DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Sexually Transmitted Diseases

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

Sexually Transmitted Diseases

STDs are diseases and infections which are capable of being spread from person to person through:

- sexual intercourse
- oral-genital contact or in non-sexual ways.
- IV drug

The morbidity and mortality of STDs vary from

1-A minor inconvenience

2- Severe health consequences

3- Death

Sexually Transmitted Diseases

The most common types of STDs are:

- Gonorrhea
- Chlamydia
- Genital Warts
- Genital Herpes

- Syphilis
- HIV

Causes:

Sexually transmitted infections can be caused by:

- Bacteria (gonorrhea, syphilis, chlamydia)
- Parasites (tri-chomoniasis)
- Viruses (human papillomavirus, genital herpes, HIV)

Sexually transmitted diseases have important implications for clinical practice in dentistry:

1-STDs are transmitted by intimate interpersonal contact, which can result in oral manifestations.

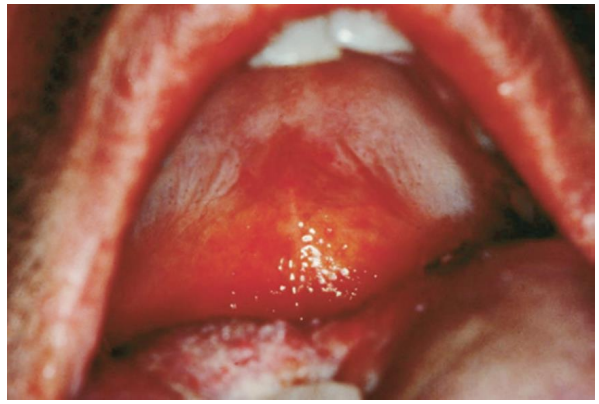
2-Some STDs can be transmitted by direct contact with lesions, blood, or saliva, and many affected persons may be asymptomatic.

3-Pathogens responsible for STDs can exhibit antimicrobial resistance, so proper treatment is essential.

GONORRHEA

- Gonorrhea is caused by Neisseria gonorrhoeae
- N. gonorrhoeae, an aerobic gram-negative
- It replicates easily in warm, moist areas and requires high humidity and a specific temperature and pH for optimum growth.
- It is a fragile bacterium that is readily killed by drying, so it is not easily transmitted by fomites.

- Gonorrhoea can also be spread from mother to child during birth.
- Gonorrhea infection can spread to other parts of the body.
- gonococcal infections of the pharynx may occur and patients may complain of a sore throat, and redness or white spotting (exudates) may be apparent.
- N. gonorrhoeae has been cultured from expectorated saliva samples of nearly 70% of patients with oropharyngeal gonorrhea



Complications:

Possible complications include:

- Pelvic pain
- Pregnancy complications
- Eye inflammation
- Arthritis
- Pelvic inflammatory disease
- Infertility
- Heart disease
- cancers

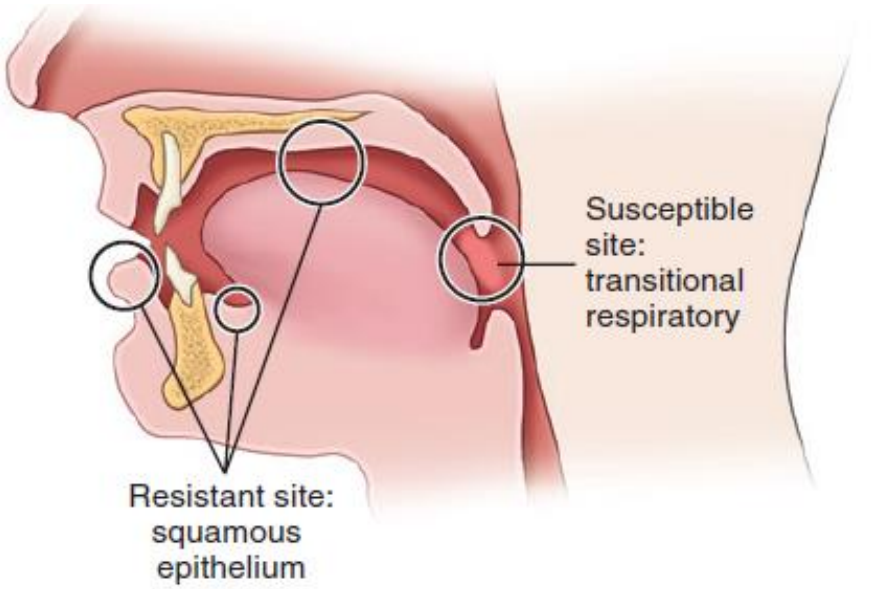


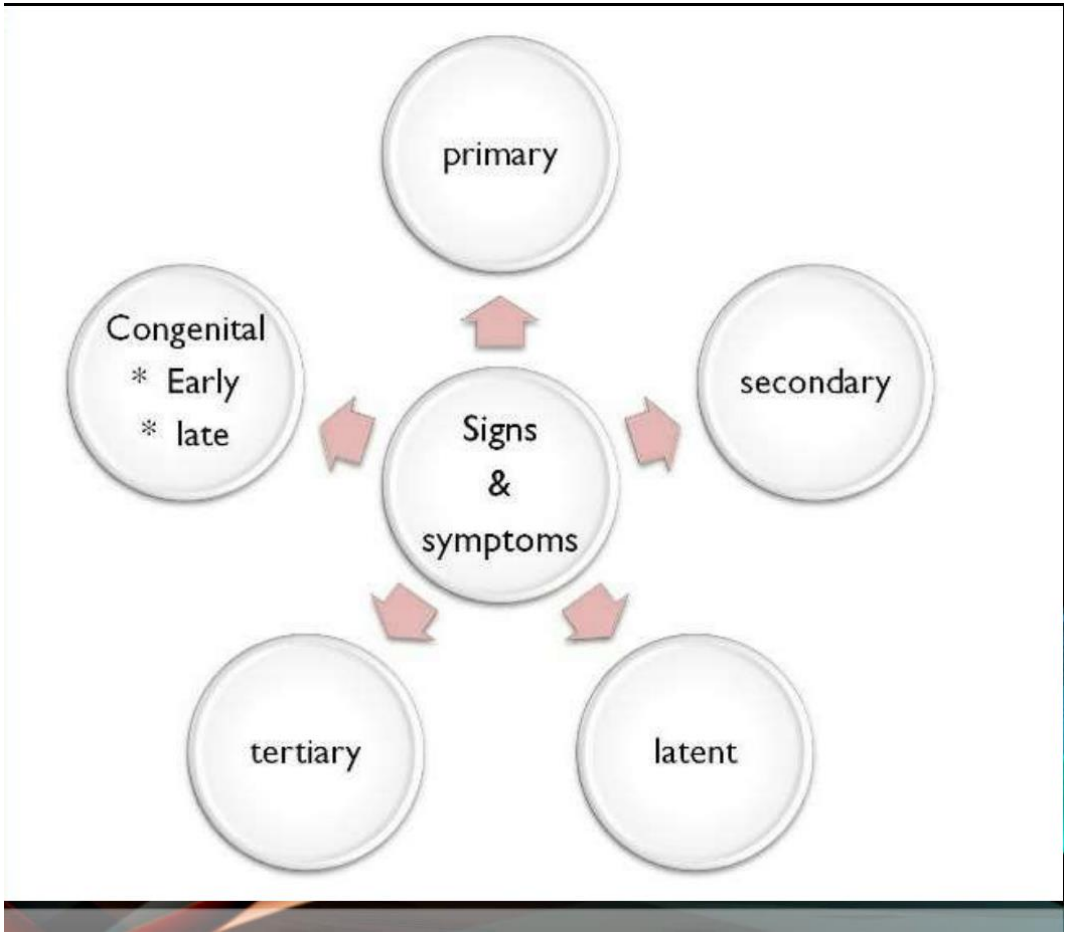
FIG 13.1 Areas of relative epithelial susceptibility to infection by *Neisseria gonorrhoeae* within the oral cavity or oropharynx.

Syphilis

Syphilis is a sexually transmitted infection that can cause serious health problems if it is not treated

- **Caused by spirochete *Treponema pallidum***

- Passed from person to person through direct contact with a syphilis sore
- Sores mainly occur on the external genitalia. Sores can also occur on the lips and in the mouth.


primary
Congenital
* Early
* late
Signs
&
symptoms
secondary
tertiary
latent

PRIMARY SYPHILIS

- Symptoms usually appear 10-90 days after contact.
- An infected person gets a sore (chancre), which may be painful at the point of contact (mouth, anus, rectum, throat or the sex organ).
- The chancre is usually firm, round, small, and painless.
- it appears at the spot where the bacterium entered the body.
- The chancre lasts 1-5 weeks and heals on its own.
- This will disappear on its own, but may last 4-6 weeks.

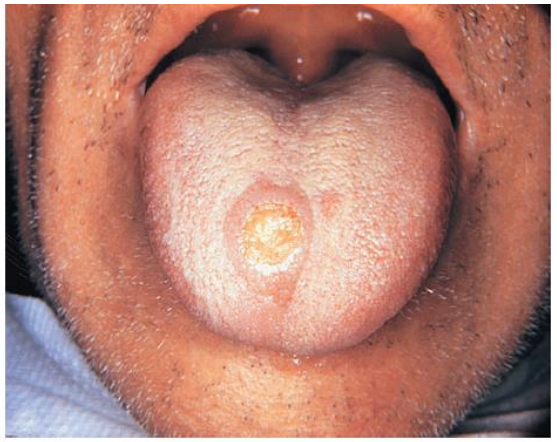
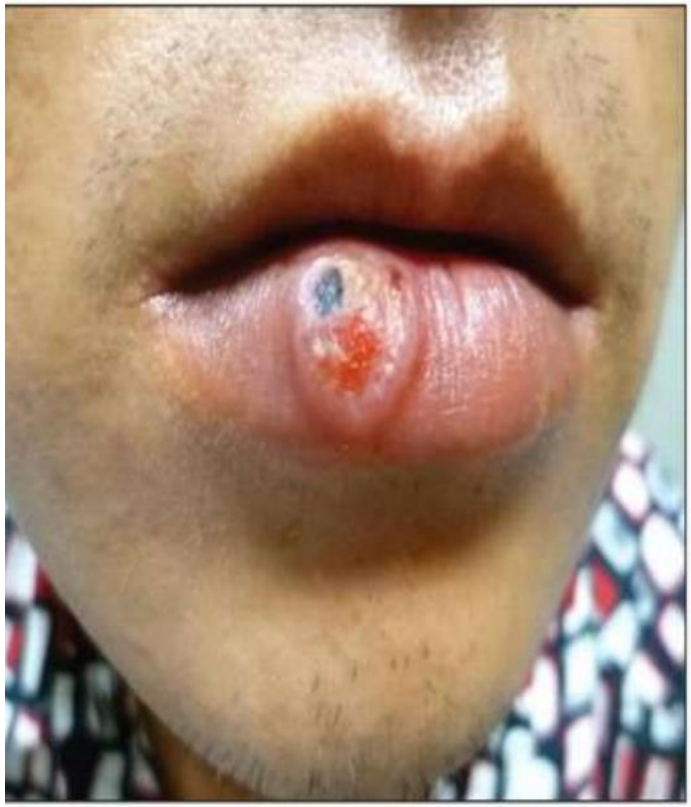


FIG 13.5 Chancre on the tongue seen in primary syphilis. (From Ibsen DAC, Phelan JA: *Oral pathology for the hygienist,* ed 4, St. Louis, Saunders, 2003.)

Oral chancres are typically solitary lesions that may involve the lips,tongue, oropharynx, or other oral sites and may be associated with lymphadenopathy



Secondary Stage OR
SECONDARY SYPHILIS

- lasts 4-10 weeks.
- After the chancre comes a copper-colored skin rash which may appear on the palms of the hands, soles of the feet, or in more severe cases covers the entire body.
- The rash may be accompanied by fever, headaches, indigestion, loss of appetite, or loss of hair in spots over the scalp.

Oral syphilitic chancres and mucous patches are usually painless unless they become secondarily infected. Both lesions are highly infectious

FIG 13.6 Lesions of secondary syphilis. **A,** Profuse papular rash. **B,** Multiple oral lesions, including mucous patches, and nonwipeable white plaques. (A, From Habif TP, Campbell JI Jr, Chapman MS, et al: *Skin disease: diagnosis and treatment,* ed 2, St. Louis, Mosby, 2005. B, From Dr. Stefania Leuci, Federico II University of Naples, Italy.)

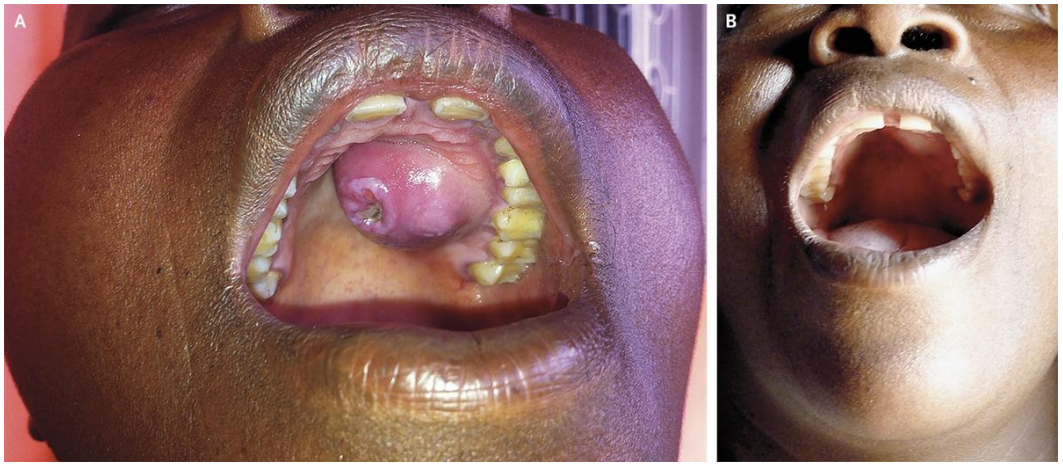
SPLIT PAPULE: It is a raised Papular lesion developed at the commissure of the lip and with a fissure separating the upper and the lower lip, giving a ‘split pea appearance’.

• CONDYLOMATUM: They are flat silver gray like PAPULE sometimes having ulcerated Surfaces.

TERTIARY SYPHILIS

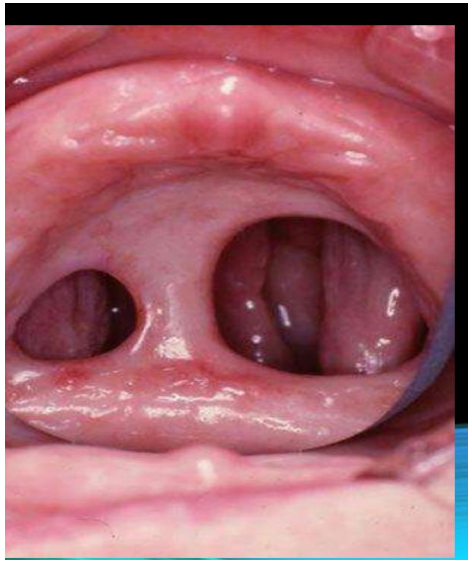
Classic lesion of tertiary syphilis is gumma.

- Gumma most frequently occurs in the skin,mucous embrane,liver,testes and bone.



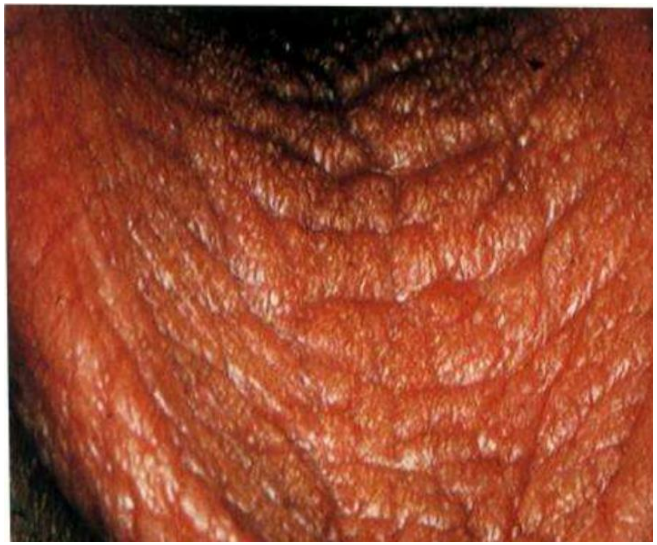
It is believed to be the end result of a hypersensitivity reaction and is basically a noninfectious inflammatory granulomatous lesion with a central zone of necrosis.

