, inflamed gingival flaps (pericoronitis) and to direct sterile water onto a surgical bur to flush bone chips and blood from the dentist's field of vision. The nonsterile, plastic tipped syringe (#412) is a multi-purpose syringe often given to patients to irrigate post-op areas to promote healing; it is also used for storage and application of lubricant, and to inject light bodied impression material.
6. Sterile, disposable, single use, and available in different gauges and lengths.
7. Diameter of the hollow shaft of the needle—the larger the gauge number, the smaller in diameter the needle.
8. By removing only the cap which covers the syringe portion of the needle.
9. The needle of the Luer lock style extends from the plastic hub in only one direction—outward; whereas the needle of the aspirating syringe extends inward to penetrate the rubber seal portion of a loaded anesthetic cartridge, and outward for injection into the patient.
10. To isolate a designated tooth or teeth in the mouth before certain restorative or endodontic procedures by keeping mouth fluids, tissues, and the tongue away from the operation site.
11. The working end is designed with a plunger on one side and a wheel on the other side.
12. The #0 clamp is designed for primary teeth, #2 for small bicuspid, #W3 is for bicuspid and small molars, #7 for mandibular molars, #8 for maxillary molars, #W8A for partially erupted molars, and #9 for anterior teeth.
13. Clamps #00, #W00, and #2.
14. The W indicates that the clamps are without wings on the outer portions opposite the holes.
15. By always tying dental floss to the clamp before placing it in the patient's mouth.
16. When the handles are squeezed together, the two working ends spread apart. Small projections on the working ends fit into corresponding holes on the rubber dam clamps and a sliding lock device locks the handles in position.
17. To hold the loose outer edges of the rubber dam sheets so that the area is visible and provides access to the tooth being treated.
18. Young's frame.
19. Vernier Caliper.
20. In prosthodontics and dental laboratory, it is used to measure the thickness of crowns before and after casting in 1/10 mm scale.
21. Sharp points are for porcelain and metal, and rounded points for wax and plastic.
22. Use the opening slanted at an angle greater than 90 degrees in anterior areas, and the end slanted at less than 90 degrees for posterior areas.

**016**

1. (1) The head is the working or cutting portion, which is made in many sizes and shapes. (2) The neck is the narrow portion of the bur, and connects the shank and the head. (3) The shank is the part of the bur that fits into the handpiece. Shank length depends on the specific use of the bur, and the shape is designed to fit a specific handpiece.
2. They are abbreviated FG and used in ultra-speed handpieces and friction grip slow-speed contra-angles. They have a small, smooth shank, held in the handpiece by friction against a metal or plastic chuck or by a wrench-tightened metal chuck. They are available in short shank, miniature (pediatric), and standard length.

3. They are abbreviated SHP and used in electric straight handpieces and slow-speed, air-driven straight handpieces. The shank is larger in diameter than the FG shank and at least twice as long.
4. They are abbreviated AHP or LA and used in conventional latch contra-angle handpieces. They are the same diameter as SHP instruments but are about half the length—some available with short or long shanks.
5. Round, pear, straight fissure (plain and crosscut), taper fissure (plain and crosscut), inverted cone, and end cutting.
6. (1) Dull after only one use.  
(2) Should be discarded after use.  
(3) Used only on dentin or procedures which use the low-speed handpiece.  
(4) Under low speed often generates heat in the tissues of the tooth, causing discomfort to the patient.
7. Advantages: hardness allows bur to be used many times to cut hard enamel tooth structure without becoming dull; operates most efficiently at high speeds and with light pressure. Disadvantages: brittleness causes a tendency to fracture under pressure.
8. (a) To gain entrance into tooth structure, retention grooves, and to remove decayed tooth substance. Numbered sizes:  $\frac{1}{4}$ ,  $\frac{1}{2}$ , 1, 2, 3, 4, 5, 6, 7, and 8.  
(b) For cavity preparations; allows for undercuts to provide retention for filling materials. Numbered sizes:  $\frac{1}{2}$ P, 1P, 2P, 4P, 330, 331, 332, and 332L.  
(c) To smooth and shape cavity walls. Straight plain numbered 56, 57, and 59. Straight crosscut numbered sizes: 556, 557, 558, 558L, 559, and 560. Rounded end 1156, 1157, and 1158 with a plain cut, and 1557 and 1558 with a crosscut design.  
(d) To smooth and shape the walls of a cavity preparation, and prepare teeth for inlay and full crown restorations. Numbered sizes: Crosscut taper fissure 699, 700, 701, 701L, 702 and 703; plain taper fissure 169, 169L, 170, 170L and 171; round end plain taper fissure 1170 and 1171.  
(e) To make undercuts in the cavity preparation to provide proper retention because the filling materials might fall out of the prepared cavities. Numbered sizes: 33 $\frac{1}{2}$ , 34, 35, 37, 37L, 38, and 39.  
(f) To shape and finish the gingival floor for crown and fixed partial denture preparations without the risk of removing more tooth structure from prepared cavity walls. Numbered size: 957.
9. By the fineness of the cutting blades on the working ends of finishing burs.
10. (a) Concave, tapered fissured.  
(b) Round.  
(c) Oval.  
(d) Bud or flowerbud.  
(e) Flame.
11. Metal surfaces are impregnated with bits of diamonds and are available in various grits. They are used as excavating and finishing burs; available in round, inverted cone, cone, cylinder, flame, and wheel shapes.
12. Round, cone, and flame.

## 017

1. Circular-shaped cutting instruments available in a wide variety of sizes, shapes, and abrasive grit.
2. (1) Coarse grits are used for gross reduction and contouring.  
(2) Intermediate grits normally are used for finishing margins.  
(3) Fine grits are used to polish the surface.
3. Contra-angle (latch) or straight handpieces.
4. The shaft upon which an abrasive disk or wheel is mounted.
5. Moore's mandrel and snap-on mandrel.
6. The Jo Dandy disk; uses a screw mandrel.
7. Safe-sided disk.
8. Disks are thinner and usually have abrasives on one side only. Wheels and points usually have abrasives on both sides as well as outer edges.

9. Their composition.
10. (a) To finish metal prosthetic devices.  
(b) To polish porcelain or metal castings.  
(c) To polish amalgam or composite restorations.  
(d) To finish and polish restorations.
11. Brownie points and Greenie points.
12. Once used on metal (gold, amalgam, or otherwise), it must not be used on porcelain or composite.
13. Used primarily in the dental laboratory to polish dentures and other prosthodontic appliances.
14. Used with an abrasive to polish dental appliances because they are not impregnated with any abrasives.

**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.

30. (009) Before a patient's appointment, both you and the dentist screen the patient's dental health record for all of the following reasons *except*
  - a. reviewing AF Form 696 for positive entries.
  - b. determining what procedures will be performed during patient treatment.
  - c. checking for communicable diseases to determine the level of infection control required.
  - d. checking currency of information, record completeness, and x-rays required for the procedure.
31. (010) When your patient is referred to another area in the clinic, you should
  - a. give the patient written directions to the designated place.
  - b. give the patient verbal directions to the designated place.
  - c. have the patient call the area referred to for directions.
  - d. escort the patient to the designated place.
32. (010) The proper way to place a routine plastic-backed paper drape on a patient is with
  - a. the plastic side facing outward.
  - b. the paper side facing outward.
  - c. the paper side facing the patient's chest.
  - d. either the paper side facing inwards or the plastic side facing outwards.
33. (010) What type of drape is used when there is a *good chance of contamination*?
  - a. Postoperative.
  - b. Disinfecting.
  - c. Surgical.
  - d. Routine.
34. (010) You have a patient seated and draped. Your next step is to position the light. To do this properly, you position the light
  - a. toward the appropriate arch and turn the light on.
  - b. within your reach from a standing position to permit adjustments required during treatment.
  - c. toward the area above the patient's chin and turn the light on to adjust toward the appropriate arch.
  - d. toward the area beneath the patient's chin and turn the light on to adjust toward the appropriate arch.
35. (011) If the medical health history form for a patient is current, why must you interview the patient before beginning treatment?
  - a. To determine what precautions to take.
  - b. To ensure the patient was honest when completing the form.
  - c. To ensure that any communicable disease is noted for infection control.
  - d. To determine if there have been any changes since the patient was last treated.

36. (011) Since it is *not* always easy for the patients to share private, personal information, how should you discuss each question on the AF Form 696 with a patient?
- Listen and accept the patient's attitudes and perceptions without judging.
  - Ask questions that make the patient account for behavior.
  - Position yourself above the patient's eye level.
  - Use a firm vocal tone.
37. (011) Which patient diseases or conditions could require *antibiotic treatment prior to dental treatment*?
- Angina pectoris, glaucoma, pacemakers, rheumatic fever or heart murmur.
  - Stroke, implant prosthesis, diabetes, anemia, angina pectoris, and heart murmur.
  - Artificial heart valves, congenital heart disease, rheumatic fever, or heart murmur.
  - Hepatitis, congestive heart failure, myocardial infarction, and coronary artery disease.
38. (011) Which disease or condition may cause a patient to be unable to tolerate the *supine position* used for most dental procedures?
- Hemophilia.
  - Heart murmur.
  - Rheumatic fever.
  - Congestive heart failure.
39. (011) At the time of dental treatment, you should always ensure that a patient has his or her nitroglycerin medication if he or she has
- congestive heart failure.
  - high blood pressure.
  - angina pectoris.
  - heart murmur.
40. (011) If a patient on anticoagulants is having dental treatment, the
- dentist reduces the dosage.
  - dentist increases the dosage.
  - physician reduces the dosage.
  - physician increases the dosage.
41. (011) What should be readily available for patients with *severe emphysema*?
- Antibiotics.
  - Nitroglycerin.
  - Anticoagulants.
  - Supplemental oxygen.
42. (011) What is required before patients with *active tuberculosis* can receive non-emergency (routine) dental treatment?
- A medical consultation with physician for additional INH therapy.
  - An AF Form 570.
  - Clearance by the dental infection control officer.
  - Clearance by Public Health.

43. (011) You suspect a patient is experiencing insulin shock. In this situation you would administer
- a. insulin.
  - b. antibiotics.
  - c. nitroglycerin.
  - d. a source of sugar.
44. (011) When a patient indicates a history of kidney trouble, it is important that you identify if this patient has had
- a. urinary tract infections and renal disease.
  - b. minor bladder infections and kidney transplants.
  - c. minor urinary tract, bladder, or kidney infections.
  - d. a kidney transplant, severe renal disease, and dialysis treatment.
45. (011) What disease is *usually* associated with an excess of bilirubin causing the skin and eyes to turn yellow?
- a. Heart.
  - b. Liver.
  - c. Thyroid.
  - d. Sick cell.
46. (011) Which hepatitis types are transmitted by viruses and have carrier states?
- a. Hepatitis A and Hepatitis B.
  - b. Hepatitis C and Hepatitis A.
  - c. Hepatitis D and Hepatitis A.
  - d. Hepatitis B and Hepatitis C.
47. (011) What type of dental treatment can be provided for a patient undergoing chemotherapy?
- a. Routine.
  - b. Elective.
  - c. Emergency.
  - d. Restorative.
48. (011) For pregnant patients, what trimester is considered the *best* time to provide dental treatment?
- a. First.
  - b. Second.
  - c. Third.
  - d. None.
49. (012) Dental clinics support which of these medical objectives of the hypertension screening program?
- a. Elimination of hypertension in active duty military.
  - b. Cure hypertension before any definitive dental treatment.
  - c. Diagnosis and prescription of medication for hypertension.
  - d. Early detection, evaluation, and treatment of hypertension.

50. (012) The patient's blood pressure reading is *routinely recorded*
- only on the SF 603 or SF 603A.
  - only on the AF IMT 696.
  - on the SF 521 and AF IMT 696.
  - on the AF IMT 696 and SF 603 or SF 603A.
51. (013) What is the working part of a *condensing* dental instrument?
- Blade.
  - Shank.
  - Head.
  - Nib.
52. (013) The identification number of a double-ended dental instrument is *usually* found
- near the center.
  - on the inner portion of the instrument's shank.
  - on the portion of the handle *nearest* the working end.
  - on the portion of the handle *farthest* from the working end.
53. (013) The width, length, angle, and sometimes the angle or curvature of a dental instrument blade is described by the
- identification number.
  - stock listing number.
  - reordering number.
  - formula number.
54. (014) Which instrument is used to detect minute breaks in the pits and fissures, find defective margins or restorations, and check the depth of cavities?
- Explorer.
  - Vitalometer.
  - Cotton forceps.
  - Periodontal probe.
55. (015) Store anesthetic carpules
- in the freezer.
  - in the syringe.
  - at room temperature.
  - at body temperature.
56. (015) To make the necessary spaced holes in a rubber dam, you would use the rubber dam
- clamp.
  - frame.
  - punch.
  - forceps.
57. (015) Which rubber dam clamp sizes are *commonly* used in *pediatric* dentistry?
- #00, #0, and #14A.
  - #00, #W00, and #2.
  - #0, #W3, #W8, and #14A.
  - #0, #3, #7, and #9.



- 
- 
58. (015) The instrument *commonly* referred to as a Boley gauge is the
- a. dentimeter.
  - b. Vernier caliper.
  - c. endodontic probe.
  - d. periodontal probe.
59. (015) Which type of gauge is available with sharp points for porcelain and metal, and rounded points for wax and plastic?
- a. Stop gauge.
  - b. Boley gauge.
  - c. Vernier caliper.
  - d. Iwanson spring caliper.
60. (016) Which part of a bur fits into a handpiece?
- a. Head.
  - b. Neck.
  - c. Shank.
  - d. Working end.
61. (016) A *disadvantage* of a *carbide bur* is that it
- a. dulls after only one use.
  - b. should be discarded after each use.
  - c. is brittle and has a tendency to fracture under pressure.
  - d. often generates heat in the tissues of the tooth under low speed.
62. (016) Which numbers identify *straight crosscut fissure* burs?
- a. 169, 170, and 171.
  - b. 330, 331, and 332L.
  - c. 699, 700, 701, and 701L.
  - d. 556, 557, 558, 559, and 560.
63. (016) Which bur is *best* suited for making *undercuts* in cavity preparation?
- a. Round.
  - b. Inverted cone.
  - c. Taper fissure.
  - d. Straight fissure.
64. (016) What is the shape of a #6 *finishing bur*?
- a. Oval.
  - b. Flame.
  - c. Round.
  - d. Concave, tapered fissure.
65. (016) Which type of bur is available in a wide variety of sizes and grits?
- a. Diamond.
  - b. Finishing.
  - c. Excavating.
  - d. Denture trimming.

