INTRODUCTION

Medical emergencies can and do occur in dental clinics. They can be life threatening as a result of a medical condition or an accident (e.g., chemicals or scrap amalgam getting in eyes). Most accidents are preventable if you observe and follow safety procedures. All dental patients must wear approved safety glasses with side shields. Also, passing of instruments and medications over a patient’s face, should be avoided to prevent injuries. The dental officer will always be in charge of an emergency. As a dental assistant, you must know how to react and treat the injured until the medical department arrives and assumes responsibility. Since each command may have slightly different equipment and procedures, you should become familiar with these emergency procedures as soon as possible.

PREVENTING MEDICAL EMERGENCY SITUATIONS

The best means of handling medical emergencies is to take every precaution to prevent them. Precautions taken in the dental treatment room or facility include: close review of the Dental Health Questionnaire, checking a patient’s vital signs, and knowledge and use of emergency equipment.

VITAL SIGNS

The physical condition of a patient can be determined by checking the following vital signs: body temperature, pulse, blood pressure, and respiratory rate.

Body Temperature

An adult’s normal body temperature may range from 97°F to 99°F (36.1°C to 37.2°C). A person with a body temperature above 99°F has a fever, and a person with a body temperature below 97°F has a subnormal temperature. Most dental clinics commonly use an electronic thermometer that displays body temperature as numbers in a digital display. It uses a disposable plastic cover that goes over the temperature probe and is placed under the tongue. Always discard the plastic cover after each use. Follow the manufacturer’s instructions for use and maintenance.

Pulse

As the heart pumps blood through the arteries, they expand and contract, producing a regular heart beat or pulsation. The number of beats per minute is the pulse rate. For adults, a normal pulse rate ranges from 60 to 80 beats per minute; for a child, it ranges from 80 to 110 beats per minute.

Normal site for taking the pulse is the carotid artery, located on either side of the neck [fig. 9-1]. You should always check the carotid pulse on the same side that you are on. Never reach across a patient’s larynx. To locate the carotid pulse, slide your index and middle fingers into the groove between the trachea and the muscles at the side of the neck where the carotid pulse can be felt. Do not use your thumb because it has a
pulse of its own and will confuse your counting. To determine the pulse, once you feel the artery beating, count the beats for 30 seconds, multiply by 2, and then record the results.

If you notice any irregularity, take the patient’s pulse again. This time, however, count the beats for a full minute. If the pulse is still irregular in rate or rhythm, inform the dental officer.

The other common site for taking the pulse is the radial artery on the thumb side of either wrist (fig. 9-2). If you are taking the pulse at the radial artery, have the patient place his arm in a relaxed position on the arm of the dental chair. Lightly rest your index and middle finger on the patient’s radial artery to determine pulse.

**Blood Pressure**

Blood pressure is the force that the blood exerts against the walls of the arteries as it flows through the arterial system.

The maximum blood pressure occurs when the heart contracts. This is referred to as the systolic pressure. Normal blood pressure range for the systolic reading for an adult is 90 to 140 millimeters of mercury (mm Hg).

The minimum blood pressure occurs when the heart relaxes. This is referred to as the diastolic pressure. Normal blood pressure range for the diastolic reading for an adult is 60 to 90 mm Hg.

Take the blood pressure of each patient over the age of 5 at the initial and annual examinations, or when directed by the dentist. Record the results on the patient’s Dental Exam Form. An entry of 120/80 would indicate the systolic pressure is 120 mm Hg (millimeters of mercury) and the diastolic pressure is 80 mm Hg.

Blood pressure is measured with a sphygmomanometer and a stethoscope or an electronic unit that provides a digital reading. Follow manufacturers’ instructions for use and maintenance of your particular equipment.

**Respiration**

Respiration is the act of inhaling and exhaling. One inhalation and one exhalation is a complete cycle. The respiration rate for an adult may range from 12 to 15 cycles per minute; for a child the rate is 15 to 18 cycles per minute; and for an infant the rate is 18 to 20 cycles per minute.

Respiration can be controlled by the patient. To obtain an accurate respiration rate without the patient’s knowledge, watch the chest rise and fall, and count the respirations.