• The intraoral gumma most commonly involves the tongue and palate that may perforate thorough the palatal bone into the nasal septum



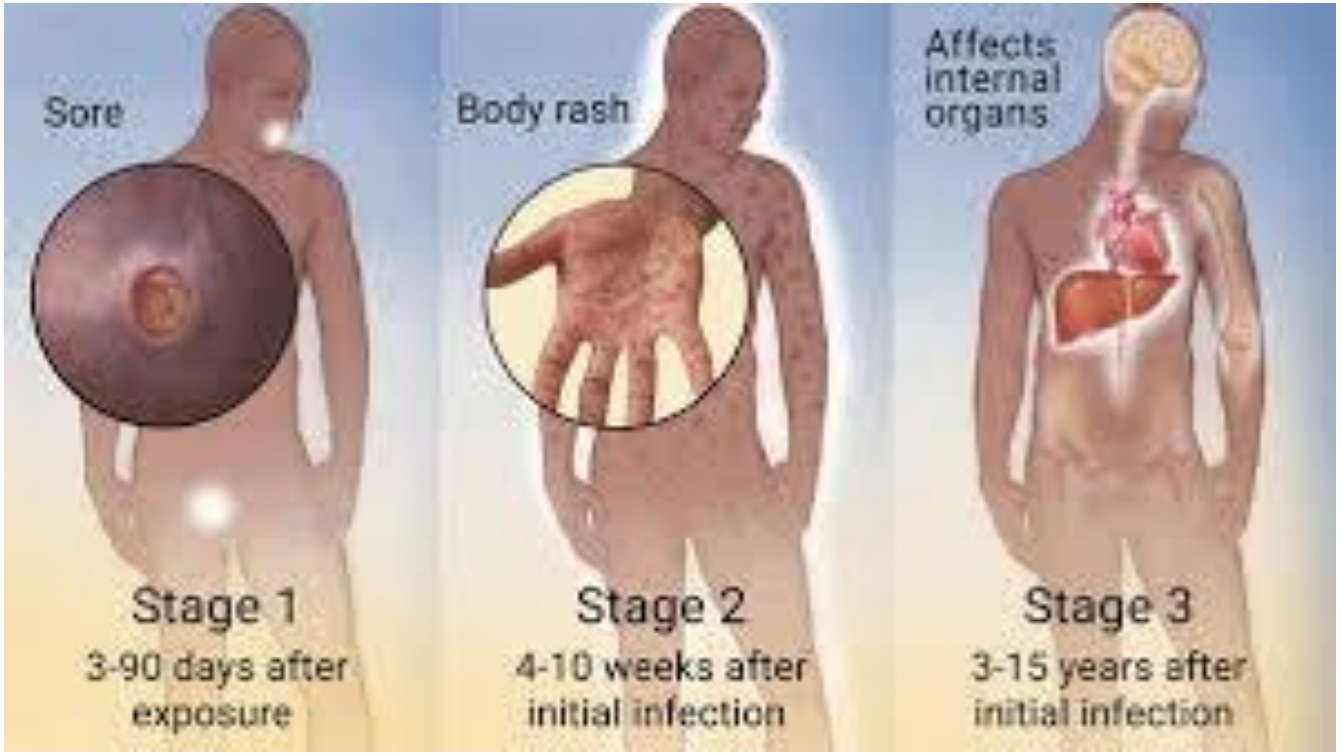
Atrophic or interstitial glossitis Occurs.

- In syphilitic glossitis, the surface of the tongue gets fissured due to atrophy and fibrosis of tongue.



Third Stage – Latent Period -TERTIARY SYPHILIS

- All symptoms disappear so that the victim thinks he/she is cured.
- If not received treatment the bacterium remains in the body and begins to damage the internal organs including the brain, nerves, eyes, heart, blood vessels, liver,bones, and joints.


Sore
Body rash
Affects internal organs
Stage 1
3-90 days after exposure
Stage 2
4-10 weeks after initial infection
Stage 3
3-15 years after initial infection

Congenital Syphilis

Syphilis may occur congenitally if the mother is infected while pregnant, and transplacental infection can occur as early as 9 to 10 weeks in utero.

Syphilis contracted during late pregnancy may involve bones, teeth , eyes, cranial nerves, viscera, skin, & mucous membranes.

A classic triad of congenital syphilis known as Hutchinson's triad includes

- Interstitial Keratitis Of The Cornea.
- Eighth Nerve Deafness.
- Dental abnormalities (i.e., Hutchinson's incisors &mulberry molars).

Oral manifestationsmof congenital syphilis include peg-shaped permanent central incisors with notching of the incisal edge (Hutchinson'sincisors)

mulberry molars are a dental condition usually associated with congenital syphilis, characterized by multiple rounded rudimentary enamel cusps on the permanent first molars

DIAGNOSIS

• The most commonly used screening test is rapid plasma reagin(RPR),the venereal disease research laboratory test(VDRL).

• The most specific serological test is the fluorescent treponemal antibody absorption test .

TREATMENT

- Primary and secondary syphilis-two term doses of benzathine penicillin G 2.4 million units i.m, applied one week part and for tertiary syphilis 3 to 4 doses.
- Patient allergic to penicillin may be treated with either ceftriaxone or tetracycline.
- Patient should be followed with repeated physical examination and repeated VDRL is to be done at 1,3,6,9,12,18 and 24 months,if VDRL is negative,patient is said to be cured.

HERPES

Herpes simplex viruses HSV belongs to a family of eight human herpes viruses

HSV-1 : usually located lesions in and around the mouth Transmitted by direct contact or droplet spread from cases/carrers

HSV-2 : majority of genital herpes Infections Transmitted venereally

As a general rule, HSV1 produces ‘above the waist’ and HSV2 ‘below the waist’

HSV Characterised by ability to establish latent infections, enabling the virus to persist indefinetly within infected hosts and to undergo periodic reactivation

Virus	Site of latency
Herpes simplex virus	Trigeminal ganglion
Varicella-zoster virus	Sensory ganglia
Epstein–Barr virus	Epithelial cells
	B lymphocytes
Cytomegalovirus	Salivary gland cells
Papillomaviruses	Epithelial cells
Human immunodeficiency viruses	Lymphocytes and other $CD4^+$ cells (see Chapter 30)

1-PRIMARY (FIRST) INFECTION multiple vesicles which will ulcerate forming shallow superficial ulcers over the affected facial skin .

2-SECONDARY (RECURRENT) HERPES

The viruses that are already present in the nerve cells will be reactivated by various stresses .

It is less painful, circumscribed, not associated with generalized symptoms & lasts an average of 7 days

herpes labialis

herpetic whitlow

Primary Herpes Simplex Infection

- Develops in both, children and young adults
- INCUBATION PERIOD 5-7 days.

- Precede local lesion by 1 to 2 days and includes fever, headache.

- malaise, nausea, vomiting and subsequently painful

- Irritability, pain upon swallowing and regional lymphadenopathy

Recurrent or Secondary Herpes Simplex Infection

- Herpes Simplex Virus may be latent in epithelium.
- When reactivation is triggered, they spread along the nerves to different sites on the oral mucosa and skin
- Destroy the epithelial cells and induce the typically inflammatory response

Precipitating Factor of herpes virus

SURGERY

- Which involve trigeminal ganglion, recurrent infections with herpes can occur (since herpes remains latent in T.ganglion)

TRAUMA

- Trauma to lips, dental extraction

INFECTION

- Upper respiratory tract infection can trigger the herpes infection

OTHERS

- Fever, emotional upset, sunburns, fatigue, menstruation, pregnancy and allergy may precipitate

Management

- Topical anesthetics like 2% lidocaine
- Topical ANTIINFECTIVE AGENTS Given to prevent secondary infection 0.2% chlorhexidine
- Antipyretics can be given to control fever
- Acyclovir 200mg orally 5 times /day for 10 days

  decreas *duration of ulcerative lesions*

  Improve the symptoms

  Used for 1ry infection

Dental Management of the Patient With a STD

- The dental management of patients with an STD begins with identification. Because they are potentially infectious, the obvious goal is to identify all individuals who have active disease

- some persons will not provide a history or may not demonstrate significant signs or symptoms suggestive of their disease.

- Therefore, it is necessary for all patients to be managed as though they were infectious

Dental Management of the Patient With a STD

- A patient with known recent gonorrhea infection that has been administered appropriate antibiotic therapy poses little threat of disease transmission to the dental team.

- Patients with an active pharyngitis referred to a physician for further evaluation.

- Lesions of untreated primary and secondary syphilis are infectious, as are the patient's blood and saliva patients who are currently under treatment or who remain seropositive for syphilis after receiving treatment should be viewed as potentially infectious

Herpes simplex virus–induced lesions elective dental treatment should be delayed until the herpetic lesion has completely healed.

Dental manipulation during these infectious stages poses risks of
(1) Inoculation to a new site on the patient
(2)Infection to the dental care worker
(3) aerosol or droplet inoculation of the conjunctivae of the patient or of dental personnel.

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

PATIENTS ON RADIOTHERAPY AND CHEMOTHERAPY

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax
٢٠٢٢-٢٠٢١

Definition

• Neoplasm: an abnormal tissue that grows by cellular proliferation more rapidly than normal tissue and continues to grow after the stimuli that initiated the new growth cease.

• Neoplasm show a partial or complete lack of structural organization and functional coordination with the normal tissue.
Neoplasms may be benign (not cancer) or malignant (cancer).

• Benign neoplasms may grow large but do not spread into, or invade, nearby tissues or other parts of the body.

• Malignant neoplasms can spread into, or invade, nearby tissues. They can also spread to other parts of the body through the blood and lymph systems.

The effective management of the patient with cancer often requires a team approach that involves;
Dental, medical, surgical, radiotherapeutic, chemotherapeutic, reconstructive, and psychiatric consideration.

Cancer could affect any organ of the body such as
Breast,
Lung,
G.I.T.
Urinary system
Bone
prostate
Skin
Oral cavity
Endocrine system.

Lines of Treatment of Cancers:

1- Surgery
2- Radiotherapy
3- Chemotherapy
4- Combination of The Above Lines.
5- Cytotoxic Drugs,
6-Endocrine Drugs.

PATIENTS ON RADIOTHERAPY

The primary goal of radiotherapy is to destroy and damage the tumor cells but in fact,

The normal cell which lies at the line of radiation will be destroyed also and the area exposed to radiation will be compromised.

Radiotherapy of the head and neck region has a direct relation with our job as dentists.

Radiation Effects on Normal Tissues in the Path of the External Beam:

1. MUCOSA (mucositis)

• Epithelial changes (atrophy), causing mucositis.
Mucositis is defined as the cytotoxic effects of radiation on rapidly dividing oral epithelium.

It develops more often in non-keratinized mucosa (buccal and labial mucosa, ventral tongue) by the end of the second week of radiation therapy.

(if the dose is 200 cGy per week) inflammation of the oral mucosa.

2. MUSCLE

• Muscular dysfunction; it's a late complication of radiotherapy it results from **Fibrosis and vascular** damage of muscles of mastication and limitation in the mouth opening, which should be maintained through physiotherapy.

The patient also should perform daily stretching exercises to relieve trismus and apply local warm moist heat.

One exercise is for the patient to place a given number of tongue blades in the mouth at least three times a day at 10-minute intervals.

By slowly increasing the number of tongue blades, muscle stretching will occur, and more normal functions will ensue.

3. BONE

• Decreased numbers of osteocytes and osteoblasts, decreased blood flow and the patient becomes more susceptible to developing osteoradionecrosis.

Osteoradionecrosis ORN results from radiation-induced (hypocellularity, hypovascularity, and ischemia) in the jaws.

Most cases result from damage to tissues overlying the bone rather than from direct damage to the bone. Accordingly, soft tissue necrosis usually precedes ORN and is variably present at the time of diagnosis.

Risk is greatest in posterior mandibular sites for patients whose jaws have been treated with in excess of 6500 cGy, and who have undergone a traumatic procedure (e.g., extraction).

Risk is greater for dentate patients than for edentulous patients, and periodontal disease enhances risk. Spontaneous ORN also occurs. This risk continues throughout a patient's life time.

Note: (the amount of radiation absorbed by the tissue is called the radiation dose. before 1985 dose was measured in a unit called rad, but now the unit of radiation dose is called Gray (Gy) one Gy is equal to 100 rads , one centigray (cGy) is the same as one rad

4. SALIVARY GLANDS

• Atrophy of acini, vascular changes, chronic inflammation, and fibrosis, leading to xerostomia, due to head and neck radiation therapy.

Management by frequently drinking water, using salivary substitutes, sugarless chewing gum, lozenges and drugs like parasympathomimetic drugs to stimulate salivary flow.

Severe xerostomia developed from the effects of radiation on the oral mucosa. Note the angular cheilitis.

5. TEETH

Radiation caries:

Radiation caries is estimated to occur 100 times more often in patients who have received head and neck radiation than in normal individuals due to hyposalivation.

It can progress within months, advancing toward pulpal tissue and resulting in a periapical infection that extends to surrounding irradiated bone.

Management required patient education, oral hygiene instruction, fluoride application and frequent dental visits, and early restoration of the teeth.

The sensitivity of the teeth increased due to hypo salivation.

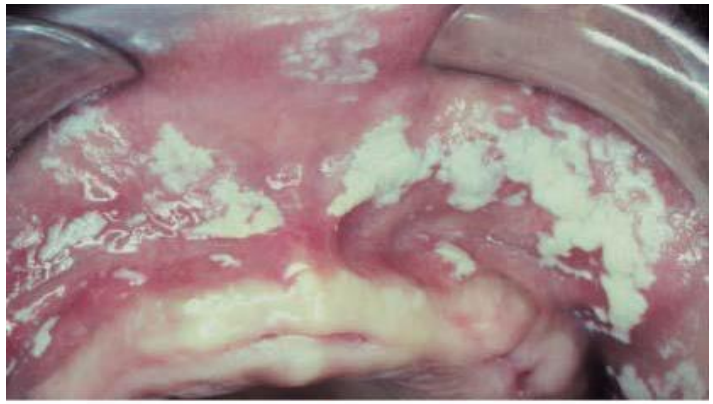
Extensive cervical caries in a patient who received radiotherapy.

6. SECONDARY INFECTION

Occurs as a result of immunosuppression and reduced salivary flow, when the WBC count falls below 2000 cells/ml the immune system is less able to manage these infections.

Other effects of radiation include loss of taste resulting from damage of the microvilli of taste cells, the patient's complain of the bitter tast, and most of the patients will restore taste within 3-4 months after therapy.

Zinc supplementation is reported to improve taste sensation (zinc sulfate).



Oral candidiasis (pseudomembranous form) in a patient undergoing chemotherapy. Arrow indicates lesions of pseudomembranous candidiasis.

DENTAL MANAGEMENT:

A. Prior to Radiotherapy:

Before the radiotherapy, the patient should be examined and a treatment plan is done for a full mouth treatment taking into consideration the following:

1. Symptomatic nonvital teeth should be endodontically treated at least 1 week before initiation of head and neck radiotherapy.

2. Teeth that are indicated for extraction should be extracted

Indications of extraction:

i. Nonrestorable teeth with poor or hopeless prognosis, acute infection, or severe periodontal disease that may predispose the patient to complications (e.g., sepsis, osteoradionecrosis)should be extracted.

ii. Presence of periapical inflammation

iii. Broken-down, nonrestorable, nonfunctional, or partially erupted tooth in a patient who is noncompliant with oral hygiene measures.

iv. Patient lack of interest in saving tooth/teeth

v. Inflammatory (e.g., pericoronitis), infectious, or malignant osseous disease associated with questionable tooth

3. The Guidelines for extraction of teeth:

- Perform extraction with minimal trauma

- At least 2 weeks, ideally 3 weeks before initiation of radiation therapy to get enough time for healing.

- Trim bone at wound margins to eliminate sharp edges

- Obtain primary closure.

- Avoid intra-alveolar hemostatic packing agents that can serve as a nidus of microbial growth.

4. Teeth scaling and prophylaxis should be provided before radiotherapy is initiated.

5. Patients who will be retaining their teeth and undergoing head and neck radiation therapy must be **informed about problems** associated with decreased salivary function, which include xerostomia, the increased risk of oral infection, including radiation caries, and the risk for osteoradionecrosis.