66. (017) What disk grit type is used on a dental *rotary instrument* for gross reduction and contouring?
- a. Fine.
  - b. Medium.
  - c. Intermediate.
  - d. Coarse.
67. (017) What do you call an abrasive disk that only has one side covered with abrasives?
- a. Slick surface.
  - b. Safe-sided.
  - c. One surface.
  - d. Reversible.

**Please read the unit menu for unit 3 and continue ➡**

## Unit 3. Basic Clinical Procedures: Part B

<b>3–1. Four-Handed Dentistry .....</b>	<b>3–1</b>
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019. Zones and positions for four-handed dentistry .....	3–2
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**D**URING your career you may assist several dentists. You also may assist in several or all of the dental specialties. In doing so, you will find that dentists do not always carry out procedures in the same way. Generally, dentists follow a similar pattern, but because of individual preferences and variations in professional training, each works differently. To be successful, you must learn the preferred instruments, medications, and procedural routines of each dentist. You may perform many of these basic clinical procedures as a provider rather than an assistant. This will include such areas as preventive dentistry or radiology. Although there are variations in treatment routines, there are basic procedures you need to know to be an effective dental assistant, regardless of which patient treatment area you may work in. In this unit, we continue our discussion of basic clinical procedures. In this unit we focus on three main areas: four-handed dentistry, basic treatment procedures, and post-treatment procedures.

### 3–1. Four-Handed Dentistry

The goal of four-handed dentistry is to allow the provider and assistant to function as a team in a seated position with maximum efficiency and minimal strain. Four-handed dentistry, as it has been developed, not only increases productivity but also reduces stress and fatigue on the provider and assistant. Four-handed dentistry can be used in all specialty and general dentistry areas.

#### 018. Principles of four-handed dentistry

The principle and practice of four-handed dentistry stresses efficiency of time and motion economy. The concept of four-handed dentistry uses the provider and an assistant who provides a second pair of hands to assist the provider. In implementing four-handed dentistry, there are five principles:

Principles of Four-Handed Dentistry	
Principle	Description
1	Dental assistants perform the duties legally delegated to them. This includes any dental procedure that is reversible.  By assuming these duties, the assistant allows the provider to devote maximum attention and energy to the diagnosis and delivery of quality patient care.
2	Making a careful examination and diagnosis of the patient's dental condition.  This principle permits treatment that is scheduled and delivered with maximum patient comfort and efficient use of the appointed chair time.

Principles of Four-Handed Dentistry	
Principle	Description
3	<p>Proper selection and arrangement of treatment equipment.</p> <p>This principle allows the dental team to work in a seated position, reducing stress and strain, yet allowing the procedures to be performed quickly and smoothly. The assistant is positioned 4 to 6 inches above the provider's sight to allow better visibility.</p> <p>To maintain the dental team's seated position, <i>do not</i> place any object beyond an arm's reach.</p>
4	<p>Positioning materials and equipment close to the point of use for motion economy and speed.</p> <p>Limiting motion is accomplished by placing the dental equipment and patient in proper proximity to the seated dental team. Careful placement of instruments, materials, and small accessories ensures their easy accessibility. The goal is to have both the provider and the assistant use fingers only, fingers and wrist, or fingers, wrist, and elbow movements. Movements of the entire arm from the shoulder or the arm and twisting of the body are more time-consuming and tiring because they require more movement and refocusing of the eyes.</p> <p>When four-handed dentistry is performed, the provider's hands and eyes remain in the treatment zone.</p>
5	Using infection control methods including barrier techniques to protect staff and patients from any potential danger of cross contamination.

### 019. Zones and positions for four-handed dentistry

The patient's position is determined by the procedure to be performed. Most dental treatment is provided with the patient in the supine position. Once the patient has been seated, the provider and the assistant place themselves in the proper positions for treatment. These positions can be best understood by relating them to a clock. In this concept, an imaginary circle is placed over the dental chair, with the patient's head at the center of the circle. The circle is numbered like a clock with the top of the circle at 12 o'clock. The clock (fig. 3-1) is divided into four zones of operation:

- Provider's (operator's) zone.
- Assistant's zone.
- Transfer zone.
- Static zone.

Using these zones is the key to the efficient implementation of the principles of four-handed dentistry. Each zone of operation is defined below.

Four-Handed Dentistry Operation Zones		
Zone Title	Position	Description
<b>Provider's Zone</b>	Right hand providers – 8 to 11 o'clock Left hand providers – 1 to 4 o'clock	Whenever the treatment site is on the lingual surfaces of anterior teeth, the provider (right- or left-handed) generally uses the 12 o'clock position.
<b>Assistants' Zone</b>	Right hand providers – 2 to 4 o'clock Left hand providers – 8 to 10 o'clock	All instruments and materials are located in this zone.
<b>Transfer Zone</b>	4 to 8 o'clock	Instruments and materials are passed and received in this zone.
<b>Static Zone</b>	11 to 2 o'clock	Non-traffic area where equipment is located.  When an object is heavy, or a material or an instrument is objectionable if held near the patient's face, you may pass or hold it in this zone.

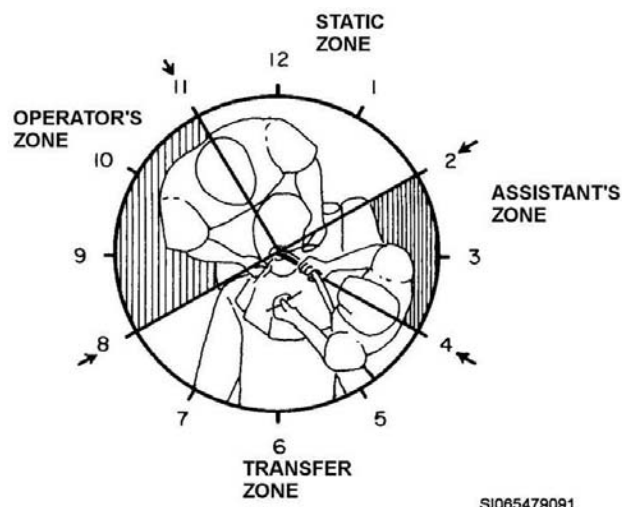


Figure 3-1. Zones of operation for four-handed dentistry.

The provider should sit with a straight back and relatively erect head. This helps prevent curvature of the spine. The provider's shoulders should be parallel to the floor and elbows close the side. The patient is lowered to a position that places the treatment site as close to the provider's elbow level as possible. When the patient is properly positioned, the provider's eyes should be 14 to 16 inches from the treatment site.

As the assistant, you sit as close as possible to the back of the patient's chair with your feet directed toward the head of the chair. This position lets you reach the treatment site, hose-attached instruments, and instruments and materials from the mobile cart or instrument tray without leaning, twisting, or overextending your arms. In this position you are also able to observe the patient's responses throughout the procedure. Adjust your stool so that your eye level is 4 to 6 inches above the provider's eye level. Like the provider, sit in an erect position.

If your assistant's chair has a curved, movable armrest, position the armrest in front to support your body just below the rib cage. Using this armrest as a brace, you are able to lean slightly forward from the hips only. Place your feet firmly on the foot-support ring so that your feet are parallel to the floor, thereby maintaining comfort and proper posture. Place the mobile cart or instrument tray toward the head of the patient's chair, and position it so that you have easy access to the needed instruments and materials.

## 020. Passing and receiving instruments and materials

To increase production while at the same time reducing both the provider's and assistant's stress and fatigue requires that they work together as a team. You must be able to anticipate the provider's needs and fulfill them without unnecessary delay. To accomplish this, you must know the treatment procedure sequence and have the required instruments and materials ready at the proper time. When you perform four-handed dentistry, you also must irrigate with air and water as well as aspirate with the high-volume evacuator throughout the procedure (as we discussed previously). To enable you to pass and receive items efficiently during the procedure, we'll discuss these transfer procedures in more depth in the following paragraphs:

- Instruments.
- Handpieces and burs.
- Preparing and passing materials.

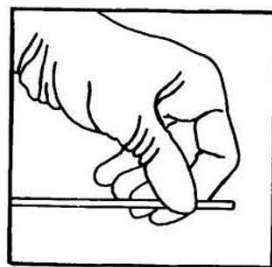
### Instrument transfers

Instrument exchange between the provider and assistant takes place in the transfer zone near the patient's chin. As the assistant, you must anticipate the provider's needs, and be ready to pass the next instrument and receive the used one in a smooth motion when signaled by the provider. An alert assistant does not need a verbal command to make the exchange, but should be constantly ready when the exchange signal occurs. Ideally, this instrument transfer is accomplished with a minimum of motion involving moving only of your fingers, wrist, and elbow. During the transfer, the provider should *not* move his or her finger or eyes from the treatment site. When the exchange is completed, the provider pivots the working hand back to the working position.

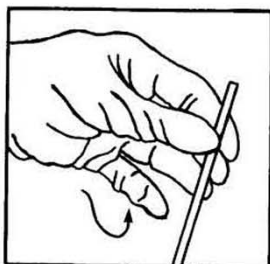
For an example of an efficient transfer, let's say that you are assisting a right-handed provider. For this reason, you are seated on the left side of a patient. Since your right hand is busy aspirating, you must be able to transfer instruments with your left hand. The one-hand instrument exchange may sound difficult at first, but it is quite easy to master. The actual instrument transfer is divided into four stages:

- Working.
- Signal.
- Pretransfer.
- Midtransfer.

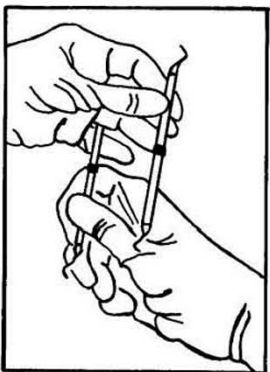
Instrument Transfer Stages	
Stage	Description
Working stage	<p>In the working stage, pick up the next instrument to be used from the instrument tray with your left hand.</p> <p>Grasp the instrument between your thumb and first two fingers by the end opposite from the working end as shown. This is illustrated in figure 3-2.</p> <p>Hold the instrument close to the treatment area and parallel to the instrument being used.</p> <p>As shown in figure 3-2, extend your little finger to receive the instrument being used by the provider.</p>
Signal stage	<p>The signal stage takes place when the provider signals for the next instrument by slightly raising the instrument from the tooth.</p> <p>During this stage, the provider maintains his or her fulcrum (finger rest) and, with a pivotal action, rotates the working hand away from the patient's oral cavity.</p> <p>This positions the used instrument so that you can grasp it with your little finger.</p>
Pretransfer stage	<p>In the pretransfer stage, grasp the used instrument firmly using the little finger, as shown in figure 3-2.</p> <p>Sometimes, you may prefer to use the last two or even three fingers to receive the used instruments.</p> <p>Immediately following this action, carry out the midtransfer stage.</p>
Midtransfer stage	<p>In this stage, as shown in figure 3-2, place the next instrument into the provider's hand with the working end positioned toward the treatment site.</p> <p>When the treatment site is located on the maxillary arch, you point the working end up. Likewise, when the treatment site is on the mandibular arch, you position the working end down.</p> <p><i>Do not</i> release your grip of the new instrument until the provider has firmly grasped it.</p> <p>Sometimes the instruments may become tangled during the exchange. This is usually caused by failure to parallel the handles before the exchange.</p>



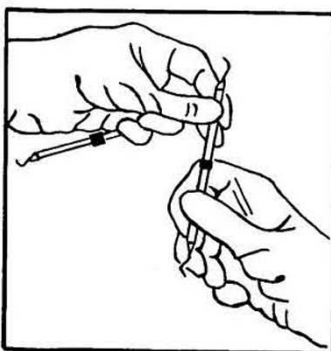
Hold instrument opposite the working end.



Hold instrument with thumb, index and ring fingers ready to pass. Prepare to receive used instrument with little finger extended.



Passing Position



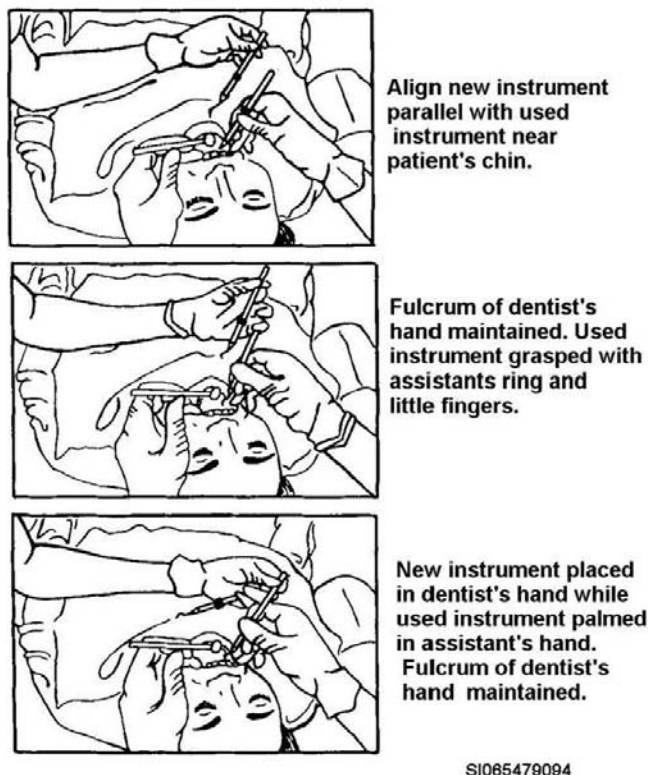
New instrument placed in dentist's hand with working end pointed towards working site. Used instrument pulled toward assistant's hand.

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Figure 3-2. Instrument transfer.

The exchange of all instruments is done with firm, deliberate movements to give both you and the provider a feeling of confidence as well as to eliminate lost time and motion. Return the used instrument to its original position on the instrument tray and prepare to repeat the procedure with the next instrument required.