**EMERGENCY RESPONSE TEAM**

Your command will have an emergency response team that is appointed by the commanding officer or branch director. This team responds to all emergencies when called upon. It consists of at least one dental officer and two dental technicians. It is activated by the front desk personnel and announced over the clinic’s loud speaker system. An example of this may be as follows: attention in the clinic, code blue in dental treatment room five. The front desk personnel should repeat this message twice. Your command instruction will have specific guidelines for announcing the emergency.

When activated the appointed dental officer goes directly to the emergency and the technicians appointed retrieve the medical emergency equipment and bring it to the scene. A mobile crash cart is brought to the emergency and will consist of an automated external defibrillator and emergency drugs. A portable unit of oxygen is also brought. The oxygen tank is an E size cylinder that provides approximately 78 liters of oxygen per minute for one-half hour. An extra cylinder should be standing by if needed. A clear oxygen mask or hand operated resuscitator will be attached to the oxygen unit.

Once the dental officer assesses the emergency, he may direct a member of the team to notify the front
desk to activate the medical clinic’s emergency response team to take over the emergency. Dental personnel should be standing by at the entrance where medical personnel will arrive in order to direct them to the emergency.

Please note that not all dental commands have the same procedures as described above. You must read your own command’s instruction on emergency medical procedures for your specific command.

**BASIC LIFE SUPPORT**

Respiratory failure and cardiac arrest occur when a victim’s heart suddenly stops beating, causing the blood to cease circulating.

A victim of respiratory and cardiac arrest must receive cardiopulmonary resuscitation (CPR) within 4 to 6 minutes after the heart stops beating. You must be able to recognize what is wrong and provide immediate emergency medical treatment including basic life support (BLS) until the medical department arrives. BLS is the attempt to restore lung and heart function. These procedures can be summarized in terms of the ABC’s of basic life support. The primary emphasis is placed on maintaining an open **airway** to counter upper airway obstruction, restoring **breathing** to counter respiratory arrest, and restoring **circulation** by chest compressions to counter cardiac arrest.

**MEDICAL EMERGENCY GUIDELINES**

The guidelines for medical emergencies are as follows:

- Get organized
- Remain calm
- Take charge of the situation
- Act quickly but efficiently
- Get assistance from other staff personnel so they can notify the emergency response team if needed
- Make a preliminary assessment of the victim’s condition in the position you found him in if possible
- Determine the foremost life-threatening condition
- Maintain treatment until qualified assistance arrives

**CPR COURSE CERTIFICATIONS**

There are three types of CPR courses, each related directly to the curriculum:

- Heartsaver course—teaches learners in one-rescuer CPR, management of foreign-body airway obstruction, and the use of barrier devices for ventilation.
- Pediatric BLS course—teaches learners how to administer CPR and first aid for choking infants and children.
- Healthcare provider course—teaches healthcare professionals in one-rescuer CPR, management of foreign-body airway obstruction, two-rescuer CPR, the use of barrier devices, and (optionally) the use of an automated external defibrillator (AED).

All dentists, dental technicians, and auxiliary dental personnel must be certified in the healthcare provider course for BLS if directly involved with patient care.

**RESUSCITATING DEVICES**

Among the standard emergency equipment in the DTR is the hand-operated resuscitator [fig. 9-3], also referred to as a bag-valve mask. It allows the operator to rescue breathe for the patient without mouth-to-mouth contact. This device consists of a face mask and an inflating bag joined by a valve. A connector at the end of the bag allows the resuscitator to be connected to an oxygen supply. The mask is clear so the operator can see the patient’s mouth in case regurgitation occurs. If this happens, gently turn the patient’s entire body on the right side, wipe out the mouth, return the body to its original position, and continue to rescue breathing with the hand-operated resuscitator.

![Figure 9-3](DTV2903)

**Figure 9-3**—Pediatric and adult resuscitators.
The resuscitator is very difficult to use. The primary problem is keeping an effective seal between the patient’s face and the mask. Due to this, it is recommended that the resuscitator be used only when there are two rescuers available to operate the resuscitator. One to maintain an air tight seal while the other rescuer squeezes the bag.

**USE OF OXYGEN SUPPLY**

At the dentist’s direction you may hook up the resuscitator to an oxygen supply. Oxygen tanks are always painted **green**. Attach the oxygen hose from the oxygen bottle to the connector on the end of the resuscitator.