B. During Radiotherapy:

1. Symptomatic treatment of mucositis: The treatment of mucositis involve:

1) Oral mucositis can be reduced by using oral cryotherapy, low-level laser therapy, systemic analgesics, and supplemental zinc.
2) Eliminate any irritating factor such as a sharp edge; and establish good oral hygiene.
3) Recommend a salt and sodium bicarbonate mouthwash
4) Topical anesthetics (viscous lidocaine 0.5%) and/or an antihistamine solution diphenhydramine [Benadryl], promethazine to provide pain control
5) Antimicrobial rinses such as chlorhexidine 0.12% mouthwash.
6) Prescribe anti-inflammatory agents (e.g., topical steroids).
7) Avoid tobacco, alcohol, and irritating foods.
8) Oral lubricants and lip balms with a water base, beeswax base, or vegetable oil base
9) Humidified air (humidifiers or vaporizers).
10) Follow a soft diet; maintain hydration.
11) Consider systemic antimicrobials, if severe.

2. Management of xerostomia:

- Recommend sugarless lemon drops
- Sorbitol-based chewing gum
- A buffered solution of glycerine
- Salivary substitutes
- Plenty of water and other fluids (sip drinks constantly to keep the oral mucosa moist, and avoid the diuretics such as coffee or tea.

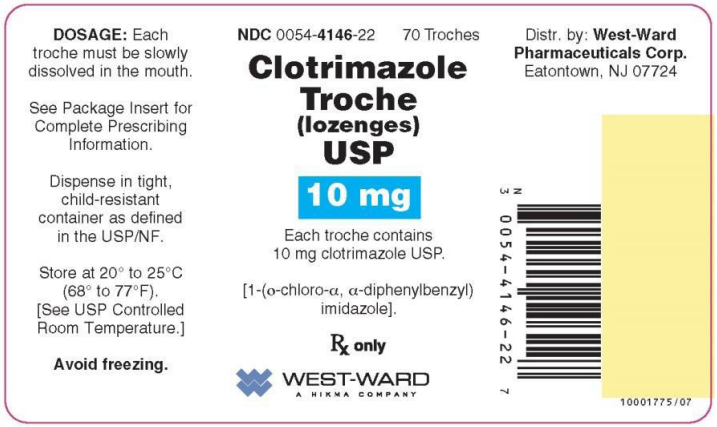
3. **Prevention of trismus** by having the patient place tongue blades or Mouth blocks each day to maintain mouth opening.

4. Diagnosis and treatment of secondary infections that developed during radiation. Because of the quantitative decrease that occurs in actual salivary flow, and because of compositional alterations in saliva, several organisms (bacterial, fungal, and viral) may opportunistically infect the oral cavity.

5. Fluoride application to prevent sensitivity of teeth and to prevent caries.

6. Instruct the patient for **oral hygiene measures.**

7. Dentures should not be worn until the acute phase of mucositis has resolved. Dentures should be cleaned and soaked with an antimicrobial solution daily for the prevention of infection.



Some of medications used to treat fungal infections in patient on radiotherapy (most frequently Candida albicans).

C. Following Radiotherapy:

1. **Consultation with the physician** to determine whether the patient is cured or in remission or is completing palliative care.

2. The patient should be examined every 1 to 3 months during the first 2 years, every 3 to 6 months thereafter, and after 5 years examined at least once per year, to check the oral hygiene and treatment of initial caries and management of xerostomia.

3. Management of xerostomia as mentioned before.

The manifestations of salivary hypofunction in patients having undergone radiation therapy for head and neck cancer include severe salivary hypofunction (unstimulated salivary flow <0.2 mL/min), mucositis, cheilitis, glossitis, fissured tongue, glossodynia, dysgeusia, dysphagia, and a severe form of caries called radiation caries.

4. Prevention of osteoradionecrosis:

A. Avoid the extraction of teeth as much as possible Endodontic therapy is preferred over-extraction (assuming the tooth is restorable).

B. If the extraction is unavoidable, then it should be done **with the following precautions**:

I. It is better to use local anesthesia **without adrenaline**.
II. Give the patient a **prophylactic dose** of antibiotic before and after the extraction i.e amoxicillin 2g one hour before extraction, then continue with amoxicillin 500mg 3-times daily for one week.

III. **Atraumatic procedure**.

- Avoid periosteal elevations in order to maintain a good blood supply to the bone.
- Limit extractions to two teeth per quadrant per appointment.
- Irrigate with saline, obtain primary closure, and eliminate bony edges or spicules.

IV**. The use of hyperbaric oxygen therapy** before and after the tooth extraction. Hyperbaric oxygen therapy is the administration of oxygen under pressure to the patient.

This process will increase the local tissue oxygenation and vascular ingrowth into the hypoxic tissue.

5. Maintain good oral hygiene.

- Use oral irrigators.
- Use antimicrobial rinses (chlorhexidine)
- Use daily fluoride gels.
- Eliminate smoking.
- Attend frequent postoperative recall appointments

6. If the patient developed osteoradionecrosis:

- Once necrosis occurs, conservative management usually is indicated.
- The exposed bone should be irrigated with a saline or antibiotic solution, and the Bony sequestra should be removed to allow for epithelialization.
- If swelling and suppuration are present, broad-spectrum antibiotics are used.
- Severe cases benefit from hyperbaric oxygen
- Cases that do not respond to conservative measures may require surgical resection of the involved bone.

PATIENTS ON CHEMOTHERAPY:

Chemotherapeutic drugs used in treatment of malignancies, based on their ability to destroy or retard the division of rapidly proliferating tumor cells.

Unfortunately, normal host cells that have a high mitotic index are also adversely affected, especially the epithelium of the G.I.T. (including the oral cavity) and the cells of the bone marrow.

The Effect Of Chemotherapy On Normal Tissues:

1. Oral Mucosa

It reduces the turnover rate of oral epithelium, this leads to atrophic and ulcerative mucosal surface.

2. Hematopoietic system

Myelosuppression, appear within two weeks and that manifested by:

I. leucopenia and, neutropenia, that leads to the development of opportunistic infections

II. Thrombocytopenia, so that Gingival bleeding and submucosal hemorrhage as a result of minor trauma (e.g., tongue biting, tooth brushing) can occur when the platelet count drops to below 50,000 cells/mm3. v

Recurrent herpes simplex virus infection presenting as a large ulcer on the palate of a patient undergoing chemotherapy.

DENTAL MANAGEMENT

I. Prior to chemotherapy:

Sam as radiotherapy ……

II. During the chemotherapy:

1- The dentist should be familiar with the patient's WBC count and platelet status before providing dental care. In general, emergency dental procedures can be performed if the **granulocyte count is greater than 2000/mm3**, and the **platelet count is greater than 50,000/mm3**. and the **patient feels capable of withstanding dental care**.

2- Provide routine care 17- 20 days after chemotherapy or a few days before the start of the second chemotherapy cycle. and you have to avoid routine dental care during the chemotherapy.

a. If urgent care is needed and the platelet count is below 50,000/mm 3, consultation with the patient's oncologist is required. Platelet replacement may be indicated if invasive **or traumatic** dental procedures are to be performed.

b. If urgent dental care is needed and the granulocyte count is less than 2000 cells/mm consultation with the physician is recommended and antibiotic prophylaxis should be provided.

This prophylaxis starts at least 1 hour before any invasive procedure that involves bone, pulp, or periodontium i.e amoxicillin 2g one hour before extraction, then continue with amoxicillin 500mg 3 times daily for at least 3 days.

3- Treatment of oral infections:

The organism that most frequently opportunistically infects the oral cavity in individuals undergoing cancer therapy (who have hyposalivation and immunosuppression) is Candida albicans. Candidiasis is best managed with the use of topical oral antifungal agents.

These include nystatin (oral suspension 100,000 international units [IU]/mL 4 to 5 times daily).

Recurrent herpes simplex virus (HSV) eruptions occur often during chemotherapy if antiviral agents are not prophylactically prescribed.

A daily dose of at least 1 g acyclovir/equivalent is needed to Suppress HSV recurrences.

III. After chemotherapy:

After chemotherapy has been provided, consultation with the physician is recommended to determine whether the patient is cured or notvld be placed on an oral recall program.

Usually, the patient is seen once every 1 to 3 months during the first 2 years and at least every 3 to 6 months thereafter.

After 5 years, the patient should be examined at least once per year. This recall program is important for the following reasons:

- A patient with cancer tends to develop additional lesions
- Latent metastases may occur

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Dental Management Considérations for Pulmonary diseases

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

Chronic Obstructive Pulmonary Disease

Chronic Obstructive Pulmonary Disease (COPD) is a condition related to the abnormal airflow to and from the lungs.

It includes

- Bronchitis
- Emphysema
- combination of both.

The most common symptoms of COPD include:

- Shortness of breath (Dyspnea)
- Difficulty breathing during activity.
- As the disease progresses, shortness of breath presents even with minimal activity or when at rest
- Cough A cough with or without sputum that doesn’t go away

Aetiology

Smoking is the most common cause of COPD. 87% to 91% of COPD

Passive or second hand smoking might also cause COPD.

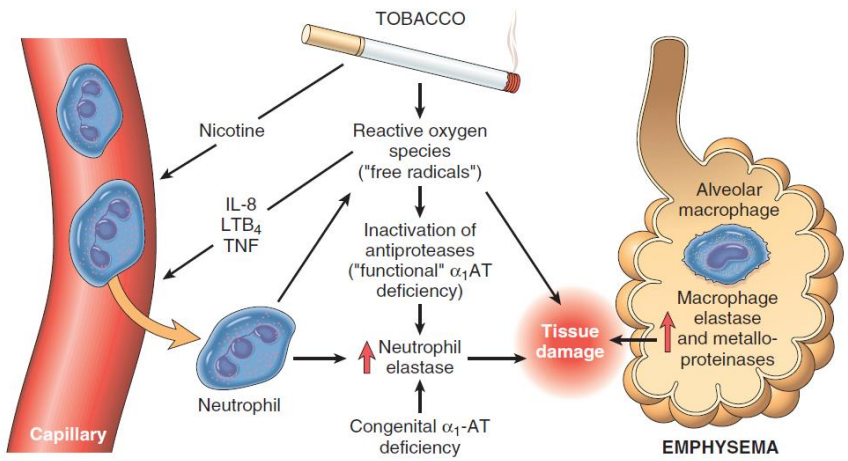
Other causes include:

- Inhaling dust
- Chemicals
- Air pollution
- Alpha1-antitrypsin deficiency (genetic disorder)
- Indoor air pollution (such as wood fire or cooking fire)

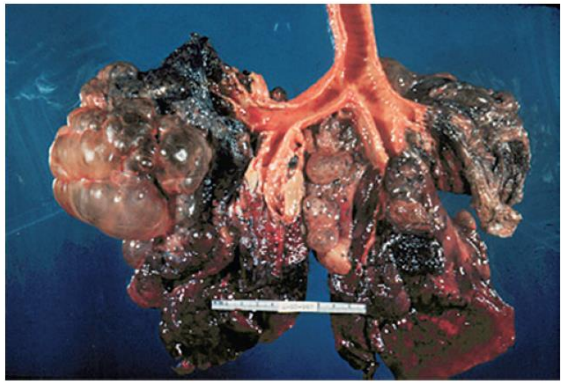
•

It is proposed that cigarette smoke can activate macrophages in the lung to release factors that directly stimulate neutrophils to secrete elastases

Inhaling cigarette smoke temporarily paralyzes the cilia, so frequent smoking over an extended period can severely damage the cilia



A



B

FIG 7.2 **A,** Pathogenesis of emphysema involving imbalance in proteases and antiproteases that results in tissue damage and collapse of alveoli. **B,** Gross pathologic specimen of an emphysemic lung. *α_1-AT,* antitrypsin; *IL-8,* interleukin-8; *LTB_4,* leukotriene B_4; *TNF,* tumor necrosis factor. (A, From Kumar V, Abbas A, Fausto N, editors: *Robbins & Cotran pathologic basis of disease,* ed 8, Philadelphia, 2010, Saunders. B, Courtesy of McLay RN, et al: *Tulane gross pathology tutorial,* Tulane University School of Medicine, New Orleans, LA, 1997.)

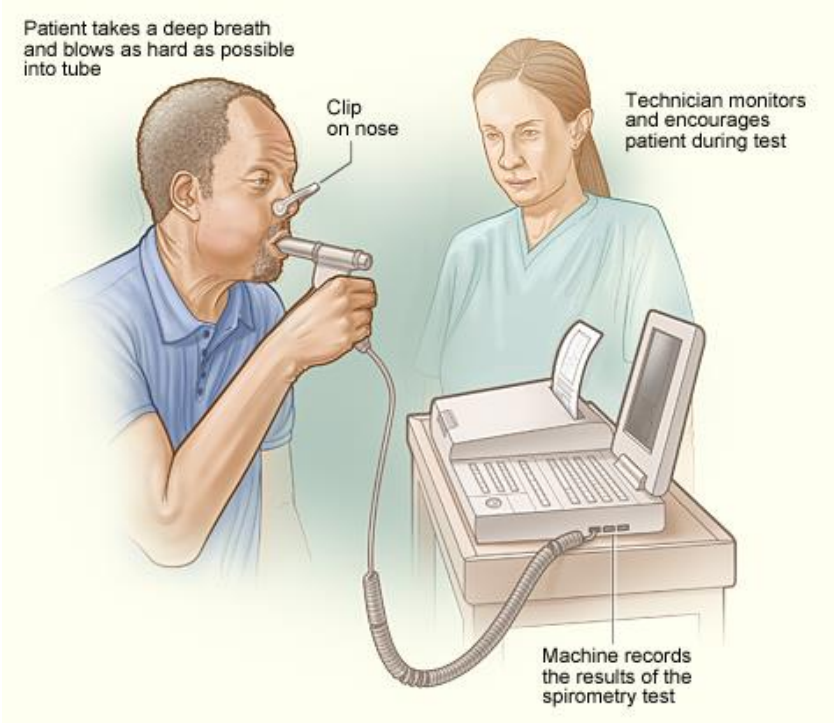
Diagnose COPD

- Pulmonary Function Test
- Oxygen Saturation Test
- Arterial Blood Gases Test
- Chest X-ray
- Chest Computed Tomography (CT) Scan

Pulmonary Function Test

Spirometry.

The machine will measure the amount of air you breathe in and out and the time it takes you to breathe the air out.



Arterial Blood Gases Test

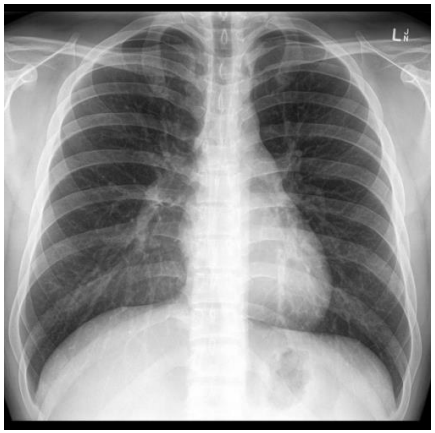
The arterial blood gases (ABGs) test measures the amount of oxygen and carbon dioxide in the blood

Oxygen Saturation Test

Oxygen is usually carried by red blood cells, particularly by the hemoglobin. The normal oxygen saturation level is above 95%. oxygen saturation level might fall below 90 especially when the person sick .

Chest X-ray

A chest X-ray shows the lungs and the ribs. It is usually done to look for an infection. It is less accurate than a chest CT; however, it is less expensive and uses less radiation

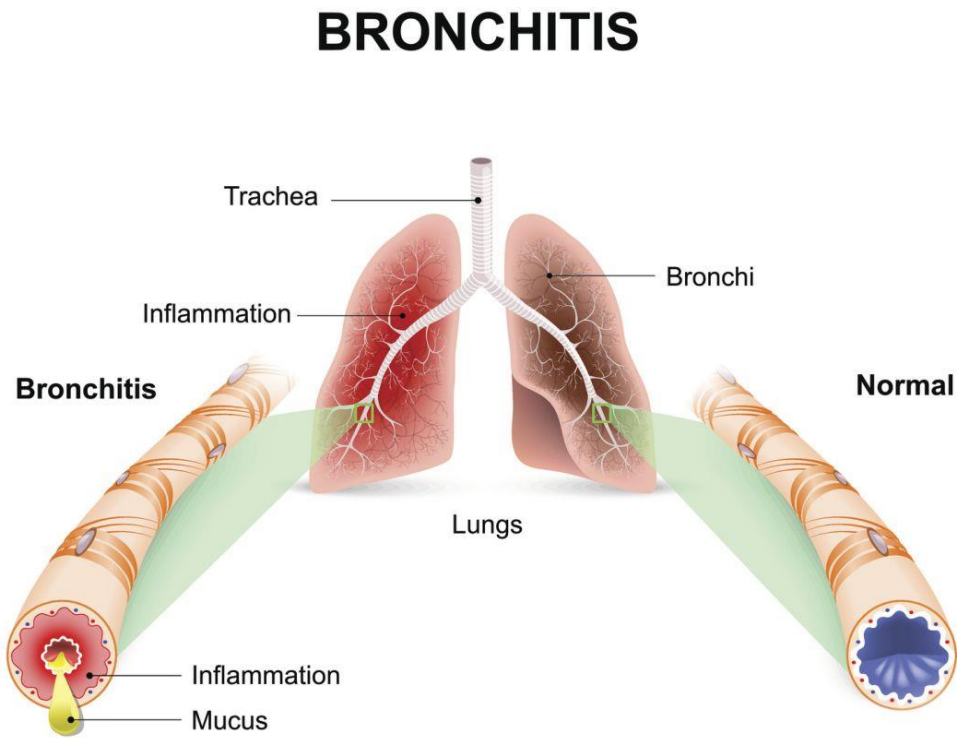


Bronchitis may be either acute or chronic.