Now, take a look at the procedure for a left-handed instrument exchange during patient treatment. Refer to figure 3-3 for a topical view. When you assist from the right side of the patient, use your right hand in the same manner described for the left hand.



**Figure 3-3. Topical view of instrument exchange.**

Double-handed instruments, such as scissors, hemostats, and forceps are transferred somewhat differently than previously described. When passing these types of instruments, grasp the working end and place the handle into the palm of the provider's hand. Point the working end of the passed instrument toward the correct arch. When the provider finishes with these instruments, receive the instrument by grasping the working end.

### **Transferring handpieces and burs**

The handpiece can be exchanged for another instrument in the same manner previously described. If two handpieces are exchanged, you exercise caution to avoid tangling the hoses during the exchange.

The exchange of the handpiece burs can be accomplished as a team effort. During this procedure, the provider holds the handpiece firmly over the patient's upper chest in the transfer zone, and you loosen and remove the bur; then immediately place the next bur in the handpiece and secure it. Always give the bur a gentle tug to ensure that it is firmly in the handpiece. If the provider uses a different instrument between bur exchanges, change the bur outside the transfer zone, usually over the tray setup.

If the provider changes handpieces and requires an exchange of burs in the returned handpiece, be sure to use the lock-out toggle for the handpiece before attempting to change burs. Failure to do this could cause you harm when the provider steps on the foot control to activate the other handpiece.

### **Preparing and passing materials**

Dental materials are exchanged at the patient's chin in the transfer zone. This prevents materials from being dropped on the patient's face. Small amounts of dental materials may be mixed and passed on a glass slab, paper pad, or dappen dish. The material itself dictates the instrumentation used with it.

As a dental assistant, you must prepare dental materials at the proper time during the procedure. A material mixed too soon does not allow sufficient handling time. For example, an impression material mixed before the provider is ready for it may harden or set in the impression tray before it can be



placed in the patient's mouth. On the other hand, a delay in mixing an impression material on your part wastes time. Similar results occur when there is a premature or delayed mixing of other dental materials. So, knowing when to mix is equally as important as knowing how to mix. Like instruments, knowing the procedure's routine lets you anticipate when the provider needs the specific materials. Have the mixing equipment ready and the material proportioned slightly before the time it is needed. Begin mixing only when you know the provider is ready.

When you are assisting during an amalgam restoration, load the amalgam into the amalgam carrier and pass the loaded carrier to the provider. Sometimes you may use two or more amalgam carriers; if so, you can fill the barrel of one while the provider is using the other. Of course, you also must pass condensing instruments during the amalgam restoration process.

When using cements, most providers prefer that you leave the mixed cement on the glass slab or mixing pad and then hold the pad or slab in your hand near the treatment site. The provider then selects the amount desired. You can hold the air syringe to dry the area for applying and placing the material in the other hand. For some materials, you may need to hold gauze in your hand (rather than the air syringe) to wipe excess material from the application instrument.

The overall idea in passing and receiving dental instruments and materials is to have the required item at the right place, in the right position, at the right time. By doing this; you free the provider to concentrate more on the treatment area.

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### **Self-Test Questions**

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

#### **018. Principles of four-handed dentistry**

1. What do the principles and practice of four-handed dentistry stress?
2. Briefly describe the concept of four-handed dentistry.
3. What duties do dental assistants perform in four-handed dentistry?
4. What does assuming these duties by the dental assistant allow?
5. Where should objects be placed to maintain the dental team's seated position?
6. Where do the provider's hands and eyes remain when four-handed dentistry is performed?

**019. Zones and positions for four-handed dentistry**

1. List the zones and clock positions used with four-handed dentistry.
2. In what zone are instruments and materials located?
3. In what zone are instruments and materials passed and received?
4. What items may be passed or held in the static zone?
5. To what level should the patient be lowered?
6. When properly positioned, how far from the treatment site should the dentist's eyes be?
7. What is the proper position to perform four-handed dentistry?
8. Describe why proper position is important.
9. Where should the assistant's eye level be in relation to that of the provider?
10. How should the curved, movable armrest on the assistant chair be positioned and why?
11. Where should your feet be placed and why?
12. Where do you position a mobile cabinet or instrument tray?

**020. Passing and receiving instruments and materials**

1. What knowledge is required to anticipate the provider's needs without unnecessary delay?
2. Instrument transfer should be limited to what motions?
3. List the steps in the working stage of instrument transfer.
4. How does the provider signal for the next instrument? What does the provider maintain during the signal stage?
5. What action takes place in the pretransfer stage?
6. How do you place the next instrument into the provider's hand? In what stage of instrument transfer is this accomplished?
7. What usually causes the instruments to become tangled during the exchange?
8. Why is the exchange of all instruments done with firm, deliberate movements?
9. How are double-handled and bulb-type handles transferred differently than other instruments?
10. Describe how to exchange handpiece burs as a team effort.
11. What must you do if the provider changes handpieces and requires an exchange of burs in the returned handpiece?
12. Why is it essential to do the procedure in question 11 correctly?
13. Where are dental materials exchanged?

14. What knowledge concerning materials is equally important as knowing how to mix?

15. Describe how cements are passed.

16. What is the overall concept in passing and receiving dental instruments and materials?

## 3-2. Basic Treatment Procedures

Some procedures, such as administration of local anesthetic, irrigation, aspiration, and retracting of tissue, are performed in nearly all aspects of clinical dentistry. Others, such as rubber dam application, assembling matrices, and making preliminary alginate impressions are performed in several clinical areas. Except for the administration of a local anesthetic, you must be able to perform these procedures. When administration of local anesthetic is required, you need to prepare all the items used for this procedure; so let's start there.

### 021. Local anesthetic

Before doing a possibly painful dental procedure, the dentist gives the patient a local anesthetic to make the treatment site insensitive to pain. Your role in administering local anesthetics is to prepare the injection. In addition, you have these other responsibilities for the administration phases:

- Knowing administration techniques.
- Preinjection.
- Injection.
- Disassembly of the aspirating syringe.

### Administration techniques

The primary effect of local anesthetic agents is to penetrate the nerve cell and block the conduction process. Thus, the nerve impulse is not conducted beyond the point at which the local anesthetic is active, producing anesthesia in the area. In dentistry, local anesthetic agents are administered by the three different techniques described in the following table.

Anesthetic Administration Techniques	
Technique	Description
Topical	<p>To produce topical anesthesia, an anesthetic solution is applied in a concentrated form directly to the surface of the mucosa or skin. To be effective, the solution must penetrate the tissue and block the nerve endings.</p> <p>Since topical anesthesia anesthetizes the surface tissue only, in dentistry it is commonly used on the oral mucosa to decrease the discomfort associated with the introduction of the needle for infiltration or nerve block procedures.</p> <p>The location and innervation of the tooth, or teeth, to be anesthetized determines the topical anesthesia placement and the type of injection to be used.</p>
Infiltration	<p>This technique, also known as field block anesthesia, is a method of injecting anesthetic solution directly into the tissue and alveolus at the site of the dental procedure.</p> <p>The solution then penetrates the tissues in the vicinity, producing anesthesia at the nerve endings and small nerve fibers. This method works well for soft tissue procedures in a confined area where the tissue can be easily penetrated by the solution.</p>

Anesthetic Administration Techniques	
Technique	Description
	<p>This technique is most frequently used to anesthetize single teeth in the maxillary arch where the alveolus cancellous bone is porous enough to allow the anesthetic solution to reach the apices of the teeth. Infiltration also may be used as a secondary injection to block gingival tissues surrounding the mandibular teeth.</p> <p>It is not possible for general use in the mandible because the very dense, compact nature of the bone does not allow the penetration of local anesthetics, except for the anterior teeth.</p>
Nerve block	<p>A nerve block or regional anesthesia is obtained by injecting the anesthetic solution near the nerve trunk that supplies the area in which the procedure is to be accomplished. The nerve tissue and its vascular supply take the anesthetic and carry it along the nerve, producing anesthesia in the entire region of distribution of the nerve.</p> <p>The dentist must make certain that the solution is not injected directly into the blood stream. After a slight amount of anesthetic is injected, the dentist aspirates a small amount of fluid to ensure there is no sign of blood.</p> <p>This technique is used to anesthetize the mandibular teeth.</p>

### Preinjection

Before giving a local anesthetic, the dentist may use the following preinjection items to prepare the injection site:

- An antiseptic solution.
- A topical anesthetic.
- Cotton-tipped applicators.
- 2×2-inch gauze sponges.

When you are preparing a patient for a local anesthetic injection, the dentist will let you know whether an antiseptic or a topical anesthetic will be used. If so, follow this general guide: have an antiseptic solution, topical anesthetic, two sterile cotton-tipped applicators, and sterile 2×2-inch gauze sponges ready for use. Your next step is to be ready to pass the material to the dentist as they are needed.

The dentist may have patients use an antiseptic mouthwash to rinse the oral cavity prior to applying a topical anesthetic. The gauze sponges are used to dry the injection site mucosa before applying the topical anesthetic. The topical anesthetic, usually supplied as an ointment, is applied to reduce the pain associated with the injection of the needle. The cotton tip applicators are used to apply the topical anesthetic.

### Injection

The items used to give local anesthetics are the aspirating syringe, the aspirating needle, and the anesthetic carpule. Since we covered syringes and needles earlier, you should already be familiar with the different types; therefore, we will limit our discussion to these two areas:

- Assembling an aspirating syringe.
- Passing and receiving the syringe.

#### *Assembling an aspirating syringe*

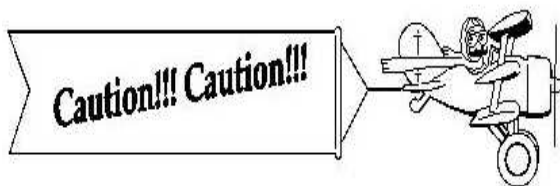
Based on the patient's dental health history and the procedure to be performed, the dentist will inform you which type of anesthetic (including vasoconstrictor content), needle length (usually a short needle for maxillary injections and a long needle for mandibular injections), and needle gauge to use to prepare the syringe. As time passes, you will become familiar with each dentist's preference and various procedures for needle length and gauge; however, always verify the type of anesthetic solution. To reduce unnecessary patient apprehension, be sure you assemble the syringe out of the

patient's view. You can do this while the dentist administers the topical anesthetic. The assembly steps are as follows:

Assembling an Aspirating Syringe	
Step	Description
1	Always check the carpule for cracks or suspended articles. If you find any, discard the carpule and notify the dentist and dental logistics.
2	Disinfect the rubber diaphragm on the carpule before loading it in the syringe. <i>Do not</i> touch the rubber diaphragm after you disinfect it.
3	Place the carpule (cartridge) in the aspirating syringe. This is fairly easy.  Use the thumb ring to pull the plunger back against the syringe body. Place the cartridge into the barrel of the syringe with the rubber stopper end in first, positioned toward the plunger.  Now, engage the harpoon into the rubber stopper of the cartridge by holding the body portion of the syringe with one hand while lightly tapping the end of the thumb ring with your other hand.  <b>NOTE:</b> <i>Do not</i> tap the thumb ring with too much force; this might cause the glass cartridge to shatter.
4	Break the seal on the needle container and remove only the small portion of the plastic needle cover.
5	Insert the needle into the syringe and screw the hub onto the syringe.
6	Make a quarter turn with the thumb ring to ensure that the harpoon is firmly engaged.  If it is, the thumb ring rotates back to its original position.
7	Force a small but visible amount of anesthesia through the needle to expel air, and assure that all things are ready for the injection.
8	Loosen the needle cap, but keep the plastic needle covering in place until you pass the syringe to the dentist.  This will guard against possible contamination. Naturally, this cover must be removed to check the syringe's operation and during the injection.
9	When recapping the needle, use some type of mechanical device or one-handed scoop technique.

### ***Passing and receiving the syringe***

Okay, the dentist has applied the topical anesthetic and you have the aspirating syringe assembled. Now the dentist is ready to administer the local anesthetic. Pass the syringe with the needle cover in place. Hold the barrel of the syringe in your hand. Place the thumb ring of the syringe over the dentist's thumb and the finger grip between the dentist's index and middle fingers. While you are still holding the syringe by the barrel, use your other hand to remove the needle cap. After the dentist gives the injection, carefully remove the syringe by grasping the barrel and lifting the syringe out of the dentist's hand.



**CAUTION: Remember, the needle is exposed and contaminated.** Because of this, you must exercise extreme caution when you are grasping the barrel of the syringe. *Do not* attempt to recap the needle while the syringe is in the dentist's hand; instead, recap the needle using a mechanical device or one-handed scoop method.

### **Disassembling the aspirating syringe**

After the patient is dismissed, you can safely disassemble the syringe. It is vitally important that you prevent needle sticks from the contaminated needle. To do this, first remove the cartridge and leave the needle remaining in place. This provides an air vent to prevent the glass carpule from shattering.

To unload the cartridge, pull the piston rod back as far as possible to disengage the harpoon from the rubber stopper without pulling the stopper from the cartridge. Then you can easily remove the cartridge can from the syringe. Remove the used needle and dispose of it into a puncture-resistant container according to established infection control standards.

## **022. Irrigation, aspiration, and retracting tissue**

Immediately after the dentist administers the local anesthesia, you will be required to irrigate and aspirate the injection site. This is necessary because the anesthetic solution produces a bitter taste in the patient's mouth. Additionally, you are required to irrigate and aspirate often throughout the treatment procedure to maintain a clean treatment site. You may also need to retract tissue as part of treatment procedure. In this lesson, we'll cover the requirements for these processes.

### **Irrigation**

As the dental assistant, the dentist expects you to irrigate the oral cavity when necessary. Applying water or saline solutions to the treatment site in the oral cavity allows small tooth particles, dried blood, and other debris to be flushed from the area and removed by aspiration. This leaves the dentist with a clean treatment site. Handpieces with water spray systems provide some irrigation, but additional irrigation is always necessary. At times, the dentist may decide not to use the water spray system for a particular procedure.

During routine restorative procedures, you use the three-way syringe on the dental unit to irrigate the treatment site with water or water spray. The tip of the three-way syringe rotates easily to direct the water, spray, or air at the specific treatment sites. The tip quickly disconnects to allow for sterilization.