On the top of the oxygen tank is the cylinder valve. A yoke is used to attach the liter gauge and pressure gauge to the oxygen tank. When directed, turn the oxygen supply cylinder valve counterclockwise until it is completely open. Next, turn the regulator control adjust handle clockwise until the proper flow rate in liters per minute is established on the liter gauge. The normal flow rate is 6 liters per minute. Once the oxygen is turned on, place the mask over the victim’s nose and mouth. Pump the inflating bag once every 5 seconds for an adult, once every 4 seconds for a child, and once every 3 seconds for an infant.

NOTE: Oxygen in the atmosphere occurs in an approximate concentration of 21%, commercial oxygen is pure 100% oxygen.

**Safety Precautions**

- Combustible materials must never come in contact with the oxygen cylinder
- No smoking in any area where there are oxygen cylinders or where oxygen is being administered
- Use only a properly fitting regulator valve
- Close all valves when the cylinder is not in use
- Secure cylinder(s) upright in a proper storage rack or carrier for transportation
- Always stand to the side of the cylinder

**OTHER MEDICAL EMERGENCIES**

Other medical emergencies may occur in the dental operatory, X-ray, or even the reception area. You must always be prepared to recognize and treat these emergencies.

**ANGINA PECTORIS**

Angina pectoris, also known as *angina*, occurs when there is a narrowing of the coronary arteries with decreased blood flow to the heart. The constriction of blood flow may cause the patient to experience similar signs associated with a heart attack such as pain radiating in the arms and chest. Some of the major causes are as follows:

- Extreme physical exertion
- Emotional stress

**Signs and Symptoms**

- Pain from under the sternum
- Heavy feeling or pressure on the chest
- Burning feeling between the shoulder blades
- Cyanosis, shortness of breath
- Anxiety

**Treatment**

- Place patient in a 45-degree angle (sitting up).
- Administer 100 percent oxygen and one nitroglycerin tablet sublingually (beneath the tongue).

**NOTE**

One additional sublingual nitroglycerin tablet or tranlingual spray dose may be repeated every five minutes until relief is obtained. If the pain persists after a total of three tablets of spray doses in a 15-minute period, the patient should be brought to medical for an evaluation by a medical officer. Also check to see if the patient is wearing a transdermal form of nitroglycerin. If they are, a second dose is **not usually** recommended unless prescribed by a medical or dental officer.

**SHOCK**

*Shock* is a syndrome (a collection of symptoms) that results from a rapid decrease in blood circulation due to a loss of blood and/or vascular collapse, and from the body’s attempt to compensate for these decreases. Some major causes of shock are as follows:

- Allergic reactions
- Severe or extensive injuries
- Bites or stings from poisonous snakes or insects
Figure 9-4.—Turning on cylinder valve.

- Severe pain or burns
- Loss of blood
- Digestion of poisons
- Exposure to extreme heat or cold
- Electrical shock
- Emotional stress
- Gas poisoning
- Certain illnesses

**Signs and Symptoms**

- Restlessness, anxiety, weakness, anxious or dull expression, and disorientation
- Weak, rapid pulse
- Shallow, irregular breathing
- Vacant, dull eyes with dilated pupils

**Treatment**

- Activate clinic’s emergency response team
- Lay the victim down
- Elevate the feet
- Keep victim warm
- Keep victim calm

Maintain an open airway

**SYNCOPE (FAINTING)**

*Syncope* is a self-correcting, temporary form of shock. Usually, the serious problems related to syncope are injuries that occur when falling down from the temporary loss of consciousness. Fainting may be caused by stressful situations. Dental patients who
experience this may tell you they feel weak and dizzy while getting out of the dental chair after a procedure. If a patient is still conscious, have him sit back in the dental chair and place him in the Trendelenburg’s position [fig. 9-5]. Place the patient in a position slightly lower than supine with feet elevated slightly above the head.

**Signs and Symptoms**

- Weakness, dizziness, black spots in vision
- Pale face, blue lips
- Cold perspiration
- Rapid, weak pulse
- Shallow breathing

**Treatment**

- Activate clinic’s emergency response team if deemed needed by the dental officer
- Lay victim down
- Elevate feet (Trendelenburg style)
- Loosen tight clothing
- Maintain an open airway
- Use an ammonia ampule

**ANAPHYLACTIC SHOCK**

Anaphylactic shock is the result of a severe allergic reaction. It is a life-threatening emergency and usually occurs within seconds after the victim is exposed.