Acute bronchitis

Develops from a cold or other respiratory infection, and often improves within a few days without lasting effects.

In more than 90% of cases, the cause is a viral infection These viruses may be spread through the air when people cough or by direct contact.

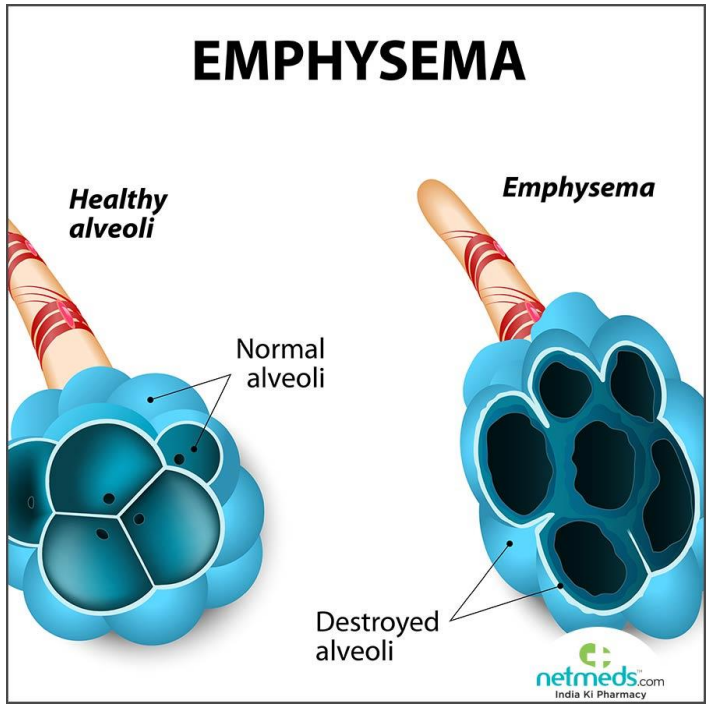


Chronic Bronchitis: The airways are irritated and inflamed. As a result, they become swollen and produce large amounts of mucus. The narrowing of the airways restricts airflow to and from the lungs. The excess mucus production increases the risk for infection.

Symptoms of chronic bronchitis may include:

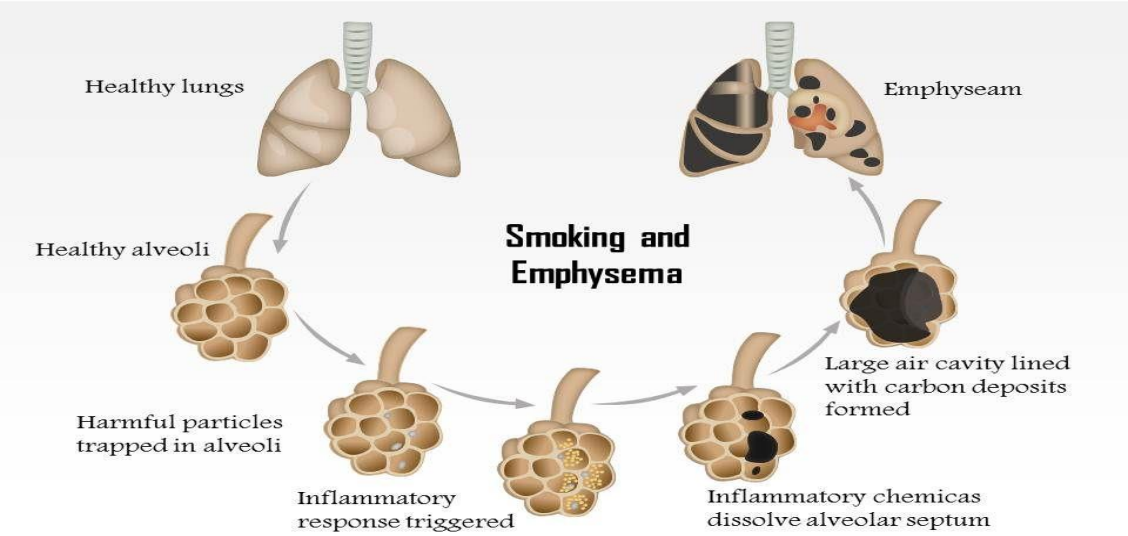
- Fatigue
- Fever
- Chest discomfort
- Sinus congestion
- Bad breath

Emphysema is a condition that involves damage to the walls of the air sacs (alveoli) of the lung. Alveoli are small, thin-walled, very fragile air sacs located in clusters at the end of the bronchial tubes deep inside the lungs.



- Smoking is the Main cause
- Air pollutants in the home and workplace,
- Genetic (inherited) factors (alpha-1 antitrypsin deficiency)
- Respiratory infections can also play a role in causing emphysema

Smoking And Emphysema



Lung Normal & in Smokers:

Oral Complications and Manifestations

Patients With Copd Who Are Chronic Smokers Have An

- Increased Likelihood Of Developing Halitosis
- Extrinsic Tooth Stains
- Nicotine Stomatitis
- Periodontal Disease
- Premalignant Mucosal Lesions
- Oral Cancer.

NOTE Poor oral hygiene,oral bacteria, and periodontitis can contribute to acute
respiratory exacerbations and aspiration pneumonia

Medical Treatments

A bronchodilator

The substance is usually breathed in through an inhaler, which is a device that pumps the medicine in the lungs.

1-Theophylline is an oral medication that relaxes the muscles of the airways

2-Steroids. These medications can be taken either with an inhaler or in pill form.

Dental Management: Considerations in Patients With Chronic ObstructivePulmonary Disease (COPD)

- Antibiotics :Avoid erythromycin, macrolide antibiotics, and ciprofloxacin in patients taking theophylline.?
- In patients who have received courses of antibiotics for upper respiratory infections, oral and lung flora may include antibiotic resistant bacteria.
- Anesthesia Local anesthesia can be used without change in technique

- Anxiety Avoid nitrous oxide, Consider low-dose oral diazepam or another benzodiazepine, although these agents may cause oral dryness.

- Bleeding No issues.

- Blood pressure Patients with COPD can have cardiovascular comorbidity. Assess blood pressure.

- Chair position Semisupine or upright chair position may be better for treatment in these patients.

- Avoid the use of rubber dams in patients with severe disease.
- Use pulse oximetry to monitor oxygen saturation.
- Avoid the use of barbiturates and narcotics, which can depress respiration.
- Avoid the use of antihistamines and anticholinergic drugs because they can further dry mucosal secretions.
- Supplemental steroids are unlikely to be needed to perform routine dental care; the usual morning corticosteroid dose should be taken on the day of surgical procedures however if the patient is a chronic user???

Asthma is a **disease of the respiratory system** characterized by chronic inflammation of the airway, whose clinical manifestations are heterogeneous and variable over time and consist of wheezing, shortness of breath, chest tightness and coughing.

Triggers of Asthma

- Extrinsic (allergic or atopic),
- Intrinsic (idiosyncratic, nonallergic, or nonatopic),
- Drug-induced,
- Exercise-induced.

Extrinsic (allergic or atopic)

Allergic 35% of all adult cases. It is an exaggerated inflammatory response that is triggered by inhaled seasonal allergens such as pollens, dust, house mites, and animal danders.

The complex of antigen with antibody causes leukocytes to degranulate and secrete vasoactive product and cytokines such as bradykinins, histamine, leukotrienes, and prostaglandins.Histamine and leukotrienes cause smooth muscle contraction (bronchoconstriction) and increased vascular permeability, and they attract eosinophils into the airway.

Intrinsic (nonallergic, or nonatopic),

Intrinsic asthma accounts 30% of asthma cases. This form of asthma generally is seen in middle-aged adults, and its onset is associated with endogenous factors such as emotional, gastroesophageal acid reflux, or vagally mediated responses.

Drug induced,

Ingestion of certain drugs (e.g., aspirin, NSAIDs, betablockers, angiotensin-converting [ACE] enzyme inhibitors) and some food substances (e.g., nuts, shellfish, strawberries, milk, tartrazine food dye yellow color no. 5) can trigger asthma.

Aspirin causes bronchoconstriction in about 10% of patients with asthma, and sensitivity to aspirin occurs in 30% to 40% of people with asthma who have pansinusitis and nasal polyps

Exercise Induced.

Exercise-induced asthma is stimulated by exertional activity. Although the pathogenesis of this form of asthma is unknown, thermal changes during inhalation of cold air provoke mucosal irritation and airway hyperactivity

Medical treatment of ASTHMA

- Bronchodilators.
- Inhaled corticosteroids.
- Cromolyn (belongs to a class of medications called mast cell stabilizers.)
- Inhaled corticosteroids
- Leukotriene antagonists.
- Theophylline
- Anticholinergics
- Systemic steroids
- Epinephrine

.(Erythromycin should be avoided)??

ORAL MANIFESTATION IN PATIENTS WITH ASTHMA

Candidiasis, xerostomia and an increased caries rate. due to ß2 agonists.

Gingivitis. Due to inhaled steroids

Orofacial abnormalities. impaired nasorespiratory function in asthmatic people,lead to increased upper anterior & total anterior facial height, higher palatal vaults, greater overjets & posterior crossbites in children with chronic rhinitis & a tendency toward mouth-breathing

Dental Management: Considerations in Patients With Asthma

Antibiotics Avoid erythromycin, macrolide antibiotics, and ciprofloxacin in patients taking theophylline.

Anesthesia Clinicians may elect to avoid solutions containing epinephrine or levonordefrin because of sulfite preservative.

Anxiety Provides a stress-free environment to reduce asthma attacks.

If sedation is required, the use of nitrous oxide–oxygen inhalation sedation or small doses of oral diazepam (or both) is recommended.

Allergy Asthmatics with nasal polyps are at increased risk for allergy to aspirin. Avoid aspirin use.

Blood pressure Monitor blood pressure during asthma attacks to observe for the development of status asthmaticus.

Chair position Semisupine or upright chair position for treatment may be better tolerated.

Instruct patients to bring their current medication inhalers to every appointment;
use prophylactically in moderate to severe disease.

Use pulse oximetry to monitor oxygen saturation during dental procedure.

Recognize asthmatic attack :

- Inability to finish sentences with one breath
- Ineffectiveness of bronchodilators to relieve dyspnea
- Tachypnea ≥25 breaths per minute
- Tachycardia ≥110 beats per minute
- Accessory muscle usage

Emergency (Asthma Attack). The Asthmatic Crisis

A short-acting β2-adrenergic agonist inhaler (Ventolin, Proventil) is the most effective and fastest acting bronchodilator. It should be administered at the first sign of an attack.

Long-lasting β2-agonist drugs such as salmeterol and corticosteroids do not act quickly and are not given for an immediate response, but they may provide a delayed response

With a severe asthma attack, use of subcutaneous injections of epinephrine (0.3–0.5 mL, 1 : 1000) or inhalation of epinephrine

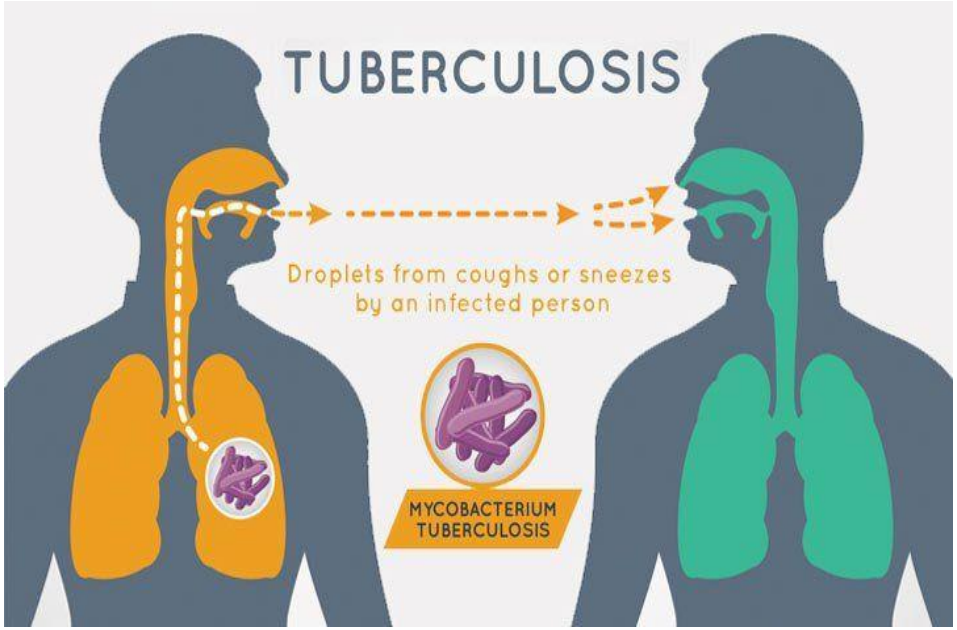
Supportive treatment includes providing positive-flow oxygenation, repeating bronchodilator doses as necessary every 20 minutes, monitoring vital signs (including oxygen saturation, if possible, which should reach 90% or higher), and activating the emergency medical system, if needed

Patients with asthma who are medicated over the long term with high-dose systemic corticosteroids may require supplementation for major surgical procedures if their health is poor

long-term use of inhaled corticosteroids rarely causes adrenal suppression unless the daily dosage exceeds 1.5 mg of beclomethasone or its equivalent

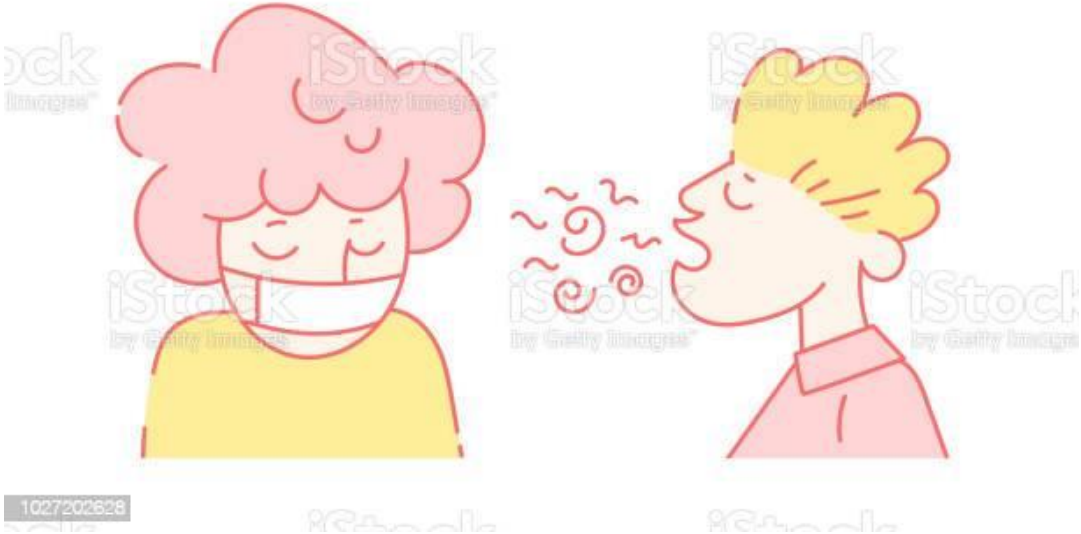
TUBERCULOSIS

Tuberculosis is an important human disease caused by an infectious organism, *Mycobacterium tuberculosis.* TB represents a major global health problem that is responsible for illness and deaths in large segments of the world's population. The disease is spread by inhalation of infected droplets .



Transmission

- Aerosolized droplets 5µm in diameter.
- Estimated 5-200 orgs required for infection
- Spreads through the air when a person:
- • Sneezes • Coughs • Speaks •



Based upon history of previous exposure Tuberculosis can be:

- Primary Tuberculosis
- Secondary Tuberculosis

Primary TB

- Primary Tuberculosis:- The infection of an individual who has not been previously infected or immunised is called Primary tuberculosis or Ghon's complex or childhood tuberculosis.