When you irrigate treatment sites during surgical procedures, you use a sterile saline solution or sterile water as the irrigation medium. You apply these solutions using either a bulb-type or Luer (piston-barrel) syringe. Irrigation's main purpose during surgical procedures is to keep a clean treatment site. The cleansing is not complete, however, until the irrigating solution is aspirated (drawn by suction) from the mouth.

### **Aspiration**

Aspiration is necessary to remove blood, pus, saliva, and debris from the treatment site and oral cavity. This is done by using the high volume evacuation (HVE) or saliva ejector. As the dental assistant, one of your responsibilities is to make sure that a sterile or disposable tip is in place for each patient. When using either the HVE or saliva ejector, always place the tip in the upright position before you turn the aspiration off. This helps prevent materials from dripping out or clogging the hoses. You also must clean and maintain the evacuation system as instructed in the manufacturer's operation and maintenance instructions.

### ***High-volume evacuator***

The HVE is generally described as a high-volume, low-pressure suction. These means it can remove a large volume of fluids from the oral cavity without exerting injurious suction pressure to soft oral tissue. These qualities make the HVE an almost ideal suction apparatus for removing the relatively high volume of fluids that accumulate during cavity preparation. Your role in manipulating the HVE is to place and hold the HVE tip in a position where it adequately evacuates saliva, debris, and water spray from the handpiece or irrigating device.

If you are assisting a right-handed provider, you'd normally be seated on the left side of the chair. Because of this, you'd normally aspirate with the right hand, and transfer instruments with your left hand. Hold the HVE using a reverse palm thumb grasp (thumb-to-nose) or modified pen grasp. These grips are shown in figure 3-4. Look closely at the tip and you will notice that it is contoured with a slanted opening at each end which allows it to adapt to the anterior and posterior areas of both arches. For proper placement, use the opening slanted at an angle greater than 90° in anterior areas, and the

end slanted at less than 90° for posterior areas. Position the suction tip so that it does not interfere with the provider's line of vision or access to the treatment site.

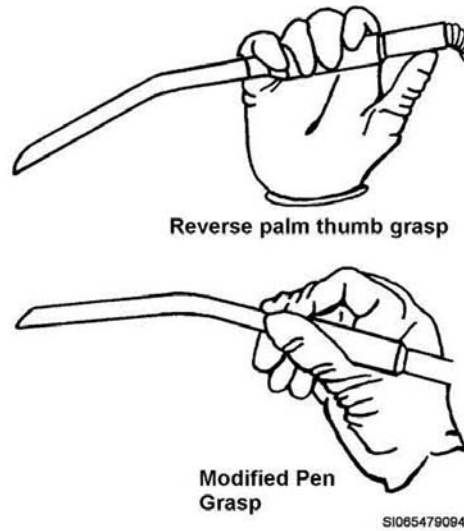


Figure 3-4. Grasps for the HVE tip.

For restorative procedures, place the tip close to the tooth being treated. Keep the opening of the tip even with the occlusal surface and parallel with the facial or lingual surface. Positioning the tip in this manner provides a washed field technique. This technique draws the water spray from the handpiece across the tooth into the HVE. Using this technique serves two purposes. First, it keeps the tooth cool, and second, it keeps the cavity preparation clear of debris. *Do not* place the HVE tip on the gingiva. Doing so causes the patient to experience pain if the gingiva is not numbed by the local anesthesia.

### **Saliva ejector**

When the saliva ejector is used your role is to make sure that a sterile or disposable saliva ejector tip is in place for each patient. The saliva ejector is only effective when there is a limited amount of fluids, such as saliva, to remove from the patient's mouth. During certain procedures, the provider may choose to keep the working site dry by using the saliva ejector. Also, it can be used to hold the tongue away from the working site and keep an area dry for placement of material that takes a long period to set.

### **Retracting tissue**

During many dental procedures, there is a need to retract oral tissue. Retraction is normally performed for three reasons:

- Allow a better view.
- Allow access to the procedure site.
- Protect the tissues being retracted.

The tongue, cheeks, lips, and gingiva are tissues that must often be retracted. The mouth mirror is very effective and widely used to retract the tongue, cheeks, and lips. The main idea in retracting oral tissues is to firmly hold the tissue out of the way. For example, the tongue can become very unruly in some patients and must be protected from possible harm by rotating burs and other sharp instruments. Likewise, sometimes the cheeks must be retracted for protection and to permit access to certain areas of the mouth. Whatever the case may be, remember to retract the tissue firmly enough to prevent slippage, but not so firmly as to cause unnecessary tissue bruises and trauma.

**NOTE:** An unfirmly applied retractor results in slippage and unnecessary tissue damage.



### 023. Rubber dam preparation, placement, and removal

The use of the rubber dam is an important part of quality dental treatment and infection control. The rubber dam has four main purposes:

- Isolate the treatment site during restorative and endodontic procedures.
- Isolate the treatment site during application of pit and fissure sealants.
- Provide maximum access and visibility to the treatment site and a clean, dry field.
- Prevent the patient from accidentally swallowing or aspirating debris.

To save valuable chairside time, place the rubber dam following administration of the local anesthetic. To place the rubber dam, you need these five items:

- Rubber dam material.
- Frame.
- Punch.
- Clamps.
- Clamp forceps.

#### Preparation

To properly apply the rubber dam follow these steps:

How to Properly Apply a Rubber Dam	
Step	Description
1	Check the contact areas of the teeth to be isolated. Use a length of floss to do this.
2	Determine on which tooth the rubber dam clamp will be placed. Once this is determined, select a rubber dam clamp for a trial placement.
3	Take precautions to prevent the patient from aspirating or swallowing the clamp. To do this, always place a ligature on the clamp before putting it in the patient's mouth. Form the ligature by attaching a piece of floss to the bow of the clamp.  A simple and secure method is to put both ends of a piece of floss together and place them on a flat surface. This forms a looped end where the floss is folded in half. Place the clamp over the floss with the bow of the clamp facing up. Now, place the two loose ends of floss through the looped end and carefully pull the loose ends through the loop until the floss is secured tightly over the bow of the clamp.  You should now have a securely placed ligature on the clamp and are ready to place the clamp on the rubber dam forceps. Hold the clamp with the bow facing upward and away from the forceps.
4	Place the small projections on the working ends of the rubber dam forceps into the two corresponding holes on the rubber dam clamps.
5	Squeeze the handles of the forceps together to align projections with the corresponding holes in the clamp.  Once the clamp is placed on the forceps, tilt them upright and slide the forceps locking device downward to lock the handles in position. Locking the forcep handles is necessary to maintain the tension required to keep the clamp attached to the forceps.

The clamp is ready for trial placement. To accomplish this procedure, follow these steps:

How to Do Trial Placement of a Clamp	
Step	Description
1	Pass the rubber dam clamp forceps, with the working end covered, with the palm of your hand and the clamp pointed toward the placement position on the tooth.
2	Hold on to the ligature while the clamp is checked for proper fitting. Normally, the clamp should fit near or slightly below the cemento-enamel junction.
3	Stabilize the clamp. All the clamp tips must be in contact with the tooth to establish a facial lingual balance.
4	Exercise care to make sure the clamp tips do not impinge on the gingival tissue. If it does, it causes the patient to experience pain.  If the clamp is not placed properly, it also may spring off the tooth and cause injury. Caution is advised to stabilize the clamp firmly on the tooth before the clamp forceps is loosened.
5	Once the trial placement is complete, remove the forceps and attached clamp until final placement.

The next series of steps are required to prepare the rubber dam material. To accomplish this, do the following:

Preparing Rubber Dam Material	
Step	Description
1	Use the rubber dam punch to make the appropriate number of holes in the material.  The punch has an adjustable wheel with holes of varying sizes. By adjusting the wheel, holes of different sizes are produced in the material when the cutting tip strikes the hole in the wheel.
2	The holes in the rubber dam material must be punched firmly and cleanly.  A ragged hole or tag tears easily as the dam is placed over the crowns of the teeth. A ragged hole may also cause leakage of moisture around the tooth.
3	Ideally, the rubber dam material has predetermined markings of an average arch made by using a rubber dam stamp and ink pad.  This makes punching the rubber dam material easier because you have a pattern to follow with the normal shape of the arch and spacing and alignment of the teeth.
4	Before punching the material, always check the oral cavity for any missing, misaligned, or extra teeth.  You need to make adjustments from the standard pattern for these items.
5	Punch the hole for the tooth to be treated first. Then, determine what additional holes must be punched.  Normally, you punch holes for the two teeth anterior and at least one tooth posterior to the tooth being treated. An exception to this is root canal therapy when only the involved tooth is exposed.
6	After the holes are punched, apply a slight amount of lubricant to the back of the material around the holes.  This eases the placement of the material over the crowns and contact areas of the exposed teeth. Now the rubber dam is ready for placement into the oral cavity.

### Placement

In this segment we cover how the rubber dam material and clamp can be placed using one of three basic methods.

**Method 1**

Assistance is required for this method. The steps are as follows:

<b>Placing Rubber Dam and Clamp: Method 1</b>	
<b>Step</b>	<b>Description</b>
1	Place the rubber dam frame on the outside of the dam with the bow of the frame facing out.
2	Stretch the dam material from side to side to secure the corners of the dam on the four projections at the corners of the frame.  The rubber dam material should appear baggy on the frame rather than tight to allow easier placement in the oral cavity.
3	Pass the rubber dam and attached frame to the provider for placement into the oral cavity.
4	As the provider stretches the rubber dam material over each tooth to be isolated, use floss to slip the septum (rubber dam material between the holes) between the teeth without tearing the material.  Always place the floss on the tooth, never directly on the rubber dam itself. Placing the floss on the tooth assists in bringing a single thickness of the dam through the proximal contact when the floss is carried through.  Floss placed on the rubber dam itself tears the dam and requires passing two thicknesses of the dam through the contact.
5	Once the floss passes the contact of the teeth, release the lingual end of the floss.  Loop this end toward the opposite end and floss through the contact again.  Now, gently remove the floss by pulling it from the side horizontally, rather than attempting to pull the floss back up through the contacts vertically.
6	Continue using the floss to invert the interproximal septum, mesially and distally as well.  Inversion of the rubber dam turns the edges of the dam inward or under, around the isolated teeth to provide a seal. After this is completed, pass the rubber dam clamp forceps and attached clamp to the provider for final placement on the tooth.  Adjusting the rubber dam material on the frame can be made at this time to ensure a smooth and stable fit.
7	Wrap the ligature attached to the clamp around a projection on the side of the frame.  This prevents the clamp from becoming a dangerous projectile if it should spring off the tooth.
8	Pass a dull instrument, such as a stellite, to the provider for inversion of the rubber dam on facial and lingual areas of the exposed teeth.
9	Dry the exposed teeth with air from the three-way syringe as needed to assist in the inversion.

**Method 2**

In the second method the following steps are used.

<b>Placing Rubber Dam and Clamp: Method 2</b>	
<b>Step</b>	<b>Description</b>
1	Place the rubber dam clamp on the tooth (first).
2	Slip the rubber dam material over the clamp.
3	In either order, attach the frame and expose the remaining teeth through the holes.
4	Secure the clamp ligature to the frame.
5	Invert the mesial and distal septum with floss, and the facial and lingual areas with a dull instrument accompanied with air from the 3-way syringe.

**Method 3**

In this method, the clamp is held in the rubber dam forceps and the rubber dam placed over the bow of the retainer. The procedure is as follows:

<b>Placing Rubber Dam and Clamp: Method 3</b>	
<b>Step</b>	<b>Description</b>
1	Holding the edges of the rubber dam with your fingers, use the forceps to carry the dam and clamp into the patient's mouth.
2	Place the clamp on the tooth and remove the forceps.
3	Continue the placement as in the second method.

**NOTE:** Methods 2 and 3 are valuable when a single individual is placing a rubber dam.

**Removal**

After the restoration is placed, it is time to remove the rubber dam. Before you begin the removal, use the water syringe and HVE to flush out all debris that collected during the procedure. After you have accomplished this, follow these steps:

<b>Removing the Rubber Dam</b>	
<b>Step</b>	<b>Description</b>
1	Cut the septa rather than pulling it through the contact of a newly placed restoration.
2	Stretch the rubber dam material outward in the facial area of the isolated teeth. This pulls the septa facially to provide access for cutting.
3	Use a pair of small blunt-nose scissors to cut each septum of the rubber from the facial aspect.
4	When all the septa are cut, gently pull the dam lingually to free the rubber dam completely from the interproximal spaces.
5	Pass or use the clamp forceps to remove the clamp.
6	Simultaneously, remove the clamp ligature from the frame.
7	Set the clamp forceps and clamp aside.
8	Remove the dam with the frame attached.
9	Wipe the patient's mouth, lips, and chin with a tissue or gauze.
10	Pieces of the rubber dam left under the free gingiva cause severe gingival irritation. Because of this, carefully inspect the dam on a flat surface for missing pieces. If a fragment of the rubber dam is missing, check the corresponding interproximal area of the oral cavity with a mirror and explorer.
11	Use dental floss to remove any material stuck between the teeth.
12	Rinse the patient's mouth with the water syringe and HVE to remove all debris from the oral cavity.

**024. Preliminary alginate impressions**

Impressions are made by placing a suitable impression material into an impression tray, and then inserting the loaded tray into the mouth of the patient. The impression produces a negative reproduction of the patient's dental arch. The impression is then poured with dental stone to produce a positive reproduction known as a cast.

Preliminary impressions are made as the first step in many treatment plans. The casts made from these impressions are used to evaluate the patient's dental problems and are called study or diagnostic casts. Preliminary impressions are also used to fabricate orthodontic casts, custom trays, and mouthguards. To be a proficient dental assistant, you must know these areas:

- Impression material.
- Impression equipment.
- Procedures for preparing the patient.
- Selecting the impression trays.
- Preparing the impression material.
- Making mandibular impressions.
- Cleaning and disinfecting an impression.
- Making maxillary impressions.

We'll take a look at each of these areas in the remainder of this lesson.

### **Impression material**

Preliminary impressions are made with alginate impression material. Alginate hydrocolloid impression material gels by chemical action. Once the gelation process begins, it is irreversible. This means that you cannot soften the material after it has solidified; it cannot be reused or returned to its powder form.