**Signs and Symptoms**

- Itching and burning of the skin with flushing
- Cyanosis around the lips
- Swelling of the face and tongue
- Paleness
- Swelling of the blood vessels just underneath the skin
- Weak, rapid pulse
- Low blood pressure
- Dizziness
- Restlessness
- Painful, squeezing sensation in the chest
- Difficulty breathing
- Respiratory wheezing
- Nausea, vomiting
- Abdominal cramps
- Diarrhea

**Treatment**

Activate clinic’s emergency response team. Provide treatment according to BLS procedures (including CPR).

**HYPOGLYCEMIA**

Hypoglycemia is caused by low blood sugar in the body. Anyone can be affected by hypoglycemia. It can occur if a victim has not eaten for a long period of time,
has overexerted themselves (such as overexercising), or has vomited. A victim can become unconscious—often referred to as insulin shock.

**Signs and Symptoms**

- Extreme weakness
- Pale, moist skin
- Normal or shallow breathing
- Normal blood pressure
- Normal or rapid pulse
- Double vision
- Apathy and irritability
- Drooling
- Tingling and numbness in fingers or feet
- Dizziness
- Headaches
- Fainting
- Profuse sweating
- Eventual unconsciousness and coma

**Treatment**

- If severe, or victim is unconscious, activate the clinic’s emergency response team
- Never give an unconscious victim oral liquids
- If the victim is conscious, give the victim a drink of (soda or presweetened juice) or a piece of candy containing sugar
- If the victim is unconscious, place a sugar cube under the tongue

**HYPERVERVENTILATION**

*Hyperventilation* is an abnormal respiratory condition where the victim overbreathes or breathes too rapidly. This condition usually occurs when apprehensive patients breathe more rapidly in response to their own anxiety.

**Signs and Symptoms**

- Anxiety, nervousness, fear
- Dizziness or lightheadedness
- Blurred vision
- Dryness or bitterness of the mouth
- Tingling of the hands, feet, or area around the mouth
- Tightness or a lump in the throat
- Shortness of breath
- Pounding feeling of the heart (tachycardia)
- Tired or weak
- Feeling of impending doom
- Rapid breathing
- Fainting

**Treatment**

- Calm the victim and provide reassurance
- Try to get the victim to slow his breathing down
- Place a paper bag over the victim’s mouth and nose

**ASTHMA ATTACKS**

*Asthma* attacks interfere with normal breathing and occur when the airways constrict making the patient produce a wheezing sound as he or she breathes. A patient who has been diagnosed as having asthma, will usually carry an inhaler containing medication to treat there mild attacks.

**Signs and Symptoms**

- Difficulty in breathing
- Wheezing, gasping sounds when attempting to breathe
- Coughing spasmodically and unproductively
- Cyanosis

**Treatment**

- Sit the victim down
- Calm and reassure the victim
- If the victim carries medication, help him take the medication
- Activate clinic’s emergency response team if needed

**SEIZURES**

In a conscious, healthy individual, muscular movements are usually smooth and coordinated. If the
normal functions of the brain are upset by injury, infection, or disease, the electrical activity of the brain can become irregular. This irregularity can bring about sudden uncontrolled muscular contractions known as seizures.

**Signs and Symptoms**
- Body becomes rigid and then jerks violently
- Jaw clamped shut
- Foaming at the mouth
- Loss of consciousness

**Treatment**
- Activate clinic’s emergency response team
- Lay the victim down
- Loosen or remove tight clothing
- Turn victim on her side with the head extended and face turned slightly downward
- Maintain airway
- Do not restrain the victim unless she is in immediate danger

- After the seizure is over, reassure and reorient the victim and allow her to rest

**DUTIES DURING ADMINISTRATION OF MEDICATION**

After the patient has been anesthetized or premeditated with a drug, you should observe the patient to ensure that the drug is working and be watching for signs of an adverse reaction. Never leave a patient alone that has be anesthetized or premeditated with a drug.

**SIGNS AND SYMPTOMS OF ADVERSE REACTION**
- Raised, hive-like patches with severe itching
- Wheezing, difficulty in breathing
- Nausea, vomiting

**TREATMENT**

if necessary administer basic life support and activate clinic’s emergency response team immediately.