- it is usually asymptomatic. Occasionally fever and cough which may be productive or dry.
- Usually seen in children but may occur in adults.

The primary pulmonary TB infection, resulting in latent TB infection (LTBI). If not controlled, the nidus of infection (granuloma) may become a productive tubercle with central necrosis and caseation

Secondary Tuberculosis :

The infection that an individual who has been previously infected or sensitized is called secondary or post primary or reinfection or chronic tuberculosis.

Tuberculosis can affect any organ-system including lungs, lymphatic, skin, CNS, Renal, Skeletal and gastro-intestinal system.
Skin involvement may occur, called Lupus Vulgaris

Clinical manifestation

A cough that will not go away
Feeling tired all the time
Weight loss
Loss of appetite
Fever
Coughing up blood
Night sweats

Diagnosis Laboratory tests are directed toward determining whether the patient has active infection or Latent TB infection.

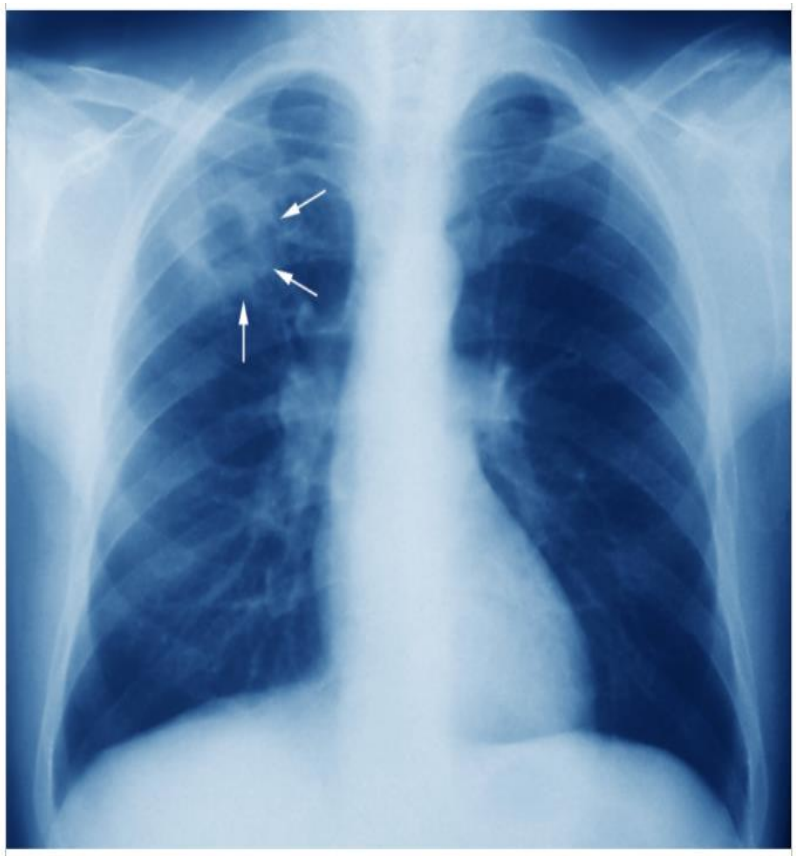
Active infection

1- it is considered when there is a positive acid-fast bacillus sputum smear.
2-symptoms are present (cough, fever, weight loss, night sweats).
3-characteristic chest radiographic changes are observed.

Latent TB infection

Latent TB infection can be diagnosed using either the tuberculin (Mantoux) skin test (tuberculin skin test [TST])[71] or a blood test known as the interferon-gamma release assay (IGRA)

Radiograpy:



Oral Complications and Manifestations

The classic mucosal lesion is a painful, deep, irregular ulcer on the dorsum of the tongue.

The palate, lips, buccal mucosa, and gingiva also may be affected. Mucosal lesions have been reported to be granular, nodular, or leukoplakic and sometimes painless.

Extension into the jaws can result in osteomyelitis.[88]

The cervical and submandibular lymph
nodes may become infected with TB; this condition is called *scrofula.* The nodes become enlarged and painful and abscesses may form with subsequent drainage

Preventive measures

1) Mask
2) BCG vaccine
3) Regular medical follow up
4) Isolation of Patient
5) Ventilation
6) Natural sunlight

Medical treatment

Include(Isoniazid+Rifampin+Pyrazinamide

Dental Management of the Patient With a History of T.B

- Consult with physician before treatment

- Treat the patient who produces consistently negative sputum as a normal patient.

noninfectious—confirm with physician

- Consult with physician & postpone treatment if there is Questionable history of adequate treatment times??

- Those with active TB have compromised pulmonary function and are infectious. Thus, these patients should not be treated in a dental setting until their condition is medically managed.

- Rifampin can lower the platelet count and increase the risk of bleeding. A complete blood count should be obtained when an invasive procedure is planned for these patients

An active TB patient can tolerate dental care after receiving

(1) appropriate anti-TB chemotherapy for at least 2 to 3 weeks.

(2) confirmation form is received from the physician that the patient is non-infectious and lacks any complicating factors.

Notices

INH, Rifampin, and Pyrazinamide therapy may cause hepatotoxicity and elevations in serum aminotransferases.

Acetaminophen-containing medications should be avoided because of the increased potential for hepatotoxicity.

Streptomycin should not be administered concurrently with aspirin because of the potential for ototoxicity.

Precautions For Dental Health Care Professional

- Avoid direct contact with blood, body fluids, and mucous membranes. High standards of operatory disinfection and instrument sterilization should be maintained.

- Rubber dams can be used to minimize aerosol contact however if coughing is evident, rubber dams should not be used.

- Personal protective equipment (eye shields, face masks, head caps, gloves, and surgical gowns) and proper sterilization procedures should be followed.

- Reusable facial protective equipment (protective eyewear or face shields) should be cleaned and disinfected between patients. Handpieces and other oral instruments should be cleaned and autoclaved regularly.

- Masks should be changed at regular intervals, inter-appointments (between patients) and intra-appointments (during patient treatment) if the mask becomes wet.

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Thyroid gland disease

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

Thyroid gland

is composed of two elongated lobes on either side of the trachea that are joined by a thin isthmus of thyroid tissue located at or below the level of the thyroid cartilage

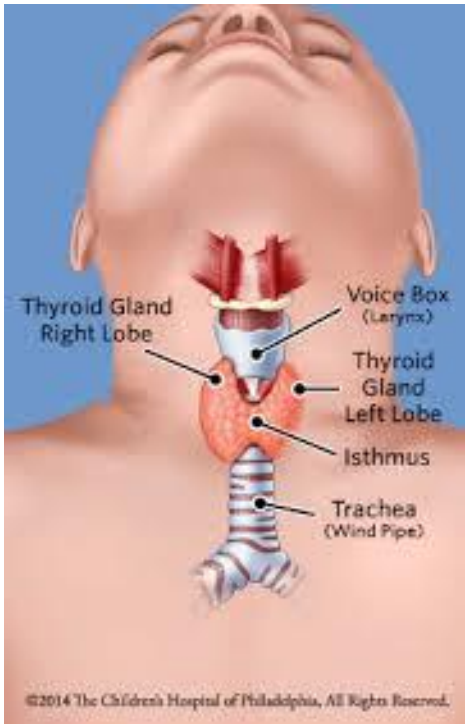
Secretes-

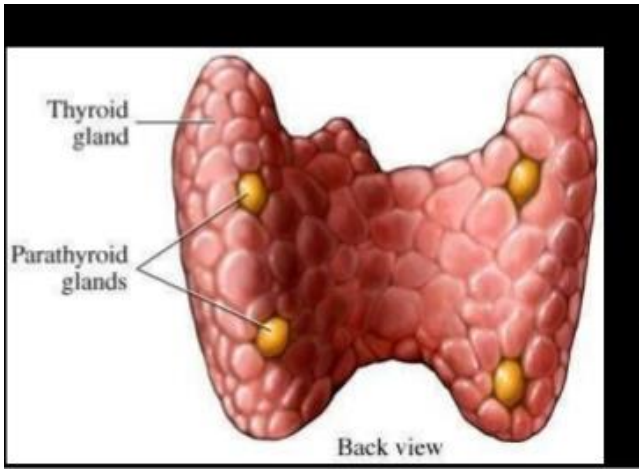
— THYROXIN (T_4)

— TRI-IODOTHYRONINE (T_3)

— CALCITONIN

collectively are termed thyroid hormone





- Normally Thyroid gland weighs about 20 to 40 gm.
- It is larger in females than in males.
- Diseases of thyroid gland are more common in females than in males

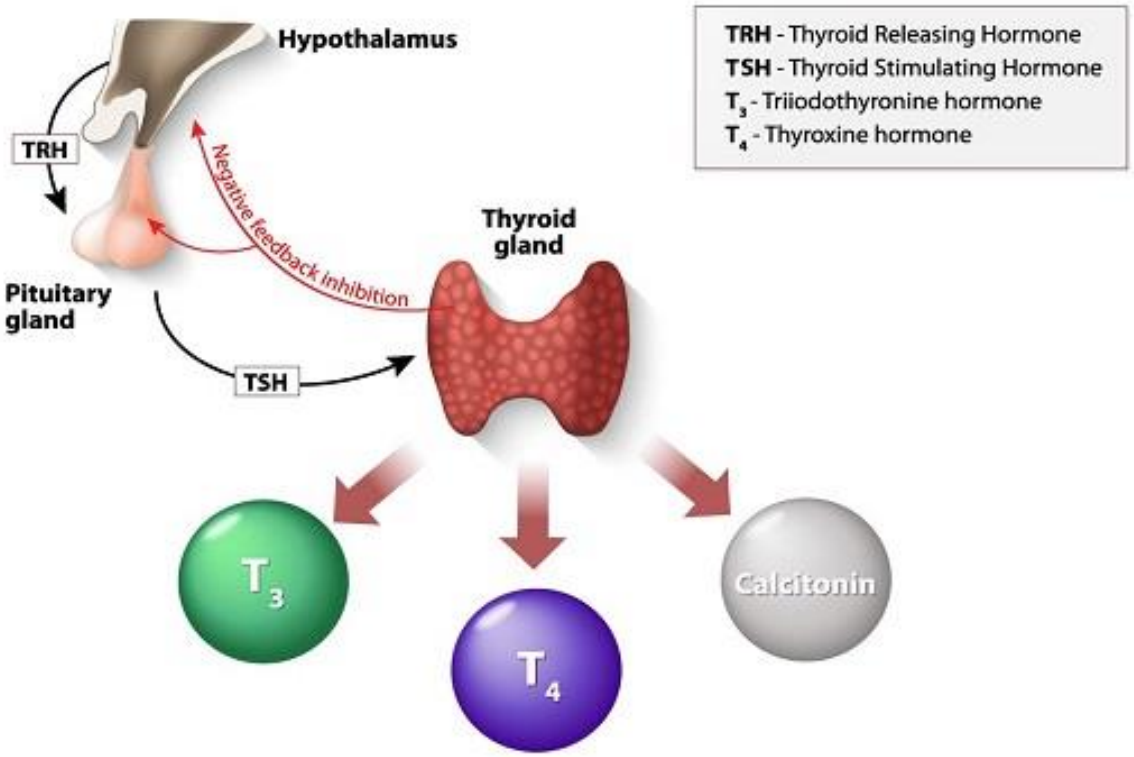
Thyroid disease.

The four main categories are

1. Hyperfunction
2. Hypofunction
3. Thyroiditis
4. Neoplasia.

Each can affect the amounts of circulating thyroid hormone and the quality of life of the affected person.

THYROID HORMONES



THYROID HORMONE HAS

1. Effect on growth
2. Effect on carbohydrate metabolism
3. Effect on fat metabolism
4. Effect on vitamin metabolism
5. Effect on basal metabolic rate
6. Effect on cardiovascular system
7. Effect on the function of the muscle

- Thyroid dysfunction may result due to hypo/hyper-function of thyroid gland

- Thyroid dysfunction is the second most common glandular disorder of the endocrine system and is increasing, predominantly among women between the age of 20 and 50, who are also five times more likely than men to develop thyroid disorders

Hypothyroidism causes:

1-Primary atrophic hypothyroidism

- Insufficient amount of thyroid tissue
- Destruction of tissue by autoimmune process
- surgical thyroidectomy,external radiation to thyroid gland
- Defects of thyroid hormone biosynthesis
- Congenital defects
- Iodine deficiency
- Drug-induced:

  Thionamides(anti-thyroid **drugs)**

  lithium(psychiatric **medication)**

2-Secondary hypothyroidism

- Pituitary
- Hypothalamic

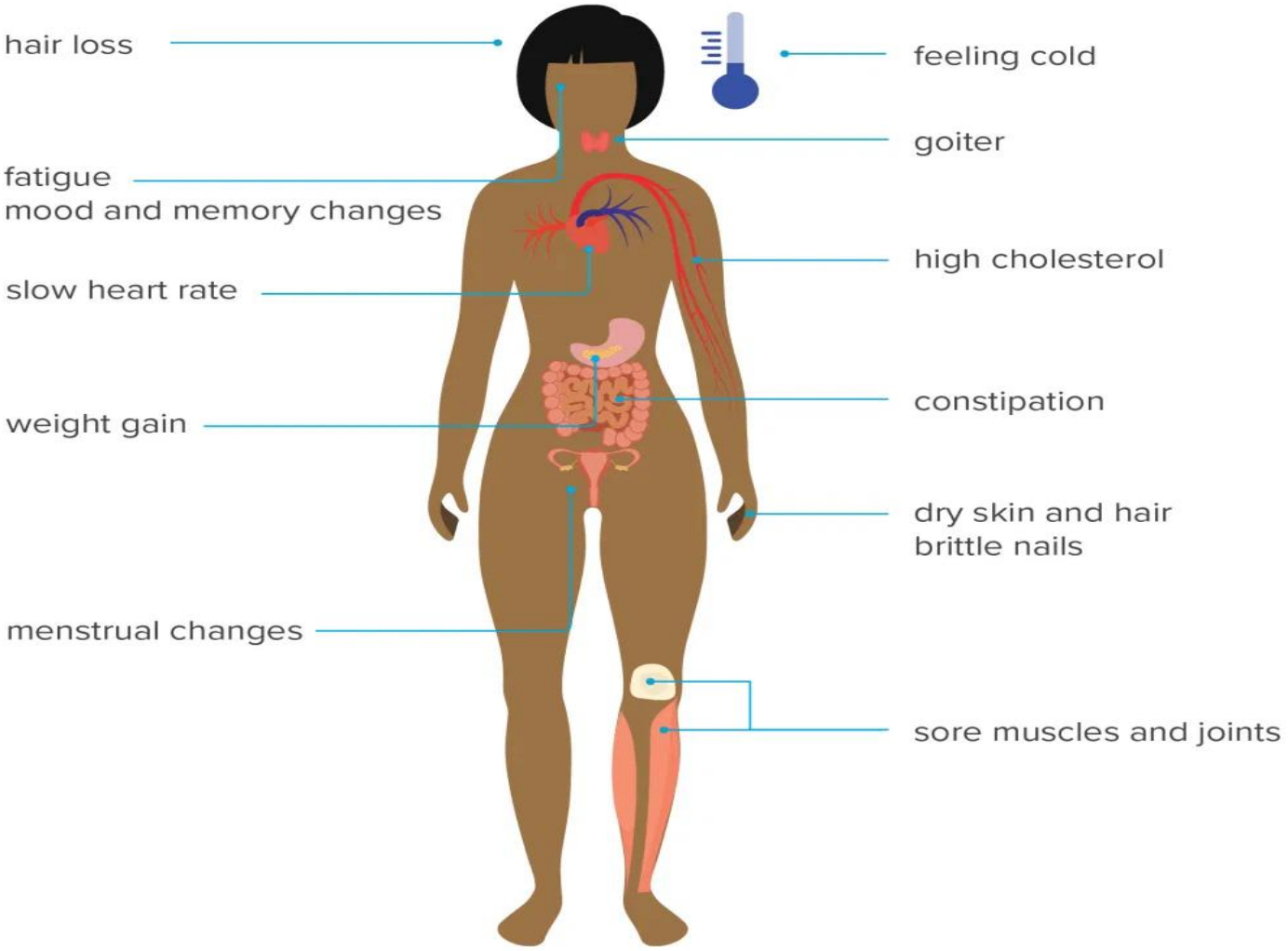
3-Thyroiditis

Subacute thyroiditis
Acute suppurative thyroiditis
Chronic fibrosing thyroiditis

4-Thyroid neoplasms

Effects on the Body

Hypothyroidism



HYPOTHYROIDISM

Oral manifestations:

- Delayed dental eruption
- Salivary gland enlargement
- Macroglossia
- Glossitis (swollen tongue)
- Compromised periodontal health-delayed bone formation
- Dysgeusia (distortion of taste)
- Delayed wound healing

Thick lips, macroglossia and spacing between incisors

With detection early in childhood, permanent mental retardation can be avoided with appropriate medical management.