It is important that alginate impression material is strong enough to resist tearing when being removed from the patient's mouth. Using too little or too much water with the powder affects the strength of the material. To mix correctly, follow the manufacturer's instructions for measuring the impression material and water to achieve the proper water-powder ratio. Also, the temperature of both the water and room affects the setting. Heat accelerates the set; cold retards it. The strength of the material continues to increase even after it appears to be set. Therefore, leaving the impression in the mouth for the full length of time recommended by the manufacturer is important to achieve maximum strength. Alginate impression material is influenced by shrinkage, expansion, strain, and stress; thus it must be poured immediately following proper disinfection. In addition, the impression material begins to distort within 10 to 15 minutes after removal from the patient's mouth.

Alginate hydrocolloids come in a powder form, either in bulk or preweighed portions. Store the powder in a cool place, and keep the bulk form in a tightly closed container to protect it from contamination and prevent it from absorbing moisture. Alginate can deteriorate very quickly if exposed to high temperatures and moisture, resulting in the material failing to set or setting too fast. The shelf life of alginate is approximately one year.

### **Impression equipment**

You need the following equipment for mixing the impression material:

- A flexible rubber mixing bowl.
- A wide, stiff to slightly flexible, bladed spatula.
- Impression trays.
- Alginate tray adhesive.

In addition, you will need a water vial and plastic scoop. These items are used to measure the proper amount of water and powder. To be accurate, use the water vial and plastic scoop supplied by the manufacturer.

### ***Mixing bowl***

This bowl is made of a flexible material, either rubber or flexible plastic, and is used to mix alginate impression material and dental stone. It comes in small, medium, large, and extra large sizes. Figure 3-5 shows one example. While all sizes are used in the dental laboratory, the medium sized one is used most often in the prosthodontic treatment room.



Figure 3-5. Rubber mixing bowl.

### *Spatula*

A laboratory spatula is shown in figure 3-6. It has a 2 ½-inch flexible blade, which is about 1-inch wide with a rounded end. The handle is usually made of wood or plastic. The spatula is used to mix the various impression materials.

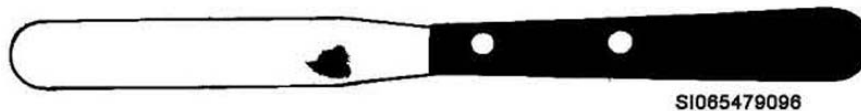


Figure 3-6. Laboratory spatula (Courtesy of Hu-Friedy).

To blend powdered alginate and water, the 2 ½-inch blade spatula is used. You may also find that a regular table knife is used as a mixing spatula. In either case, the rounded ends on the spatula or table knife should approximate the contour of the mixing bowl.

### *Impression trays*

Impression trays hold the impression material in place while it sets. These trays must be rigid in order to:

- Carry the material into the oral cavity.
- Hold the material close to the teeth.
- Avoid breaking during removal.
- Prevent warping the completed impression.

The impression may include a portion of the arch or entire arch. Generally, the impression tray is shaped to match the natural contour of the arch. The tray used to make mandibular impressions differs from the maxillary tray because it allows free tongue movement.

The impression tray is also characterized by the tray's surface—either perforated or smooth. When a perforated tray is used, the impression material oozes through the holes in the tray, creating a mechanical lock to hold the material. When a smooth surface rimlock tray is used, there is no mechanical lock, so the tray is painted or sprayed with an adhesive to hold the impression material securely in the tray.

For alginate impressions, you use a stock tray. Stock trays come in many sizes for both the maxillary and mandibular arches (figs. 3-7 and 3-8). Both are available in regular, endentulous, and orthodontic styles.



Figure 3-7. Maxillary and mandibular rimlock stock trays.



Figure 3-8. Maxillary and mandibular perforated stock trays.

Rimlock trays are easily identified by a rim which resembles a metal wire soldered along the inner part of the tray at the edge of the outer borders. The maxillary impression tray has a U-shaped wire soldered to a palatal area of the tray (refer again to fig. 3-7). Semiliquid impression material flows into the undercuts (ledges) formed by the rim and sets (hardens). This locks the material in the tray.

Figure 3-9 shows a rimlock edentulous tray that is shallow in comparison to the regular tray. This is because less space is required due to the absence of teeth. Stock trays are also used for hydrocolloid impression materials. Unless disposable, these stock trays must be cleaned and sterilized after each patient's use.

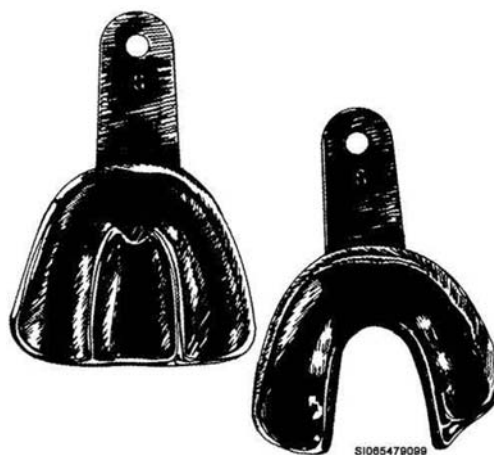


Figure 3-9. Maxillary and mandibular edentulous rimlock stock trays.

**NOTE:** Generally, the size of a tray is identified on the tray handle.

***Alginate tray adhesive***

Because there is no porous opening in a smooth rimlock tray, alginate tray adhesive is needed to retain the alginate in the trays when the tray is removed from the patient's mouth. Apply the adhesive after the try-in of the trays. Paint or spray the adhesive at least 15 minutes before use. It is important that the adhesive is dry before the impression material is loaded into the tray. If the adhesive is not dry, the impression material will pull away from the tray, causing distortion.

**Preparing the patient**

Position the patient upright so that the head is against the headrest, and the patient's occlusal plane is parallel to the floor. While you are selecting and trying-in the trays, briefly explain the procedure for making impressions to patients, to ensure his or her comfort. The patient needs to know:

- The material will feel cold, there is no unpleasant taste, and the material will set quickly.
- Breathing deeply through the nose helps a person relax and be more comfortable.
- Refrain from talking during the procedure.
- To use some type of hand signals to communicate any discomfort.

Before trying-in the trays, ask patients to remove any removable dental prosthesis. Also have them rinse vigorously with water or an antiseptic mouth rinse.

Explain to your patients that you will make the mandibular impression first in order to familiarize them with the taste and consistency of the material. Let the patient know that while you are making the maxillary impression it is important to tilt the head forward and concentrate on breathing through the nose in order to prevent gagging. If patients still gag, tell them to raise a leg or any comparable distracter. After you explain the procedure and instruct patient, prepare the material.

**Selecting the impression trays**

Select prefabricated, stock trays that fit the patient's maxillary and mandibular arches. To ensure that the size of the trays you have selected fit, try the trays in the patient's mouth before filling them with impression material. When you insert each tray into the patient's mouth, it should extend slightly beyond the facial surfaces of the teeth. The tray should extend distally 2 to 3mm beyond the maxillary tuberosity or the retromolar pads. Trays must be deep enough to provide 2 to 3mm of space between the tray and the occlusal or incisal edges of the teeth. Also, each tray should be capable of retaining the impression material during insertion and withdrawal from the patient's oral cavity. If a tray does not fit, it must be resterilized.

**Preparing the impression material**

Fill the water vial to the level required with room temperature distilled water. Pour the water into the rubber bowl. With the lid of the alginate container tightly closed, rotate the container gently, end over end, to fluff the powder. Remove the lid carefully, to prevent the particles from flying into the air. Alginate is fluffed because the material tends to settle and pack down in the can, making the measurement inaccurate. Dip the scoop lightly into the powder. Tap the scoop against the rim to ensure a full measure without voids. To ensure a level scoop, scrape the excess powder off the scoop with the spatula. Place powder in a paper cup and replace the container cover immediately.

Some providers prefer using premeasured amounts of powder determined by weight content rather than the scoop measure. Check with the dentists for whom you are making the preliminary impressions to determine their preference.

When mixing most prosthodontic dental materials, add the powder to the liquid. Consult the manufacturer's instructions to ensure that you are familiar with the mixing instructions for that specific product.

Stir the mixture slightly to absorb the water into the powder. Then, turn the bowl on its side and mix against the side using a figure-eight motion. Rotate the bowl and clean the sides as you mix.



Vigorously and thoroughly spatulate the mix to incorporate all of the powder into the mixture, this prevents lumps and makes for a faster mix. Continue until the mix is smooth and creamy and has a somewhat shiny surface. Keep in mind, there is a maximum mixing time that differs from product to product. To determine the correct mixing time, always check the manufacturer's instructions for the product you are using. When you have a homogeneous or lump-free mix, you are ready to load the impression tray.

### **Making mandibular impressions**

As you will recall, the mandibular impression is made first to allow the patient to become familiar with the taste and consistency of the material. It is also easier for the patient to tolerate. The steps are as follows:

<b>Making a Mandibular Impression</b>	
<b>Step</b>	<b>Description</b>
1	Load the mandibular impression tray by placing the spatula with impression material in the space for the tongue.
2	Position the spatula toward the right or left side of the tongue space.
3	Press the spatula against the edge of the tray and pull the spatula in a downward motion. This action quickly unloads the spatula and fills one side of the tray with impression material.
4	Quickly fill the spatula with impression material again and repeat the process to load the remaining half of the tray.
5	Ensure that you do not have voids of air trapped. Remove any excess material and smooth the surface quickly.
6	Before inserting the tray into the patient's mouth, use your finger and swipe some extra alginate material onto occlusal tooth surfaces. This prevents the formation of air bubbles and creates accurate occlusal anatomy in the impression.

Now you are ready to insert the tray into the patient's mouth by following these steps:

<b>Inserting the Mandibular Tray Into the Patient's Mouth</b>	
<b>Step</b>	<b>Description</b>
1	Use one hand to retract the patient's right cheek.
2	In the other hand, hold the tray by the handle with the impression material toward the occlusal surface.
3	Quickly, but carefully, insert the tray in a sideways, circular motion.
4	Once the tray is inside the patient's mouth, straighten it so that the handle is perpendicular to the anterior teeth. Then, use both index fingers to position the tray evenly over the mandibular teeth. Use both fingers to apply gentle pressure to the occlusal surface.
5	Quickly stretch the patient's cheeks and lower lip to ensure they are not caught under the edge of the tray.
6	Gently seat the tray until the impression material flows out into the facial areas and over the posterior portion of the tray.
7	Have the patient slightly lift and place the tongue forward.
8	Hold the tray in place until the material is set. <i>Do not</i> attempt to remove the tray before the material is set. When alginate impression is set, it does not register a dent when pressed by the fingernail.

Once the material sets, you are ready to remove the tray. To do this properly, follow these steps:

Removing the Mandibular Tray	
Step	Description
1	Use your thumb and index finger to grasp the handle and exert a firm lifting motion in an upward and outward direction.
2	After the impression tray is removed from the dental arch, rotate the tray with a circular, sideways motion to remove it from the patient's mouth.
3	Allow your patients to rinse their mouth with water.

Earlier, we said that alginate impressions begin to distort within 10 to 15 minutes after removal from the patient's mouth. Therefore, it is critical that impressions are poured within this time. Before the impressions can be poured to fabricate casts, several additional procedures must be performed.

### Cleaning and disinfecting an impression

To prevent distortion, remember to handle alginate impressions with care as you work with them. Initially clean and rinse impressions in the treatment room for infection control purposes. This cleaning and rinsing removes blood, mucous and saliva, and ensures good surface detail and no interference with setting of the stone. If necessary, you can sprinkle a small amount of dental stone into the impression before rinsing to aid in the cleaning process. Gently rinse the impressions under cool tap water and shake to remove excess water. The next step is impression disinfection.

Impression disinfection is accomplished in the treatment room. To properly disinfect an impression, spray with an approved disinfectant. Place the impression in a plastic baggie or container and transport to the dental laboratory accompanied by the proper paperwork. After the required contact time elapses, the impression is rinsed and poured.

### Maxillary impressions

The maxillary impression can be difficult for some patients because they have a tendency to gag when excess impression material begins to run down their throat. Therefore, when loading the maxillary tray, it is essential to remove any excess impression material. Actually, loading the maxillary stock tray is fairly easy. Here are the steps:

Loading the Maxillary Stock Tray	
Step	Description
1	With the impression material on the spatula, place the spatula against the posterior edge.
2	Use a downward, pulling motion to load the material into the tray.
3	Use the spatula to spread the material and eliminate any air voids. Quickly remove any excess and smooth the surface.
4	Place some alginate material on your finger and swipe on the occlusal tooth surfaces before inserting the tray.
5	When inserting the maxillary tray, use one hand to retract the patient's right cheek.
6	In your other hand, hold the tray by the handle with the impression material toward the occlusal surface.
7	Insert the tray in a sideways, circular motion.
8	Once the tray is inside the patient's mouth, straighten it so that the handle is perpendicular to the anterior teeth.
9	Have the patient lean forward to prevent material from running down the throat.
10	Make the first contact of the impression material over the maxillary tuberosity and the posterior teeth.

Loading the Maxillary Stock Tray	
Step	Description
11	Apply pressure over the anterior teeth, seating the tray so its flange is under the upper lip.
12	Stretch the patient's cheeks and upper lip out and down over the flange. Apply gentle pressure until the impression material flows out into the facial areas. Remind the patient to breathe through the nose.
13	Hold the tray in place with the tray handle between your thumb and index finger, and middle and index fingers extended onto both the left and right sides of the occlusal area.
14	Continue to hold the tray in place until the material is set.

Now you are ready to remove the tray. Here's how:

Removing the Maxillary Stock Tray`	
Step	Description
1	Insert your finger facially, and push down at the third molar area. This breaks the airtight mucous seal at the posteriors.
2	Use your thumb and index finger to grasp the handle and apply pressure to the handle in a straight downward and slightly outward motion. <i>Do not</i> rock the tray back and forth because this causes distortion.
3	Rotate the tray with a circular, sideways motion to remove it from the patient's mouth.
4	Allow patients to rinse their mouth with water
5	Give them a tissue and hand mirror, and assist with removing any excess material from their face.
6	Clean and disinfect the impression.
7	Transport it to the dental laboratory.

## Self-Test Questions

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

### 021. Local anesthetic

1. What technique is most frequently used to anesthetize maxillary teeth?
2. What technique is used to anesthetize mandibular teeth?
3. What is the purpose of administering a local anesthetic?

4. Identify the purpose of the specific item or procedure listed in column A with the item or procedure listed in column B. Column B items are used only once.

*Column A*

- \_\_\_\_ (1) Used to dry the mucosa at the injection site.
- \_\_\_\_ (2) Needle usually used for maxillary injections.
- \_\_\_\_ (3) Used to apply the topical anesthetic.
- \_\_\_\_ (4) Used to reduce the pain associated with the injection of the needle.
- \_\_\_\_ (5) Engages the harpoon into the rubber stopper.

*Column B*

- a. Short needle.
- b. Gauze sponge.
- c. Cotton-tipped applicators.
- d. Topical anesthetic.
- e. Tapping the syringe's thumb ring.

5. Where should you assemble the aspirating syringe and why?
6. Sequentially list the steps to assemble the aspirating syringe.
7. How can you check to ensure the harpoon is firmly engaged?
8. Explain how to properly pass the aspirating syringe.
9. Explain how to properly receive the aspirating syringe.
10. How must an aspirating syringe needle be recapped?
11. List the sequential steps to disassemble the aspirating syringe.

**022. Irrigation, aspiration, and retracting tissue**

1. What is the purpose of irrigation and aspiration?
2. What type of irrigation is normally used for routine restorative procedures?
3. What type of medium is used to irrigate a surgical treatment site?

4. What should you do to prevent materials from dripping out or clogging the aspiration hoses?
5. What type of aspiration can remove a large volume of fluids from the oral cavity without exerting injurious suction pressure to oral soft tissues?
6. If you are assisting with a right-hand provider, how is HVE normally held?
7. For proper placement of the HVE tip, which opening is used in the anterior areas and which is used in the posterior areas?
8. Explain how to position the HVE tip to provide a washed field technique.
9. What is the purpose of this technique?
10. Why should you not place the HVE tip on the gingiva?
11. What type of aspiration is effective when there is a limited amount of fluids to remove from the patient's mouth?
12. What else can this type of aspiration be used for?
13. Why is tissue normally retracted?
14. What instrument is effective in retracting the tongue, cheeks, and lips?
15. How much pressure do you apply to the tissue you are retracting?

**023. Rubber dam preparation, placement, and removal**

1. When is a rubber dam used?
2. What does the use of a rubber dam provide and prevent?
3. List the preparation sequence before preparing the rubber dam material.
4. Why must the holes in the rubber dam material be punched firmly and cleanly?
5. Why is it necessary to check the oral cavity prior to punching the dam material?
6. Normally, in addition to the tooth to be treated, what holes are punched in the rubber dam material?
7. What is the exception to the above?
8. What can be used to ease the placement of the material over the crowns and contact areas of the exposed teeth?
9. List the sequence of rubber dam placement that usually requires assistance.
10. Describe two other methods of rubber dam placement.
11. What do you do before the rubber dam is removed?
12. Describe how the septa of the rubber dam are removed.

13. Why should you carefully inspect the rubber dam on a flat surface for missing pieces?

14. How are pieces of the rubber dam removed?

**024. Preliminary alginate impressions**

1. Preliminary impressions are used to fabricate what impressions?
2. What type impression material is used to make preliminary impressions?
3. Why must alginate impressions be poured immediately following proper disinfection?
4. What quality of the impression material is affected if either too little or too much water is used with the powder?
5. Explain what affects the setting time of the impression material.
6. How is alginate powder stored, and why?
7. What equipment items are needed to measure and mix the impression material?
8. How should the rim-lock stock tray fit when inserted into the patient's mouth?
9. How are patients positioned for making a preliminary impression?
10. What instructions should you give to the patient regarding the preliminary impression procedure?
11. How do you fluff alginate material, and why?

12. Explain how to measure the water and powder.
13. When mixing prosthodontic dental materials, how are the powder and liquid combined?
14. Explain how to mix the alginate impression material.
15. Explain how to insert and place the mandibular impression in a patient's mouth.
16. Once the alginate material sets, describe how to remove the mandibular impression from the patient's mouth.
17. How soon after removal from a patient's mouth do alginate impressions begin to distort?
18. Where are impressions initially cleaned and rinsed, and why?
19. Explain how the initial cleaning and rinsing are accomplished.
20. Why can maxillary impressions be difficult for patients? What can you do when loading the tray to help prevent this from occurring?
21. Why should you have patients lean forward after inserting maxillary impressions in their mouth?
22. Explain how to position the maxillary impression after it is initially inserted into the patient's mouth.
23. Explain how to remove the maxillary impression.
24. After removing impressions from patients' mouths, what should you have them do?



### 3-3. Post-treatment Procedures

After the dental procedures are performed your work is far from being done; several tasks remain in order to complete the patient's treatment. The patient must be dismissed, paperwork completed, infection control procedures performed, and the dental treatment room (DTR) turned around or prepared for the next patient or the end of the treatment day. You also must find time to inventory, order, and restock the treatment room with supplies for future procedures.

#### 025. Completing dental treatment

To complete the dental treatment, you take the following actions:

- Dismiss the patient.
- Complete administrative duties.
- Perform instrument decontamination and sterilization.
- Store materials.
- Clean and disinfect the equipment.

#### Dismissing a Patient

Once the treatment is completed, your final task is to dismiss the patient. While doing so, remain as cordial and pleasant as you were when you greeted the patient. This leaves the patient with the feeling of having received the finest treatment possible. The steps in patient dismissal are shown here:

Dismissing a Patient	
Step	Description
1	Remove all debris from the patient's face. You can hand patients a hand mirror and dampened gauze, and let them remove any debris.
2	Remove the drape, napkin, or protective clothing from the patient.
3	Push the dental light and bracket tray to an out-of-the-way position.
4	Lower the dental chair and move the arm of the chair to make exiting easier.
5	Return personal items (such as glasses) the patient may have removed at the beginning of the appointment.
6	Schedule additional appointments if necessary.

#### Completing administrative duties

You can do your administrative tasks as breaks in your assisting dictate, providing you practice proper infection control standards. Do not put off completing these associated administrative tasks, because you may forget some of the specifics involved. Forgetting such details could impact medical-legal accuracy of the dental health record and productivity reports. In most cases, it is best to complete as much of the dental treatment forms before the patient arrives and finish the forms before you dismiss the patient. This allows the patient to return the record to the front desk for any further appointments.

**NOTE:** Whenever you complete treatment forms and handle patient records in the treatment rooms, always be sure that you do not compromise infection control standards.

#### Instrument decontamination and sterilization

Complete all instrument cleaning and remove the contaminated instruments from the immediate patient treatment area prior to cleaning and disinfecting the DTR. Do not seat the next patient in the DTR until all decontamination procedures related to the previous patient have been completed. Thoroughly clean, rinse, and dry the instruments used in the procedure. Sterilize these and other items according to the procedures you learned in the unit on infection control.

**Storing materials**

This step is critical in preventing the contamination of the next patient. Follow the proper infection control standards before storing materials and medications used during patient treatment. Clean and disinfect containers of medications and materials, such as dycal tubes and cavity varnish bottles, before returning the items to the storage areas.

**Cleaning and disinfecting equipment**

Sometimes the areas on dental units and cuspidor become spattered with debris during patient treatment. Such debris is a source of contamination and must be removed before the next patient. To maintain professional and infection control standards, not only do you remove the debris to provide a clean appearance, but you also disinfect the area with an approved disinfectant. Refer to the unit on infection control for more details regarding cleaning and disinfection.

**026. Dental treatment room supplies**

You are also responsible for maintaining the supplies used in dental treatment rooms. These supplies include both patient treatment supplies and the administrative forms used to record patient treatment. In carrying out this duty you are responsible for:

- Inventory.
- Order.
- Turn-in.
- Store.
- Ensuring the currency of dated dental supplies for the dental treatment room.

**Inventory**

Having an adequate inventory of supplies in the DTR is critical if dental treatment is to proceed smoothly. It is very disruptive and embarrassing not to have all of the supply items required for patient treatment once treatment starts. If you have ever assisted with a dentist whose regular assistant has been on leave for any length of time, you have experienced the frustration of assisting in a DTR that has not been restocked regularly. For the best results, keep a daily list of the low stock items needed for your treatment room. If you manage your supply inventory in this manner, it does not take long to get your supply order together, you will not forget to order items, or run out of supplies. Normally, you need to keep a two week level of supplies on hand. This level ensures that you always have the supplies needed to handle the daily schedule of patients. Also, routinely assess the items and amount of stock in your DTR to help prevent an excess of unused supplies on hand. Depending on what you find, adjust your stock levels by turning in or ordering supplies.

**Ordering supplies**

Because procedures for ordering dental supplies vary from base to base, check with local dental logistics personnel for the appropriate procedures. When ordering, always practice good supply management. Order only a working level of supplies—don't hoard. Hoarding deprives others of the supplies they need, ties up supply dollars needlessly, and may cause the loss of some items due to deterioration. When ordering dental supplies, consider what types of items are needed. When you submit your order, be sure you include both the replacement and new items needed for patient treatment. Of course, emergency supply requirements can be filled any time.

**Turning in supplies**

In assessing your DTR supply inventory, return all overages to dental supply personnel. It may be necessary to report the overages to your Dental Logistics NCOIC so that further distribution or turn-in steps can be taken.

**Storing supplies**

Proper storage of dental supplies is also your responsibility. Proper storage simply means that you take whatever steps are necessary to protect the supply items. This means keeping bottles, caps, and lids tightly closed to prevent contamination or moisture from entering the containers. Some items, such as hydrogen peroxide and visible light cure materials, require storage in a cool, dark place. Always check the manufacturer's directions for proper storage of supplies. Certain drugs and precious metals must be kept under lock and key. Large quantities of flammables require storage in designated and approved areas only. Take any other steps necessary to protect supply items.

**Ensuring currency of dated items**

To ensure the currency of dated items, keep older items in front so that they are used first. Often the manufacturer stamps or imprints an expiration date on materials and supplies. Always verify the currency of dated items before each use in patient treatment. This can prevent using expired items, such as impression materials and cements that will not set or anesthetic solution that will not provide anesthesia.

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**Self-Test Questions**

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

**025. Completing dental treatment**

1. Describe the steps involved in dismissing a patient from a treatment room.
2. When should you complete the necessary dental treatment forms?
3. Why is it important not to put off completing these associated administrative tasks?
4. After you have dismissed a patient, what do you do to prepare the treatment room for the next patient?

**026. Dental treatment room supplies**

1. Name the five elements involved with dental treatment room supply management.
2. Why is it important to inventory supplies?
3. How should you manage your treatment room stock level?
4. Why is it important not to hoard supplies?

5. What does the proper storage of supply items entail? Briefly explain.
6. How can you ensure the currency of dated items?

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### Answers to Self-Test Questions

#### 018

1. Efficiency of time and motion economy.
2. It uses both the provider and an assistant who provides a second pair of hands to assist the provider.
3. The duties legally delegated including any reversible dental procedure.
4. The provider devotes maximum attention and energy to the diagnosis and delivery of quality patient care.
5. Within arm's reach.
6. In the treatment zone.

#### 019

1. (a) For right-handed providers, the providers' zone is between 8 and 11 o'clock, and the assistants' zone is between 2 and 4 o'clock.  
(b) For left-handed providers, the providers' zone is between 1 and 4 o'clock, and the assistants' zone is between 8 and 10 o'clock.  
(c) The transfer zone is from 4 to 8 o'clock.  
(d) The static zone is from 11 to 2 o'clock.
2. The assistant's zone.
3. The transfer zone.
4. A heavy object, material, or an instrument that is objectionable if held near the patient's face.
5. One that places the treatment site as close to the provider's elbow level as possible.
6. 14 to 16 inches.
7. Sitting as close as possible to the back of the patient's chair with feet directed toward the head of the chair.
8. It lets you reach the treatment site, hose-attached instruments, and the instruments and materials from the mobile cart or instrument tray without leaning, twisting, or overextending your arms. In this position, you are also able to observe the patient's responses throughout the procedure.
9. 4 to 6 inches above the dentist's eyes.
10. Adjusted in front to support the body just below the rib cage. Using this armrest as a brace, you are able to lean slightly forward from the hips only.
11. Firmly on the foot-support ring so that your feet are parallel to the floor, thereby maintaining comfort and proper posture.
12. Toward the head of the patient's chair, positioned to allow you easy access to the needed instruments and materials.

#### 020

1. The sequence of the treatment procedure and having the required instruments and materials ready at the proper time.
2. Movement of the fingers, wrist, and elbow only.
3. (1) Pick up the next instrument to be used with the left hand.  
(2) Grasp the instrument between your thumb and first two fingers by the end opposite from the working end.  
(3) Hold the instrument close to the treatment area and parallel to the instrument being used.

- (4) Extend your little finger to receive the instrument being used by the provider.
4. By slightly raising the instrument from the tooth. The finger rest or fulcrum.
5. You grasp the used instrument firmly using the little finger, or the last two or three fingers.
6. With the working positioned toward the treatment site. Midtransfer.
7. Failure to parallel the handles before the exchange.
8. To give both the provider and the assistant the feeling of confidence and to eliminate lost time and motion.
9. You grasp the working end and place the handle into the palm of the provider's hand. You receive the instrument by grasping the working end.
10. The provider holds the handpiece firmly over the patient's upper chest in the transfer zone, and you loosen and remove the bur. Immediately place the next bur and secure it in the handpiece. Always give the bur a gentle tug to ensure it is firmly in the handpiece.
11. Be sure to use the lock-out toggle for the handpiece before attempting to change burs.
12. If you fail to do this, you could cause harm to yourself when the provider steps on the foot control to activate the other handpiece.
13. At the patient's chin in the transfer zone.
14. Knowing when to mix.
15. Most providers prefer that you leave the mixed cement on the glass slab or mixing pad and then hold the pad or slab in your hand near the treatment site and the provider can select the amount. In the other hand, you may hold the air syringe to dry the area for application and placement of the material. You may need to hold gauze in your hand, rather than the air syringe, to wipe excess material from the application instrument.
16. To have the needed item at the right place, in the right position, and at the right time.