In addition, oral complications of delayed eruption of teeth, malocclusion, enlarged tongue, and skeletal retardation can be prevented through early detection and medical treatment

A 9-year-old girl with severe hypothyroidism. **B,** The same patient 1 year after treatment with thyroid hormone replacement. Note the return to normal facial appearance.

Treatment of hypothyrodism

Synthetic thyroid hormone

Sodium levothyroxine (LT4)

Sodium liothyronine (LT3)

Myxoedema (crisis) coma

is a loss of brain function as a result of the severe, longstanding low level of thyroid hormone in the blood (hypothyroidism). Myxedema coma is considered life-threatening complication of hypothyroidism and represents one of the more serious sides of thyroid disease.

Myxedema coma may have symptoms and signs

The body temperature is usually abnormally low (hypothermia), (26.6 C)

Severe mental changes including

- Hallucinations
- Disorientation
- Seizures
- Deep coma

Myxedematous coma can be precipitated by:

- CNS depressants
- Infection
- Surgical procedure
- Cold

Myxedema coma emergency treatment

- Seek medical aid
- Vital signs must be monitored
- Cover patient to conserve body heat
- Inject 100 to 300 mg of hydrocortisone
- Thyroxine (1.8 µg/kg daily with a 500-µgloading dose)
- IV saline, and glucose
- Transport to medical emergency facility

Dental Management Considerations in Patients hypothyroidism

Analgesics

CNS depressants, sedatives, and narcotic analgesics may cause an exaggerated response in patients with mild to severe hypothyroidism. These drugs must be avoided in all patients with severe hypothyroidism and must be used with care (reduced dosage) in patients with mild hypothyroidism

Antibiotics

Acute oral infection in an uncontrolled hypothyroid patient could trigger a myxedema coma; such a patient should receive immediate consultation with the patient's physician as part of the management program

In patients with poorly controlled as well as well-controlled disease, treat acute infection aggressively using appropriate antibiotics and incision and drainage when indicated

Anaesthesia No issues

THYROTOXICOSIS (HYPERTHYROIDISM)

It is excess of T_4 and T_3 in the bloodstream.

Caused by

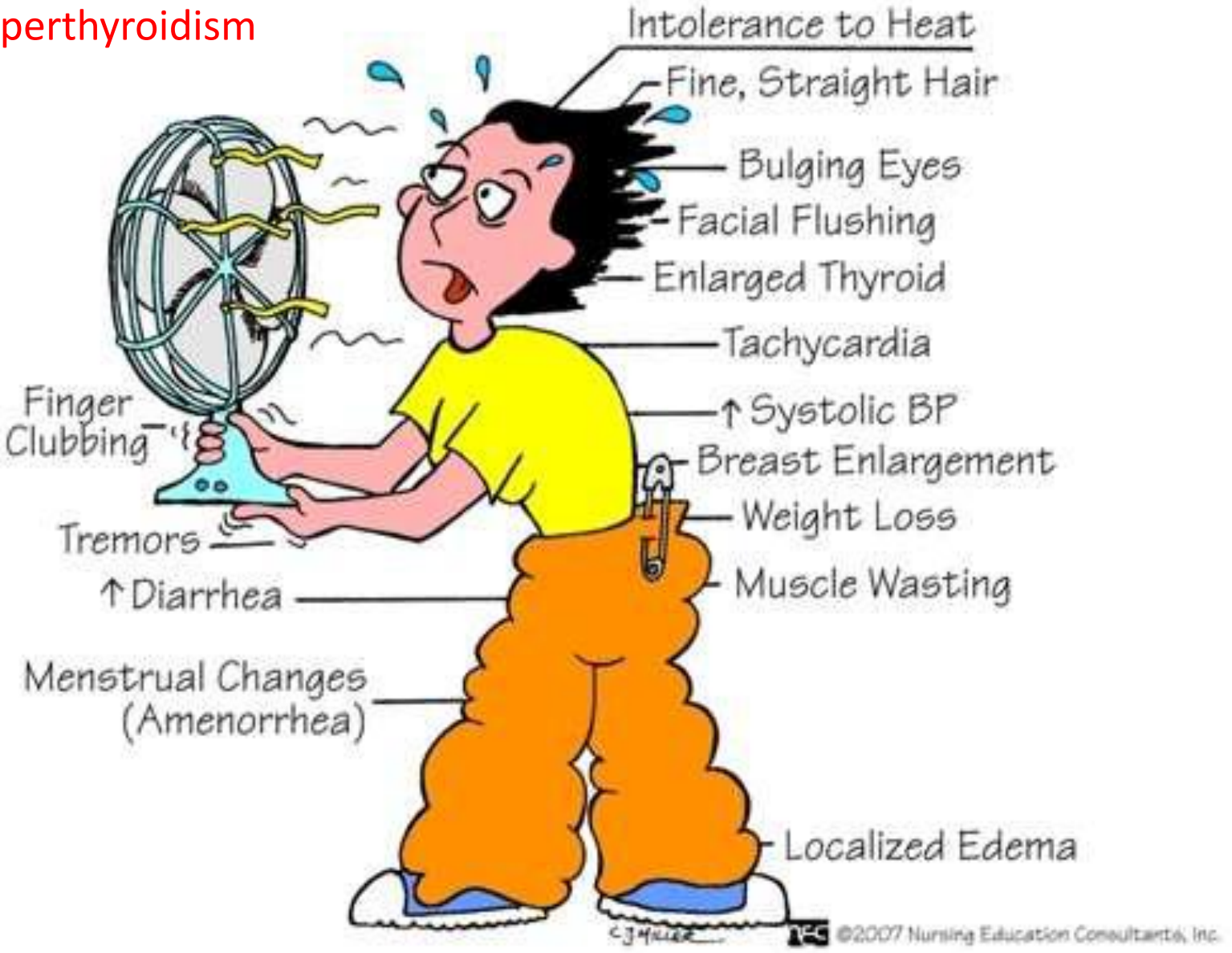
- Ectopic thyroid tissue
- Thyroid adenoma
- Thyroiditis (painful and painless)
- Pituitary disease
- Ingestion of thyroid hormone
- Graves disease
- Toxic nodular goiter

Graves disease is an autoimmune disease causing the gland to grow and stimulating the thyroid follicles to increase T_4 and T_3 synthesis.

Toxic goiter (is a thyroid gland that contains functioning thyroid **nodules**, with resulting hyperthyroidism.

A nontoxic goiter is a diffuse or nodular enlargement of the thyroid gland that does not result from an inflammatory or neoplastic process

Sign and symptoms of hyperthyroidism

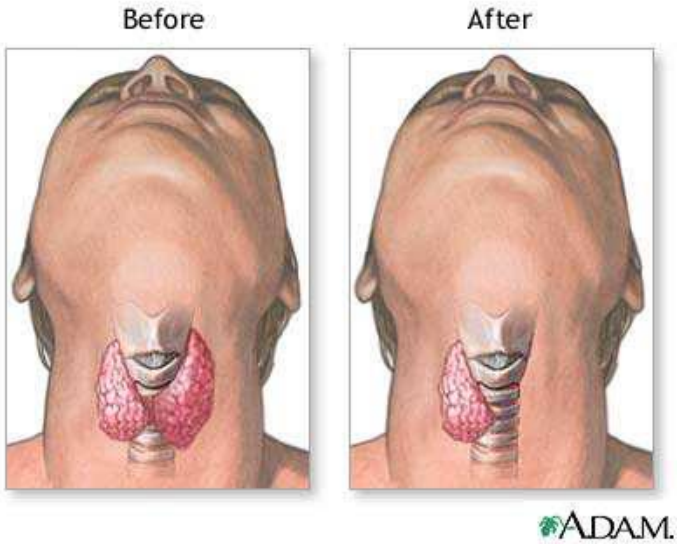


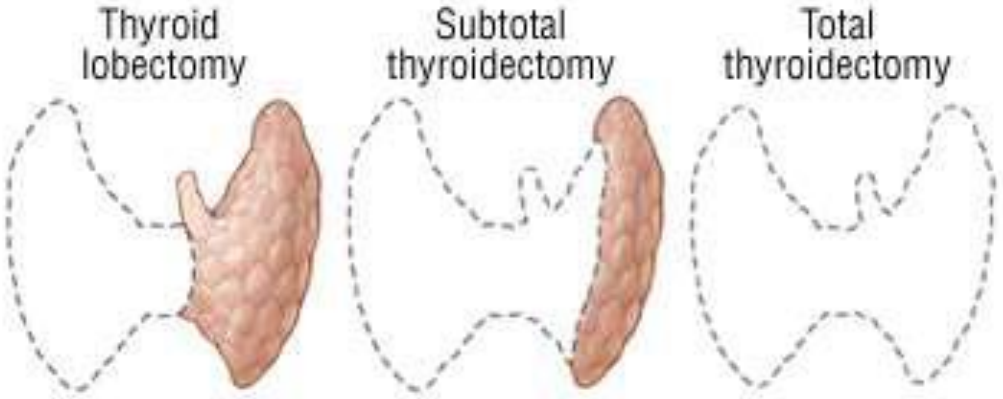
Proptosis in Graves disease results from enlargement of muscles and fat within the orbit as a result of mucopolysaccharide infiltration

common eye sign in Graves disease. It is recognized when the sclera is visible between the lower margin of the upper eyelid and the cornea..

Medical Management

- antithyroid agents that block hormone synthesis
- iodides,Radioactive Iodine RAI
- subtotal thyroidectomy





Oral manifestations of hyperthyroidism

- Increased susceptibility to caries
- Periodontal disease
- Enlargement of extraglandular thyroid tissue (mainly in the lateral posterior tongue)
- Maxillary or mandibular osteoporosis
- Accelerated dental eruption
- Burning mouth syndrome.

- *Burning mouth syndrome*, a condition that causes a burning pain in the mouth,
- *Sjogren's syndrome*, a condition that causes dry mouth, are more common in people with thyroid disease.

Dental Management Considerations in Patients Hyperthyroidism

Analgesics

Aspirin and other NSAIDs can increase the amount of circulating T_4, making control of thyroid disease more difficult.

Anesthesia

Avoid using epinephrine in local anesthetics in untreated and poorly controlled patients.

Bleeding

Excessive bleeding may occur in patients with untreated or poorly controlled disease owing to thrombocytopenia,

Blood pressure

Monitor blood pressure because it may be elevated in patients with untreated or poorly controlled disease.

Hemostasis

- Patients with hyperthyroidism may have elevated blood pressure and heart rate on the basis of the effects of thyroid hormone on sympathetic nervous system activity. Patients with high arteriolar pressures may require increased attention and a longer duration of local pressure to stop bleeding.

- Hyperthyroid patients who are on warfarin sodium have increased metabolism of this drug, leading to alteration in previously therapeutic coagulation indices

- Anti-thyroid drugs namely propylthiouracil (PTU) has anti-vitamin K activity and can cause bleeding that poses a risk for hemorrhage. Thus, patients taking PTU must be carefully evaluated before surgery or invasive dental treatment.

Thyroid storm is severe and potentially life-threatening complication of hyperthyroidism (overactivity of the thyroid gland).

It is characterized by

- a high fever (temperatures often above 40 °C)
- Fast irregular heart beat
- Elevated blood pressure
- Vomiting
- Diarrhea
- Agitation

Thyrotoxic crisis(storm) can be precipitated by:

- Infection
- Surgical procedures

The primary treatment of thyroid storm is with

- Inorganic iodine
- Antithyroid drugs (propylthiouracil)
- Beta blockers are often used to reduce the effects of thyroid hormone.
- Patients often require admission to the intensive care unit.

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Cardiac Arrhythmia

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,PhdOS
Maxfax

Cardiac Arrhythmia

is a group of conditions in which the heartbeat is irregular, too fast, or too slow. The heart rate that is too fast – above 100 beats per minute in adults – is called tachycardia, and a heart rate that is too slow – below 60 beats per minute – is called bradycardia.

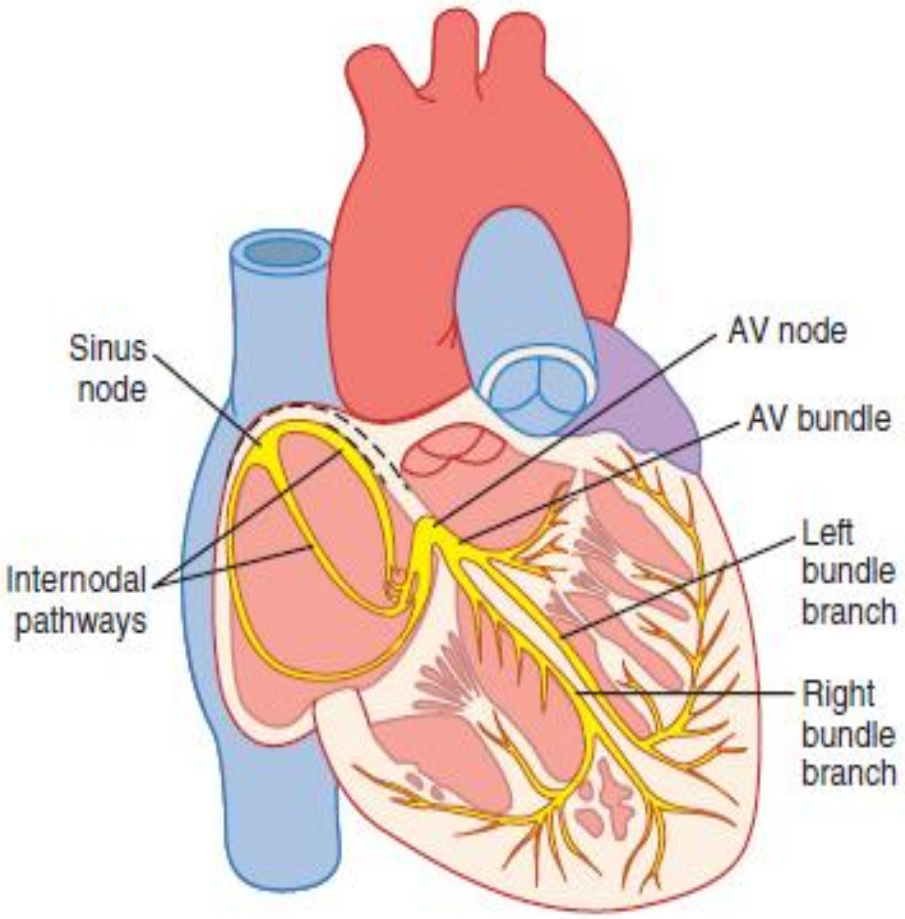
Potentially fatal arrhythmias can be precipitated by strong emotion such as anxiety or anger and by various drugs, both of which are factors likely to be encountered in the dental setting.