## 021

1. Infiltration, also known as field block anesthesia.
2. A nerve block or regional anesthesia.
3. To make the treatment site insensitive to pain.
4. (1) b, (2) a, (3) d, (4) e, (5) f.
5. Out of the patient's view to reduce unnecessary patient apprehension.
6. (1) Check the carpule for cracks or suspended articles.  
(2) Disinfect the rubber diaphragm on the carpule.  
(3) Place the cartridge into the syringe with the rubber stopper end in first, toward the plunger.  
(4) Break the seal on the needle container and remove only the small portion of the plastic needle cover.  
(5) Insert the needle into the syringe and screw the hub onto the syringe.  
(6) Engage the harpoon into the rubber stopper of the cartridge.  
(7) Force small amount of anesthesia through needle, to expel air.  
(8) Loosen the needle cap.  
(9) Recap the needle.
7. Make a quarter turn with the thumb ring, which will rotate back to its original position if the harpoon is firmly engaged.
8. Pass the syringe with the needle cover in place. Hold the barrel of the syringe in your hand. Place the thumb ring of the syringe over the dentist's thumb and the finger grip between the dentist's index and middle fingers. While you are still holding the syringe by the barrel, use your other hand to remove the needle cap.
9. Carefully remove the syringe by grasping the barrel and lifting the syringe out the dentist's hand. Remember to exercise extreme caution when grasping the barrel of the syringe because the needle is exposed and contaminated. Do not attempt to recap the needle while the syringe is in the dentist's hand.
10. Use some type of mechanical device or one-handed scoop technique.
11. (1) Remove the cartridge with the needle remaining in place. This provides an air vent to prevent the glass carpule from shattering. (2) Unload the cartridge by pulling the piston rod back as far as possible to

disengage the harpoon from the rubber stopper without pulling the stopper from the cartridge. (3) Remove the cartridge. (4) Remove the used needle and dispose of it in a puncture-resistant container according to established infection control standards.

**022**

1. To maintain a clean treatment site.
2. Water or water-spray from the three-way syringe on the dental unit.
3. Sterile saline solution or sterile water with a bulb-type or Luer syringe.
4. Always place the aspirator tip in the upright position before turning the aspiration off.
5. High-volume evacuator.
6. With the right hand, using a reverse palm thumb grasp (thumb-to-nose) or modified pen grasp.
7. The opening slanted at an angle greater than 90° in anterior areas, and the end slanted at less than 90° for posterior areas.
8. It is placed close to the tooth being treated with the opening of the tip even with the occlusal surface and parallel with the facial or lingual surface.
9. To keep the tooth cool and the cavity preparation clear of debris.
10. Doing so could cause the patient to experience pain if the gingiva is not numbed by the local anesthesia.
11. Saliva ejector.
12. To hold the tongue away from the working site and keep an area dry for placement of material that takes a long period to set.
13. To allow better viewing and access to the procedure site and protect the tissues being retracted.
14. Mouth mirror.
15. Enough to prevent slippage, but not enough to cause unnecessary tissue bruises and trauma.

**023**

1. During restorative and endodontic procedures, as well as the application of pit and fissure sealants.
2. Maximum access and visibility to the treatment site, and a clean, dry field. It prevents the patient from accidentally swallowing or aspirating debris.
3.
  - (1) Check the contact areas of the teeth to be isolated with floss.
  - (2) Determine on which tooth the rubber dam clamp will be placed.
  - (3) Select a clamp and place a ligature on it.
  - (4) Hold the clamp with the bow facing upward and away from the forceps.
  - (5) Place the projections on the working ends of the rubber dam forceps.
  - (6) Tilt the forceps upright and slide the locking device downward to lock the handles.
4. A ragged hole or tag tears easily as the dam is placed over the crowns of the teeth and also could cause leakage of moisture around the tooth.
5. If there are any missing, misaligned, or extra teeth, you need to adjust for these items from the standard pattern.
6. Two teeth anterior and at least one tooth posterior to the tooth being treated.
7. Root canal therapy when only the involved tooth is exposed.
8. A slight amount of lubricant to the back of the material around the holes.
9.
  - (1) Place the rubber dam frame on the outside of the dam with the bow of the frame facing out.
  - (2) Stretch the dam material from side to side to secure the corners of the dam on the four projections at the corners of the frame. The rubber dam material should appear baggy on the frame.
  - (3) Pass the rubber dam and attached frame to the provider for placement into the oral cavity.
  - (4) Use floss to slip the septum between the teeth without tearing the material.
  - (5) Remove the floss by pulling it from the side horizontally.
  - (6) Use the floss to invert the interproximal septum, mesially and distally. Pass the rubber dam clamp forceps and attached clamp for final placement on the tooth.

- (7) Wrap the ligature attached to the clamp around a projection on the side of the frame.
- (8) Pass a dull instrument for inversion of the rubber dam on facial and lingual areas of the exposed teeth.
- (9) Dry the exposed teeth with air from the 3-way syringe as needed to assist in the inversion.
10. (1) Place the rubber dam clamp on the tooth first. Then slip the rubber dam material over the clamp. Next, in either order, attach the frame and expose the remaining teeth through the holes. Secure the clamp ligature to the frame. Then, invert the mesial and distal septum with floss, and the facial and lingual areas with a dull instrument accompanied with air from the three-way syringe. (2) Holding the edges of the rubber dam, use the forceps to carry the dam and clamp into the patient's mouth. Place clamp on the tooth and remove forceps. Continue as in method 2.
11. Use the water syringe and HVE to flush out all debris that collected during the procedure.
12. Rather than pulling the septa through the contact of a newly placed restoration, the septa are cut. Stretch the rubber dam material outward in the facial area of the isolated teeth. Use a pair of small blunt-nose scissors to cut each septum of the rubber on the facial aspect. When all the septa are cut, gently pull the rubber dam lingually to free the rubber completely from the interproximal spaces.
13. Because pieces of the rubber dam left under the free gingiva cause severe gingival irritation.
14. By checking the corresponding interproximal area of the oral cavity with a mirror and explorer and using dental floss to remove any material stuck between the teeth.

## 024

1. Study or diagnostic casts, orthodontic casts, custom trays, and mouthguards.
2. Alginate.
3. Because it is influenced by shrinkage, expansion, strain, and stress.
4. The strength.
5. Temperature of both the water and room affects the setting. Heat accelerates the set; cold retards it.
6. In a cool place, and in a tightly closed container to protect it from contamination and prevent it from absorbing moisture.
7. Water vial and plastic scoop supplied by the manufacturer for measuring and impression material, a flexible rubber mixing bowl and a wide, stiff to slightly flexible bladed spatula.
8. It should extend slightly beyond the facial surfaces of the teeth, extend distally 2 to 3mm beyond the maxillary tuberosity or the retromolar pads, be deep enough to provide 2 to 3mm of space between the tray and the occlusal or incisal edges of the teeth, and can retain the impression material during insertion and withdrawal from the patient's oral cavity.
9. Upright with the patient's head against the headrest and occlusal plane parallel to the floor.
10. Remove any removable dental prosthesis before trying-in the trays. Rinse the mouth vigorously with water or an antiseptic mouth rinse. Refrain from talking and, if uncomfortable, to use some type of hand signals. You make the mandibular impression first to familiarize them with the taste and consistency of the material. The material will feel cold but will set quickly. Tilt the head forward and concentrate on breathing through the nose to prevent gagging while making maxillary impression. If patients still gag, instruct them to raise a leg or any comparable distracter.
11. With the lid of the container tightly closed, rotate the container gently, end over end. It is fluffed because the material tends to settle and pack down, making measurement inaccurate.
12. Fill the water vial to the level required with room temperature distilled water. Dip the scoop lightly into the powder. Tap the scoop against the rim to ensure a full measure without voids. Scrape the excess powder off the scoop with the spatula to achieve a level scoop.
13. The powder is added to the liquid.
14. Stir the mixture slightly to absorb the water into the powder. Turn the bowl on its side and mix against the side using a figure eight motion. Rotate the bowl and clean the sides as you mix. Vigorously and thoroughly spatulate the mix to incorporate all of the powder into the mixture. Continue until the mix is smooth and creamy, and has a quasi shiny surface. Complete mixing within the maximum mixing time.
15. Use one hand to retract the patient's right cheek and, in your other hand, hold the tray by the handle with the impression material toward the occlusal surface. Insert the tray in a sideways, circular motion. Once the tray is inside the patient's mouth, straighten it so that the handle is perpendicular to the anterior teeth. Use

both index fingers to position the tray evenly over the mandibular teeth and apply gentle pressure to the occlusal surface. Quickly stretch the patient's cheeks and lower lip to ensure they are not caught under the edge of the tray. Gently seat the tray until the impression material flows out into the facial areas and over the posterior portion of the tray. Have the patient slightly lift and place the tongue forward. Hold the tray in place until the material is set.

16. Use your thumb and index finger to grasp the handle and exert a firm lifting motion in an upward and outward direction. After the impression tray is removed from the dental arch, rotate the tray with a circular, sideways motion to remove it from the patient's mouth.
17. Within 10 to 15 minutes.
18. In the treatment room; for infection control purposes.
19. If necessary, a small amount of dental stone may be sprinkled into the impression before rinsing to aid in the cleaning process. Gently rinse the impressions under cool tap water and shake to remove excess water.
20. Because of a tendency to gag when excess impression material begins to run down their throat. Remove any excess impression material.
21. To prevent material from running down the throat.
22. Make the first contact of the impression material over the maxillary tuberosity and the posterior teeth. Next, apply pressure over the anterior teeth, seating the tray so that its flange is under the upper lip. Stretch the patient's cheeks and upper lip out and down over the flange. Apply gentle pressure until the impression material flows out into the facial areas. Remind the patient to breathe through the nose. Hold the tray in place until the material sets. Have the tray handle between your thumb and index finger, and middle and index fingers extended onto both the left and right sides of the occlusal area.
23. Insert your finger facially, and push down at the third molar area to break the air tight mucous seal at the posteriors. Use your thumb and index finger to grasp the handle and apply pressure to the handle in a straight downward and slightly outward motion. Do not rock the tray back and forth because this causes distortion. Rotate the tray with a circular, sideways motion to remove it from the patient's mouth.
24. Rinse the mouth with water. Give the patient a tissue and hand mirror and assist with the removal of any excess material from the face.

## 025

1. First, remove all debris from the patient's face. You can hand the patient a hand mirror and dampened gauze and let him or her do it. You then remove the drape, napkin, or protective clothing from the patient. Push the dental light and bracket tray to an out-of-the-way position, lower the dental chair, and move the arm of the chair to make exiting easier. Return personal items (such as glasses) left in your care. Schedule additional appointments, if necessary.
2. In most cases, it is best to complete as much of the dental treatment forms before the patient arrives and finish the forms before you dismiss the patient.
3. You may forget some specifics involved that could impact on the medical-legal accuracy of the dental health record and productivity reports.
4. Clean all instruments and remove the contaminated instruments from the immediate patient treatment area prior to cleaning and disinfecting the dental treatment room. Clean and disinfect containers of medications and materials before returning the items to the storage areas. Clean and disinfect unprotected equipment items and surfaces with an approved intermediate level disinfectant. If barriers are used to protect the surfaces, remove and replace the barriers contaminated during patient treatment. Surfaces protected by barriers require cleaning and disinfection only if the integrity of the barrier was compromised. The next patient should not be seated in the DTR until all decontamination procedures related to the previous patient are completed.

## 026

1. (1) Inventory, (2) order, (3) turn-in, (4) store, and (5) ensure the currency of dated dental supplies.
2. It is critical if dental treatment is to proceed smoothly.
3. Keep a list daily of the items in which your treatment room stock levels become low.
4. Hoarding may deprive others of the supplies they need, ties up supply dollars needlessly, and could result in loss due to deterioration.



5. Taking whatever steps necessary to protect the supply items. Keeping bottles, caps, and lids tightly closed to prevent contamination or moisture from entering the containers. Some items require storage in a cool, dark place. Always check the manufacturer's directions for proper storage of supplies. Certain drugs and precious metals must be kept under lock and key. Large quantities of flammables require storage in designated and approved areas only.
6. By keeping older items in front so that they are used first. Always verify the currency of dated items before each use in patient treatment.

## 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).**

68. (018) To maintain the dental team's seated position, where do you place objects used during four-handed dental treatment?
- a. 4 to 6 inches above the provider's sight.
  - b. In the zone between 11 and 2 o'clock.
  - c. Slightly beyond an arm's length.
  - d. Within an arm's length.
69. (018) When four-handed dentistry is performed, the
- a. assistant's and provider's hands remain in the treatment zone.
  - b. assistant's hands and eyes remain in the treatment zone.
  - c. provider's hands and eyes remain in the treatment zone.
  - d. provider's hands remain in the treatment zone.
70. (019) When performing four-handed dentistry procedures, a right-handed provider is between the
- a. 8 and 11 o'clock position, and the right-handed assistant is between the 2 and 4 o'clock position.
  - b. 1 and 4 o'clock position, and the right-handed assistant is between the 8 and 10 o'clock position.
  - c. 2 and 4 o'clock position, and the right-handed assistant is between the 8 and 11 o'clock position.
  - d. 12 to 6 o'clock position, and the right-handed assistant is between the 12 to 6 o'clock position.
71. (019) In four-handed dentistry, *instruments and materials* are located in the
- a. static zone.
  - b. transfer zone.
  - c. assistant's zone.
  - d. provider's zone.
72. (019) When performing four-handed dentistry, your (the dental assistant's) eye level should be
- a. 4 to 6 inches above the provider's eye level.
  - b. 6 to 10 inches above the provider's eye level.
  - c. 10 to 12 inches above the provider's eye level.
  - d. 14 to 16 inches above the provider's eye level.