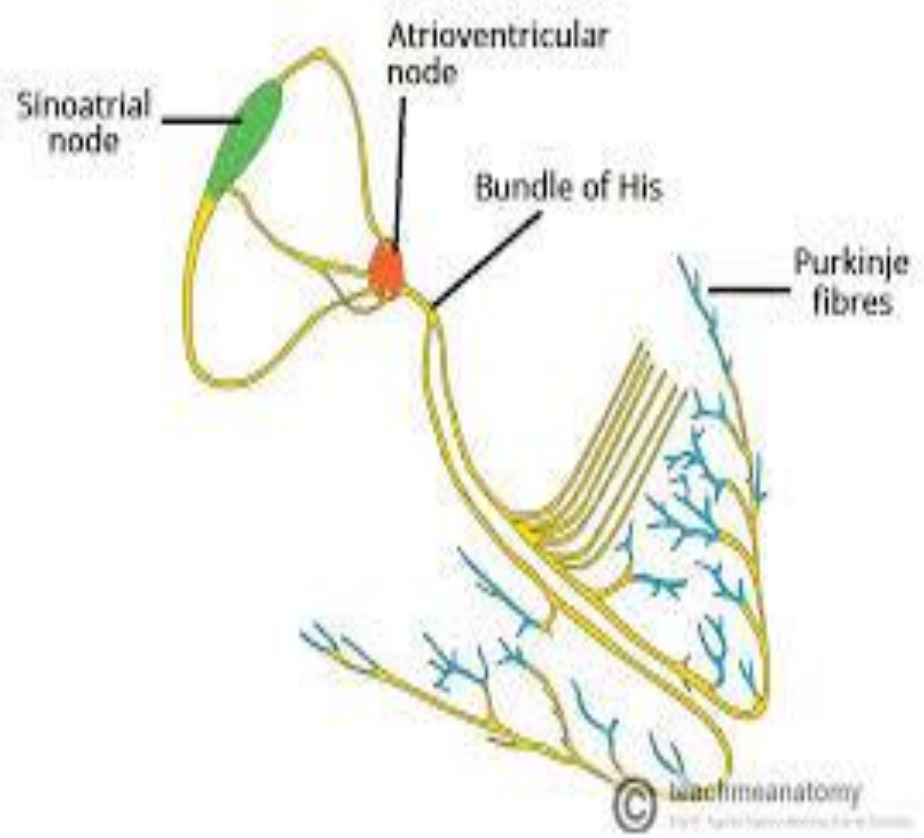
Therefore, patients with significant arrhythmias must be identified before undergoing dental treatment so appropriate modifications in dental management are administered

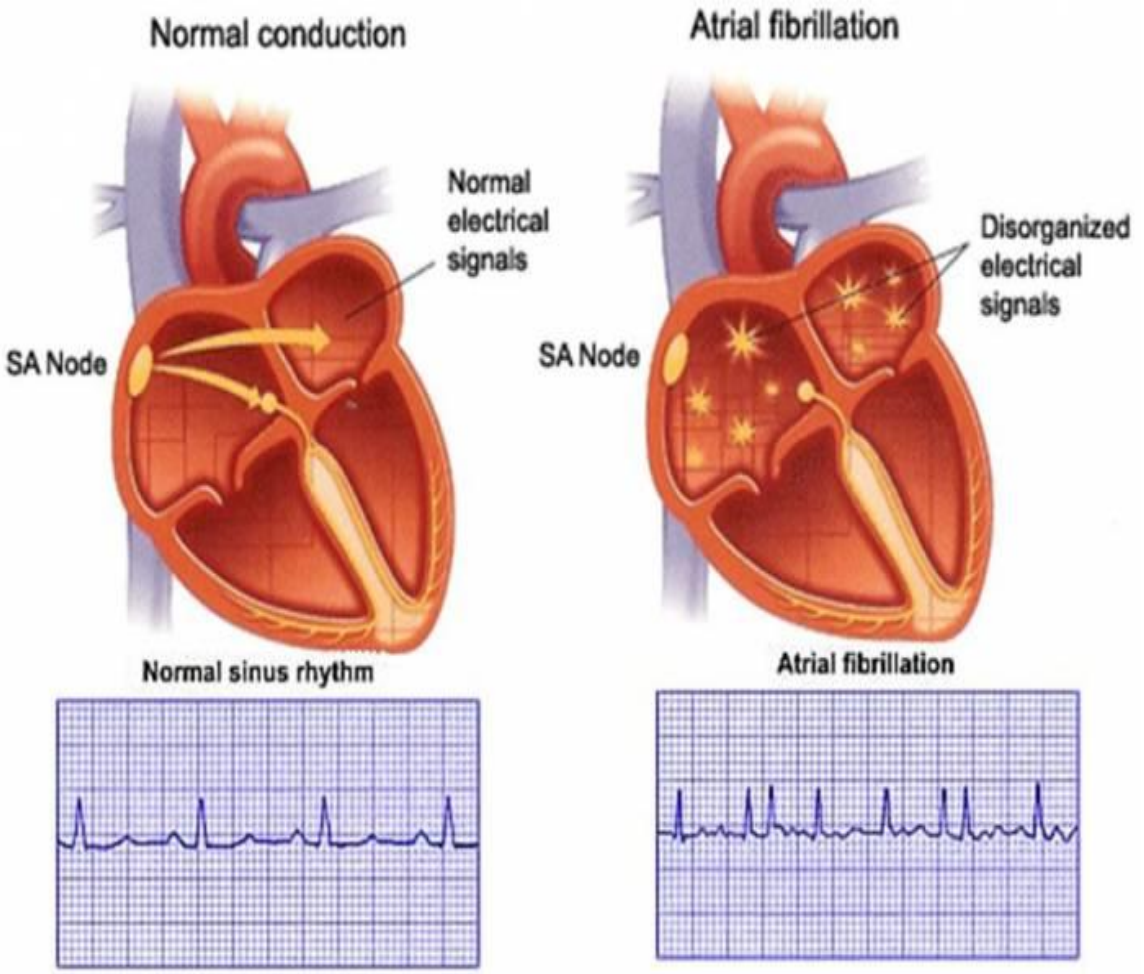
In the United States, arrhythmias occur in 15% to 17% of the population and are present in about 35% of people older than 65 years of age.

The Normal pattern of sequential depolarization involves the structures of the heart in the following order:

(1)Sinoatrial (SA) node.
(2) Atrioventricular (AV) node.
(3) Bundle of His.
(4) Right and left bundle branches.
(5) Purkinje network.

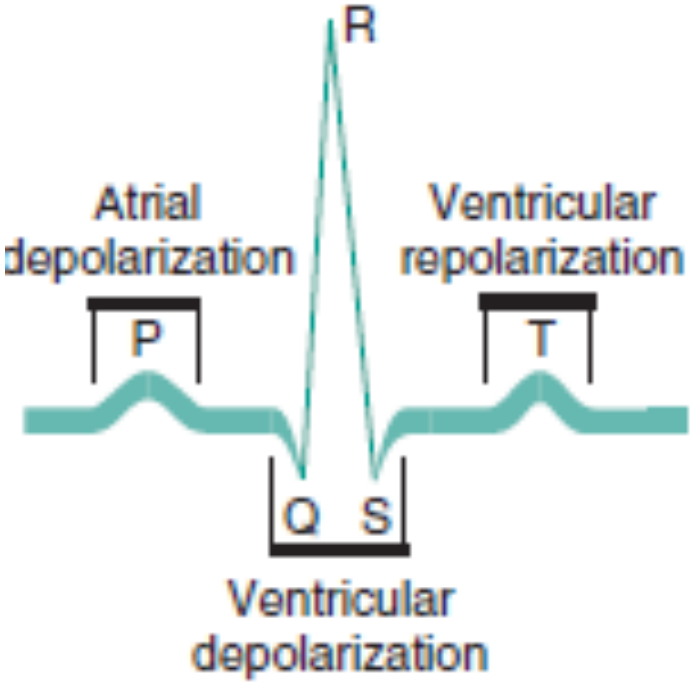



Sinoatrial node
Atrioventricular node
Bundle of His
Purkinje fibres
© teachmeanatomy


Normal conduction
Normal electrical signals
SA Node
Normal sinus rhythm
Atrial fibrillation
Disorganized electrical signals
SA Node
Atrial fibrillation

Electrocardiogram

graphic recording of the electrical activity produced by the conduction system and the myocardium (tissue) of the heart.



The normal ECG consists of

1-P wave, representing atrial depolarization.

2- QRS complex, representing ventricular depolarization.

3- T wave, representing rapid repolarization of the ventricles.

Cardiac Arrhythmias Associated With Various Systemic Diseases

1- Obstructive lung disease, pneumonia.
2-MI, mitral stenosis, ischemic heart disease, thyrotoxicosis, hypertension.
3-Infectious diseases.
4-anemia.
5-hyperthyroidism.
6-drug-related side effects:

- Atropine
- Epinephrine
- Nicotine
- Ephedrine
- Caffeine
- Alcohol
- Digitalis
- Morphine
- Beta-blockers
- Calcium channel blockers

Classification of Common Cardiac Arrhythmias

1-Supraventricular Arrhythmias

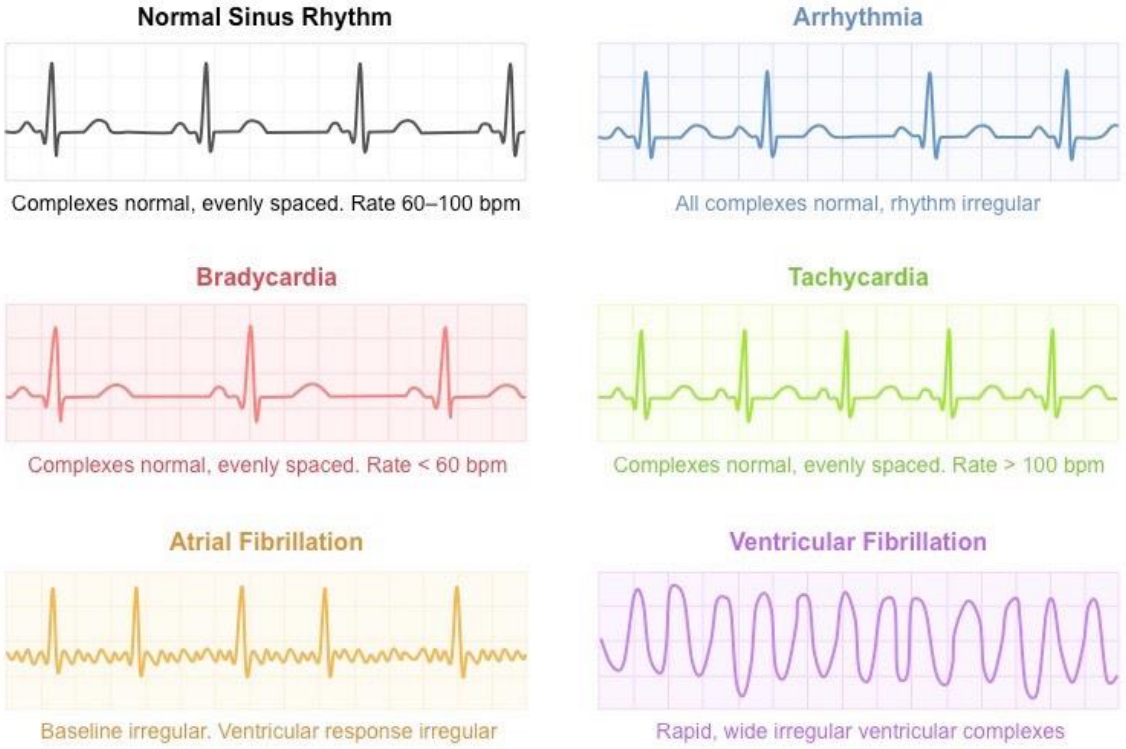
- Atrial Tachycardia
- Atrial Fibrillation

Atrial Flutter (rapid, regular atrial rate of 250 to 350 beats/min.)

2-Ventricular Arrhythmias

- Ventricular Tachycardia
- Ventricular Fibrillation

3-Disorders of Repolarization



Signs and Symptoms of Cardiac Arrhythmias

Signs

- Slow heart rate (<60 beats/min)
- Fast heart rate (>100 beats/min)
- Irregular rhythm
  - The ECG is the primary tool used in the identification and diagnosis of cardiac arrhythmias.

Symptoms

- Palpitations, fatigue
- Dizziness , angina
- Congestive heart failure
  - Shortness of breath
  - Orthopnea(shortness of breath or difficulty breathing when you're lying down).
  - Peripheral edema

MEDICAL MANAGEMENT

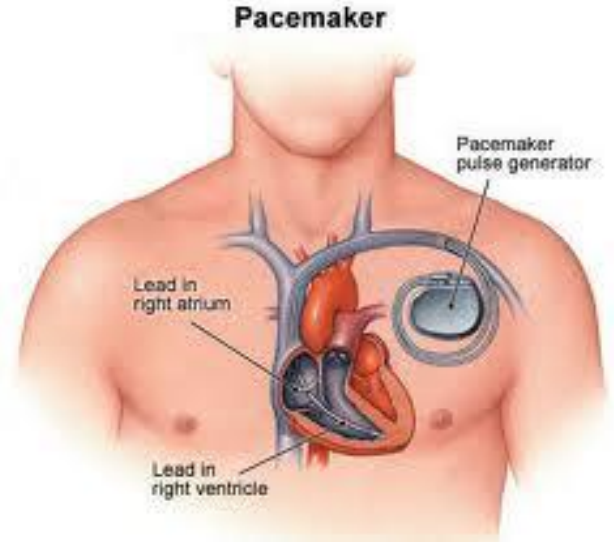
- Medications
  - ***Antiarrhythmic Drugs***
  - ***Direct Oral Anticoagulant (DOAC) Therapy***
- Cardioversion(**a procedure used to return an abnormal heartbeat to a normal rhythm**.)
- pacemakers
- implanted cardio defibrillators (ICDs)
- radiofrequency catheter ablation.
- surgery.

Antiarrhythmic drugs

1. **CLASS I: FAST SODIUM CHANNEL BLOCKERS(**quinidine, procainamide, disopyramide, lidocaine, mexiletine, tocainide, flecainide)
2. **CLASS II: BETA-BLOCKERS (**Propranolol , atenolol)
3. **CLASS III: POTASSIUM CHANNEL BLOCKERS(**Amiodarone)
4. **CLASS IV: SLOW CALCIUM CHANNEL BLOCKERS (**Diltiazem
5. **CLASS V: VARIABLE MECHANISM (**Digoxin)

A pacemaker is a small device that's placed under the skin in the chest to help control your heartbeat. It's used to help the heart beat more regularly if you have an irregular heartbeat (arrhythmia), particularly a slow one. Implanting a pacemaker in the chest requires a surgical procedure

A permanent, implanted pacemaker consists of a lithium battery–powered generator implanted subcutaneously in the left **infraclavicular area** that produces an electrical impulse that is transmitted by a lead inserted into the heart through the **subclavian vein** to an electrode in contact with endocardial or myocardial tissue.



The SA node is the heart’s natural pacemaker

Implantable Cardioverter-Defibrillators

An ICD is a device that is similar to a pacemaker and is implanted in the same way as for a pacemaker. ICDs are capable not only of delivering a shock but also of providing antitachycardia pacing (ATP) and ventricular bradycardia pacing.

Dental management of the patient at risk for a cardiac arrhythmia

1-Awareness

Potentially fatal arrhythmias can be precipitated by strong emotion, various drugs, or the performance of dental procedures in these patients

2-Patient Evaluation and Risk Assessment

- Review **medical history**
- Identify all **medications and drugs**
- **Examine** the patient for signs and symptoms of disease and obtain vital signs.
- c
- Obtain a **medical consultation** if the patient has a poorly controlled or undiagnosed problem or if the patient's health status is uncertain.

3-Analgesics

Provide good postoperative analgesia to minimize pain and associated stress.

4-Antibiotics

For patients with pacemakers or ICDs, antibiotic prophylaxis to prevent infective endocarditis is not recommended.(however consultation is preferable)

Some antibiotics (e.g., metronidazole, extendedspectrum penicillins) are known to increase the INR in patients on warfarin (Coumadin);caution in their use is advised.

5-Anesthesia

Ensure profound local anesthesia. Epinephrinecontaining local anesthetic can be used with minimal risk if the dose is limited to 0.036 mg epinephrine (two capsules containing 1 : 100,000 concentration). Higher doses may be tolerated, but the risk of complications increases with dose. Avoid the use of epinephrine in retraction cord.

Digoxin Toxicity. Because the therapeutic range for digoxin is very narrow, toxicity can easily occur (Signs of toxicity include hypersalivation, nausea, vomiting, headache, drowsiness, visual distortions, with objects appearing yellow or green, and ventricular premature beats.

Vasoconstrictors should be avoided in patients taking digoxin because of the potential for inducing arrhythmias, but if their use is considered essential, it should be discussed with the physician (see Box 5.7).

Studies have shown that modest amounts of vasoconstrictor can be used safely in high-risk cardiac patients when accompanied by oxygen, sedation, nitroglycerin, and excellent pain control measures

6-Anxiety

- schedule short morning appointments.
- Use anxiety reduction techniques to reduce catecholamine levels

- Provide preoperative sedation (short-acting benzodiazepine the night before and/or 1 hour before the appointment).

- Administer intraoperative sedation (nitrous oxide–oxygen).

7-Bleeding

In patients taking

A- warfarin:

- Review current INR laboratory test results (lab laboratory should be performed within 24 to 72 hours of the surgical procedure); confirm that the patient is taking warfarin regularly and has consistent INR within therapeutic range.
- If INR is within the therapeutic range (2.0–3.5), dental treatment, including minor oral surgery, can be performed without stopping or altering the warfarin regimen.

Patients who have AF are at increased risk for stroke and thromboembolism

B-In patients taking DOAC(Rivaroxaban, Xarelto, apixaban)
Consult with physician regarding planned dental procedure and patient's coagulation status.