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73. (019) To provide support during four-handed dentistry, position the curved, movable armrest of the assistant's chair
- to the right side.
  - to the left side.
  - in front.
  - in back.
74. (020) In four-handed dentistry, the *next instrument in the working stage* is held
- close to the treatment area and perpendicular to the instrument being used.
  - close to the treatment area and parallel to the instrument being used.
  - in the assistant's zone, parallel to the instrument being used.
  - in the static zone, perpendicular to the instrument being used.
75. (020) In four-handed dentistry, how should you position the working end of the instrument you are passing to the provider?
- Toward the treatment site.
  - Toward the provider's fulcrum.
  - Whatever is most comfortable for you.
  - It does not matter since providers change it to suit their own style.
76. (020) Instruments becoming tangled during the instrument exchange are *usually* caused by a failure to
- parallel the handles *after* the exchange.
  - parallel the handles *before* the exchange.
  - hold the handles perpendicular *after* the exchange.
  - hold the handles perpendicular *before* the exchange.
77. (021) The proper sequence for *assembling the aspirating syringe* is to
- insert the carpule with the rubber stopper end in first, positioned *toward* the plunger, then attach the needle and engage the piston rod.
  - insert the carpule with the rubber diaphragm end in first, positioned *toward* the plunger, then attach the needle and engage the piston rod.
  - insert the carpule with the rubber stopper end in first, positioned *away* from the plunger, next engage the piston rod, then attach the needle.
  - attach the needle first, then insert the carpule with the rubber stopper end in first, positioned *away* from the plunger, and engage the piston rod.
78. (021) The *disassembly* sequence for the *aspirating syringe* is to
- disengage the harpoon, remove the cartridge, and remove the needle.
  - remove the needle, disengage the harpoon, and remove the cartridge.
  - disengage the harpoon, remove the needle, and remove the cartridge.
  - recap and remove the needle, disengage the harpoon, and remove the cartridge.
79. (022) Which of the following is used for irrigation during *routine* dental restorative procedures?
- Sterile saline solution applied by either a bulb-type or Luer syringe.
  - Saline or water applied by either a bulb-type or Luer syringe.
  - Sterile water applied by either a bulb-type or Luer syringe.
  - Water or water spray from the dental unit's 3-way syringe.

80. (022) To remove a large volume of fluid from an oral cavity without exerting injurious suction pressure to oral soft tissue, you would use
- a saliva ejector.
  - a gamco aspirator.
  - bulb-type suction.
  - a high-volume evacuator.
81. (022) What technique draws the handpiece water spray across the tooth keeping the tooth cool and the cavity preparation clear of debris?
- Aseptic.
  - Washed field.
  - Four-handed dentistry.
  - High volume/low pressure.
82. (022) What type of pressure do you apply to tissue you are retracting?
- Light.
  - Very light.
  - Very firm.
  - Firm enough to prevent slippage.
83. (023) To *prevent* the patient from aspirating or swallowing the rubber dam clamp, you use
- the rubber dam forceps.
  - the rubber dam frame.
  - the rubber dam.
  - a ligature.
84. (023) The rubber dam clamp is placed onto the rubber dam forceps with the *bow of the clamp facing*
- upward* and *toward* the forceps.
  - downward* and *toward* the forceps.
  - upward* and *away* from the forceps.
  - downward* and *away* from the forceps.
85. (023) To *invert* the rubber dam on the *facial and lingual areas* of the exposed teeth, you would use
- floss.
  - an explorer.
  - a dull instrument.
  - a sharp instrument.
86. (023) When removing the rubber dam, *remove the septa* by
- pulling it through the contacts of the teeth.
  - cutting the septum from the lingual and facial aspect.
  - cutting each septum from the facial aspect and pulling the dam *lingually*.
  - cutting each septum from the lingual aspect and pulling the dam *facially*.
87. (024) In dentistry, *preliminary impressions* are used to fabricate
- crowns, fix partial dentures, removable partial dentures and complete dentures.
  - study casts, orthodontic casts, custom trays, and mouthguards.
  - only diagnostic and orthodontic casts.
  - only custom trays and mouthguards.

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88. (024) What affect does *heat* have on *alginate impression material*?
- a. Increases expansion.
  - b. Decreases shrinkage.
  - c. Accelerates the set.
  - d. Retards the set.
89. (024) When making a *preliminary impression*, patients should be
- a. *reclined* with their head against the headrest and their occlusal plane *perpendicular* to the floor.
  - b. *upright* with their head against the headrest and their occlusal plane *parallel* to the floor.
  - c. *upright* with their occlusal plane *perpendicular* to the floor.
  - d. *reclined* with their occlusal plane *parallel* to the floor.
90. (024) What instructions do you give to the patient regarding the *preliminary impression procedure*?
- a. Remove removable dental prosthesis; rinse their mouths with an antiseptic mouth rinse; refrain from talking; if they are uncomfortable, have them raise a hand to let you know; tilt their heads forward; and breathe through the nose to prevent gagging.
  - b. Remove all dental prosthesis; refrain from talking; if they are uncomfortable, have them raise a hand to let you know; tilt their heads backwards; and concentrate on breathing through the mouth to prevent gagging.
  - c. Remove any removable prosthesis; rinse with an antiseptic mouth rinse; tell you if they are uncomfortable; tilt their heads upward; and concentrate on breathing through the nose to prevent gagging.
  - d. Remove any removable dental prosthesis; if they are uncomfortable, have them raise a hand to let you know; tilt their heads forward; and concentrate on breathing through the mouth to prevent gagging.
91. (024) How much space must be between the rim-lock impression tray and the occlusal or incisal edges of the teeth?
- a. 2 to 3 mm.
  - b. 4 to 5 mm.
  - c. 6 to 7 mm.
  - d. 8 to 10 mm.
92. (024) To remove blood, mucous, and saliva from an alginate impression and ensure good surface detail, you
- a. clean and rinse the impression under cool tap water and shake to remove excess water.
  - b. submerge the impression in a disinfectant.
  - c. rinse the impression under warm water.
  - d. clean with slurry water.
93. (024) While you are *making maxillary impressions*, have the patient lean forward
- a. to allow the material to set.
  - b. to cover the surfaces of the teeth.
  - c. so the patient can breathe through the nose.
  - d. to prevent the material from running down the patient's throat.

94. (024) To properly make a *maxillary impression* your *first contact* of the impression material is made
- in the palatal area.
  - over the *incisal* surfaces of *anterior* teeth.
  - over the *occlusal* surfaces of *posterior* teeth.
  - over the *maxillary tuberosity* and *posterior* teeth.
95. (024) To remove the *maxillary impression* from the patient's mouth, you
- grasp the handle and apply pressure in an upward and outward motion.
  - rock the tray back and forth to break the mucous seal at the posteriors.
  - insert your finger facially and push down at the third molar area.
  - hold the handle and apply facial pressure at the anterior area.
96. (025) Which procedure *best* describes how to position the dental chair and unit when dismissing the patient?
- Move the dental light and bracket tray out of the way; lower the chair, and move the arm of the chair.
  - Raise the arm of the chair and move the bracket tray out of the way.
  - Lower the chair and slide the arm of the chair out of the way.
  - Raise the chair, the bracket tray, and dental light.
97. (025) Which example *best* identifies why administrative tasks associated with patient treatment should *not* be delayed?
- Forgotten details could impact medical-legal accuracy of the dental health record and productivity reports.
  - Better management of your time permits these tasks to be accomplished during patient treatment.
  - Prevention of an excessive backlog of typing and filing.
  - Permits easier location of the patient record.
98. (026) Which method *best* describes managing your treatment room *stock levels*?
- Keep a daily list of the stock items that are used.
  - Reorder supplies when you have exhausted your supply.
  - Inventory and order supplies every two weeks.
  - Reorder supplies weekly.
99. (026) Hydrogen peroxide should be stored
- in a refrigerator.
  - under lock and key.
  - in a cool, dark place.
  - in designated and approved areas only.
100. (026) Which statement *best* identifies how to ensure the currency of dated items?
- Keep older items in front to use first, and check the expiration dates of items stamped or imprinted by the manufacturer.
  - Keep only the supplies needed for each week in your treatment room.
  - Store all items with an expiration date in the refrigerator or freezer.
  - Discard all items when the expiration date is reached.

# Glossary

## Terms

**asepsis**—The absence of all pathogenic microorganisms or process of preventing the access of microorganisms.

**bacteremia**—The presence of viable bacteria in the circulating blood.

**barrier technique**—The use of rubber, plastic, paper, foil, or other fluid resistant materials to cover surfaces and protect them from contamination.

**biangle**—Having two angles.

**bioenvironmental engineering (BEE)**—Biomedical Service Corps function responsible for identifying and controlling occupational hazards in the workplace.

**carpule**—A glass cartridge containing a sterile solution of a drug, as for local anesthetic, which is loaded into a special syringe for injection.

**clinical attire**—Work clothes worn when treating dental patients. Clinical attire may include duty uniform, or scrub suits. Must be supplemented with personal protective equipment (PPE), such as clinic smocks, or long sleeved gowns and head covers, when exposure to blood or other potentially infectious materials (OPIM) is reasonably anticipated. Clinical attire must be laundered by the employer if it becomes contaminated with blood or OPIM.

**contaminated sharps**—Any contaminated object that can penetrate skin including, but not limited to, needles, scalpels, glass (including used anesthetic carpules), orthodontic wires and dental burs.

**contaminated**—The presence or reasonably anticipated presence of blood or OPIM on a item or surface.

**countertop steam sterilizer (autoclave)**—A small capacity steam autoclave that usually does not use externally generated steam. Heating elements either inside or outside the chamber are used to heat a measured amount of water which is converted to steam under pressure.

**cyanosis**—A bluish discoloration of the skin caused by insufficient wxygen supply.

**decontamination**—The use of physical or chemical means to remove, inactivate, or destroy pathogens on a surface or item to the point where the surface or item is rendered safe for handling, use, or disposal.

**edema**—Excessive accumulation of fluid in the tissue spaces causing swelling.

**endentulous**—Without teeth.

**engineering control**—Controls (e.g., sharps disposal containers, rubber dam) that isolate or remove the bloodborne pathogens hazard from the work place.

**exposure incident**—Specific eye, mouth, other mucous membrane, nonintact skin, or parenteral contact with blood or other infectious materials that results from the performance of an employee's duties.

**exposure time**—The total continuous elapsed time during which items are subjected to chemical solutions for disinfection or sterilization, or the sterilizer is operating at preselected sterilizing parameters, such as temperature and pressure.

**hand washing facilities**—A facility providing an adequate supply of running potable water, soap, and single use towels or hot air drying machines.

**hematologist**—One that specializes in the science encompassing the generation, anatomy, physiology, pathology, and therapeutics of the blood.

**hemorrhage**—Excessive or serious bleeding.

**infectious microorganisms**—Organisms capable of producing disease in appropriate hosts.

**invasive procedure**—A surgical entry into the tissues, cavities, organs, or the repair of traumatic injuries. This includes the manipulation, cutting, or removal of any oral or perioral tissue during which bleeding occurs or the potential for bleeding exists. Most routine restorative or related dental procedures are not considered invasive procedures.

**microorganisms**—Bacteria, fungi, viruses, and bacterial spores.

**parenteral**—Penetration of mucous membrane or skin as a result of events such as needle sticks, human bites, cuts, and abrasions.

**pallor**—Paleness or loss of skin color.

**parenteral**—Penetration of mucous membrane or skin as a result of events such as needlesticks, human bites, cuts, and abrasions.

**personal protective equipment (PPE)**—Specialized clothing or equipment worn by an employee to protect against a hazard. General work clothes (e.g., duty uniforms, pants, skirts or blouses) not intended to function as protection against a hazard are not considered PPE.

**Public Health (PH)**—Air Force Biomedical Services Corps (BSC) functions with responsibility for public health programs in the workplace including HBV vaccination and post exposure evaluation and follow up.

**sanitary sewer system**—A sewer system connected to a sewage treatment plant.

**septa**—Plural of septum, rubber dam between the holes of the punched dam.

**stat**—At once, immediately.

**standard precautions**—A protocol for infection control that treats all human blood and body fluids as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

**sterile/sterility**—Free from all living microorganisms.

**sterilization**—Process which destroys all types and forms of microorganisms

**sterilization area**—The area of a health care facility designed for housing sterilization equipment and conducting sterilization procedures.

**tachycardia**—Excess of rapid heartbeat (cardiac rate).

**trachea**—The windpipe or airway; tube made up of cartilage and membrane tissue extending from the lower part of the larynx to its division into the two bronchi.

**unit dose**—The quantity of materials or supplies required to treat a single patient.



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**work practice controls**—Controls that reduce the likelihood of exposure by altering the way one performs a task (e.g., prohibiting two-handed recapping of needles).

## Abbreviations and Acronyms

<b>ADA</b>	American Dental Association
<b>AFOSH</b>	Air Force Occupational Safety and Health
<b>AHP</b>	angle handpiece
<b>AIDS</b>	acquired immunodeficiency syndrome
<b>BDS</b>	base dental surgeon or basic diagnostic setup
<b>BEE</b>	Bioenvironmental Engineering
<b>BMET</b>	biomedical equipment repair technician
<b>cc</b>	centimeter
<b>CDC</b>	Centers for Disease Control
<b>CSS</b>	Central Sterile Supply
<b>CVA</b>	cerebrovascular accident
<b>DE</b>	double ended
<b>DECS</b>	Dental Evaluation & Consultation Service
<b>DRMS</b>	Defense Reutilization and Marketing Service
<b>DTR</b>	dental treatment room
<b>ECG</b>	electrocardiogram
<b>EPA</b>	Environmental Protection Agency
<b>FDA</b>	Food and Drug Administration
<b>FG</b>	friction grip
<b>HCW</b>	health care workers
<b>HIV</b>	human immunodeficiency virus
<b>HVE</b>	high volume evacuation
<b>INH</b>	isoniazid
<b>IV</b>	intravenous
<b>LA</b>	latch
<b>MERC</b>	medical equipment repair center
<b>mm</b>	millimeter
<b>MPF</b>	Military Public Health
<b>MSDS</b>	material safety data sheets

<b>MTF</b>	medical treatment facility
<b>NFPA</b>	National Fire Protection Association
<b>OPIM</b>	other potentially infectious material
<b>OSHA</b>	Occupational Safety and Health Administration
<b>PH</b>	public health
<b>PM</b>	preventive maintenance
<b>PPE</b>	personal protection equipment
<b>psi</b>	pounds per square inch
<b>rpm</b>	revolutions per minute
<b>SHP</b>	straight handpiece
<b>TB</b>	tuberculosis
<b>VLC</b>	visible light curing

## **Student Notes**

**AFSC 4Y051**  
**4Y051B 01 1206**  
**Edit Code 04**