In patients taking warfarin, DOAC, or another anticoagulant or antiplatelet use local hemostatic measures and products

including

- gelatin sponge
- oxidizedcellulose
- chitosan products in sockets
- suturing
- gauze pressure packs
- stents.
- Tranexamic acid or aminocaproic acid can be used as mouth rinse

Dentists are advised to limit the number of extractions performed at one appointment, and use good local hemostatic procedures for patients taking these drugs.

8-Pacemakers and Implantable Cardioverter-Defibrillators

may experience electromagnetic interference with dental equipment such as electrosurgery devices; thus, avoid (Electrosurgery,pulp tester, cavitron)

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Hypertension

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

Hypertension

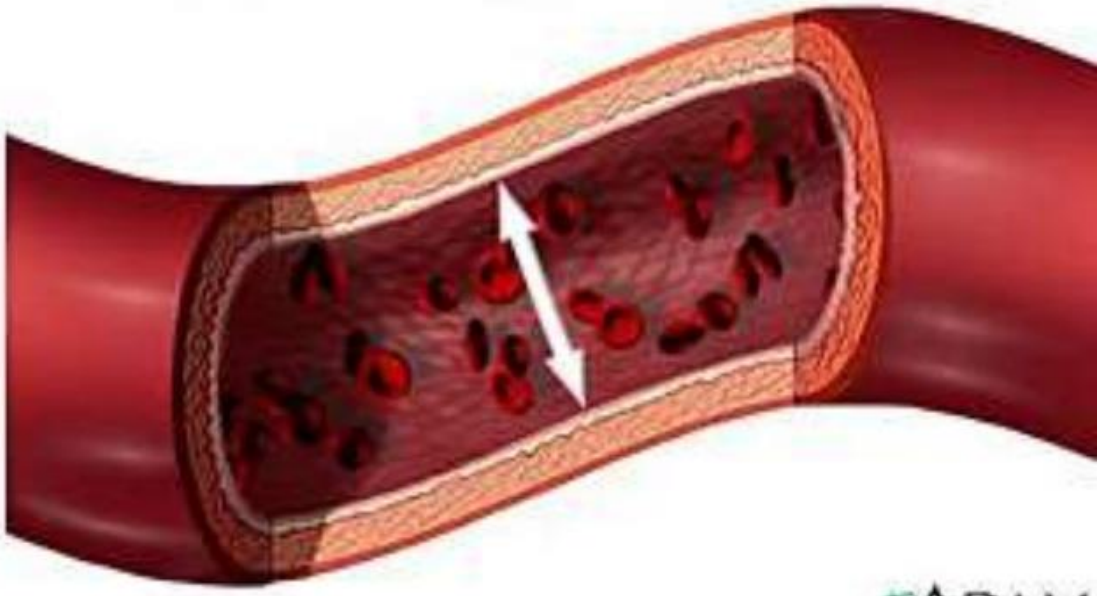
Hypertension is an abnormal elevation in arterial pressure that can be fatal if sustained and untreated.(silent killer)

it is used to describe patient with blood pressure more than 140/90 mmHg.

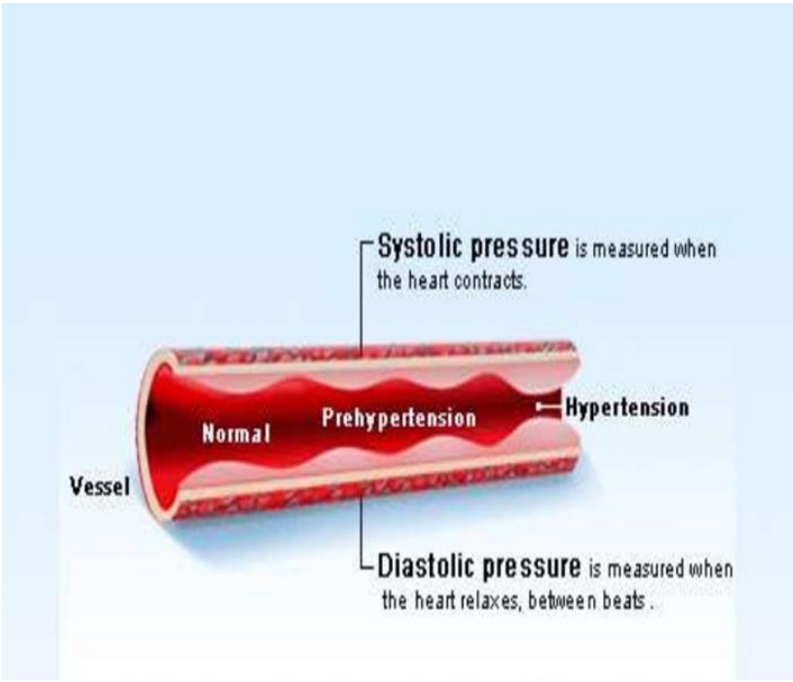
The higher the BP, the greater the chances of heart attack, heart failure, stroke, and kidney disease.

About 50% of hypertensive patients die of coronary heart disease or congestive heart failure, about 33% of stroke, and about 10% of renal failure.

Blood pressure is the measurement of force applied to artery walls

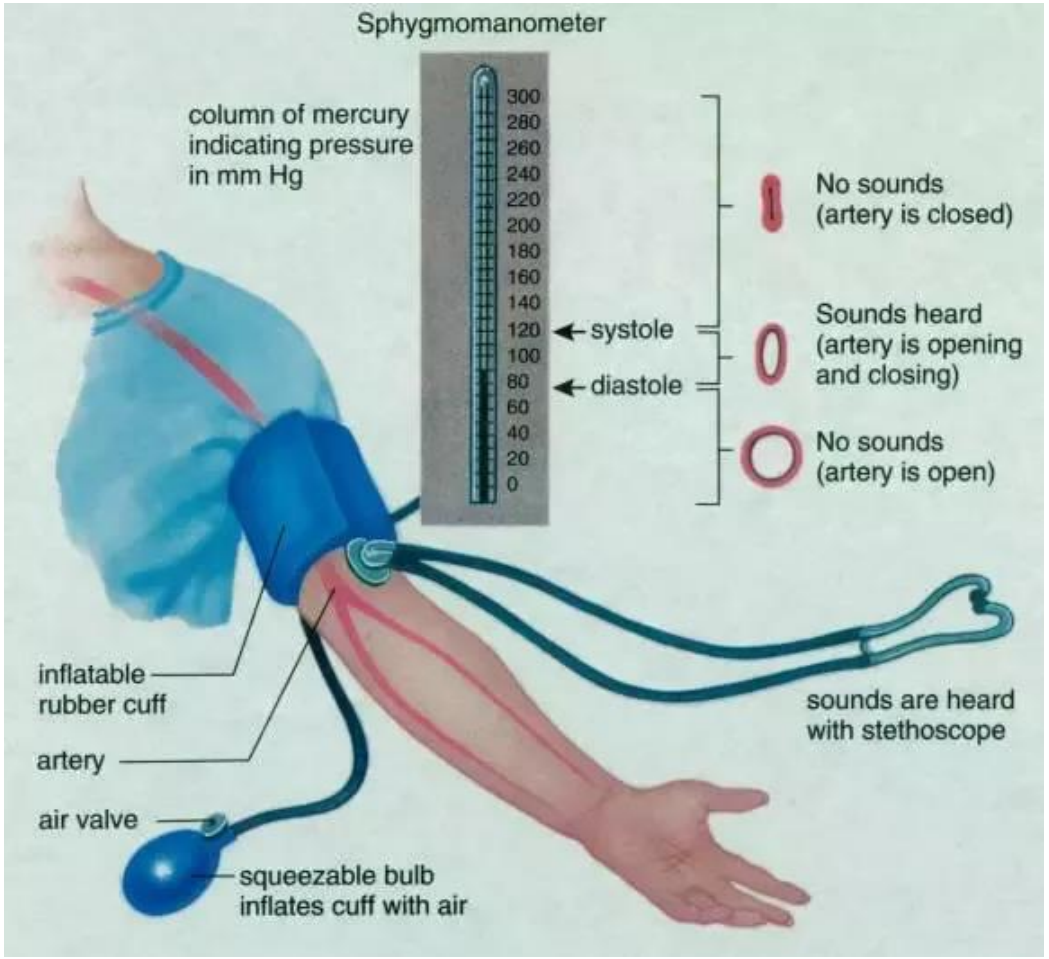


ADAM.



systolic pressure is the **pressure** of the **blood** in the arteries when the heart pumps

diastolic pressure is the pressure of the blood in the arteries when the heart is filling



Normal Regulation of Blood Pressure

Arterial blood pressure (BP) is directly proportionate to the product of the blood flow (cardiac output, CO) and the resistance to passage of blood through precapillary arterioles (peripheral vascular resistance, PVR)

- BP = CO × PVR

REGULATION OF BLOOD PRESSURE

NERVOUS → By vasomotor center &Impulse

RENAL → By regulation of ECF volume & Renin – Angiotensin mechanism

HORMONAL → By Hormones by casing vasoconstriction and vasodilation

LOCAL → By local vasoconstriction and vasodilation

TABLE 3.1 Classification of Blood Pressure (BP) in Adults and Recommendations for Follow-Up

BP Classification	Systolic BP (mm Hg)		Diastolic BP (mm Hg)	Recommended Follow-Up
Normal	<120	and	<80	Recheck in 2 years.
Prehypertension	120–139	or	80–89	Recheck in 1 year.
Stage 1 hypertension	140–159	or	90–99	Confirm within 2 months.
Stage 2 hypertension	≥160	or	≥100	Evaluate or refer to source of care within 1 month. For those with higher BP (e.g., >180/110 mm Hg), evaluate and treat immediately or within 1 week, depending on the clinical situation and complications.

ETIOLOGY

90% of patients have no readily identifiable cause for their disease, which is referred to as
primary (essential) hypertension.

10% of patients, an underlying cause or condition may be identified; for these patients, the term *secondary hypertension* is applied.

SECONDARY HYPERTENSION

1) Alcohol (is possible that **alcohol** may stimulate adrenals to release adrenaline, resulting in increased heart rate cardiac output and systolic **blood)**

2) Obesity
3) Increased intra cranial pressure
4) Toxemias of pregnancy(is characterized by water retention, hypertension, proteinuria, and edema,)

5) RENAL DISORDER
a) Renal vascular disease
b) Glomerulonephritis
c) Polycystic kidney disease

6) ENDOCRINE DISORDER

a) Pheochromocytoma (tumor of adrenal gland tissue. It results in the release of too much epinephrine and norepinephrine.)
b) Cushing syndrome(body makes too much of the hormone cortisol over a long period of time.)
c) Hyperaldosteronism(condition where in too much aldosterone is produced by the adrenal glands)

7) CARDIOVASCULAR DISORDER

a) Coarctation of aorta(is a birth defect in which a part of the **aorta** is narrower than usual.)
b) Atherosclerosis(refers to the buildup of fats, cholesterol and other substances in and on artery walls (plaque), which can restrict blood flow.)

8-Drugs related HTN.
9- Food related HTN.
10- Chemicals related HTN.

Food related

- Sodium
- Ethanol.

❑DRUGS

Corticosteroids.
Estrogen.
NSAID,s.
Cyclosporins.
Amphetamine.
MAOI,s.
TCA.
Cocaine.
Oral contraceptives.
Nicotine.

❑ CHEMICALS

- Lead
- Mercury
- Lithium
- thallium

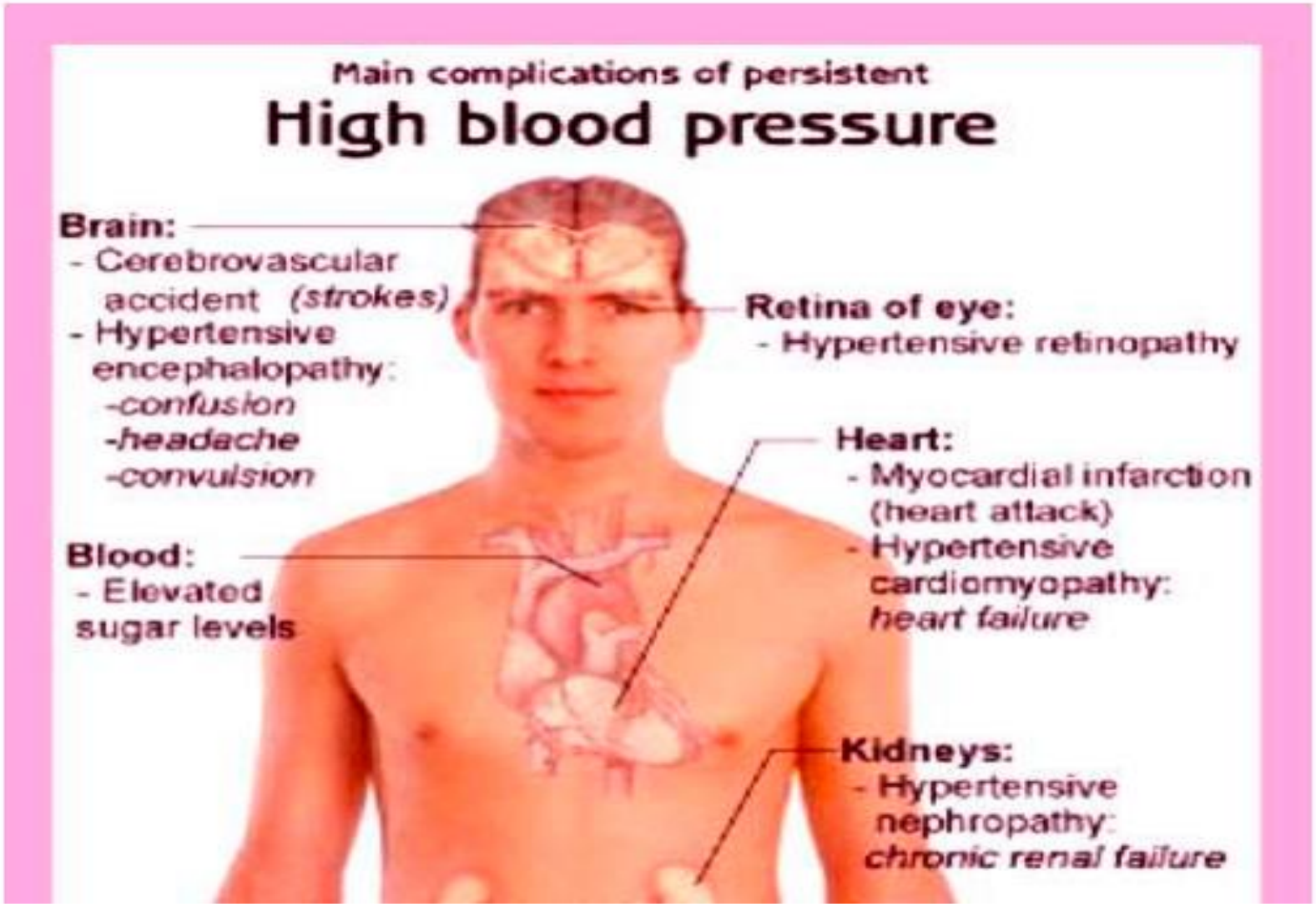
BOX 3.2 Signs and Symptoms of Hypertensive Disease

Early

- Elevated blood pressure readings
- Narrowing and sclerosis of retinal arterioles
- Headache
- Dizziness
- Tinnitus

Advanced

- Rupture and hemorrhage of retinal arterioles
- Papilledema
- Left ventricular hypertrophy
- Proteinuria
- Congestive heart failure
- Angina pectoris
- Renal failure
- Dementia
- Encephalopathy


Main complications of persistent
High blood pressure
Brain:
- Cerebrovascular accident (strokes)
- Hypertensive encephalopathy:
-confusion
-headache
-convulsion
Blood:
- Elevated sugar levels
Retina of eye:
- Hypertensive retinopathy
Heart:
- Myocardial infarction (heart attack)
- Hypertensive cardiomyopathy:
heart failure
Kidneys:
- Hypertensive nephropathy:
chronic renal failure

HYPERTENSIVE CRISES

Hypertensive crisis is an umbrella term for hypertensive urgency and hypertensive emergency.

EMERGENCY= Severe SYMPTOMATIC elevation in BP WITH evidence of end organ damage

Brain (seizures, increased ICP)
Kidneys (renal insufficiency)
Eyes (papilledema, retinal hemorrhage)
Heart (heart failure)

URGENCY= Severe elevation in BP WITHOUT severe symptoms or evidence of end organ damage

DRUG THERAPHY :

1-THIAZIDE & OTHER DIURETICS

-Hydrochlorothiazide , Cyclopenthiazide -Furosemide , bumetanide

2-ACE INHIBITOR -Enalapril , ramipril , lisinopril

3-ANGIOTENSIN RECEPTOR BLOCKER -Valsartan , Losartan

4-CALCIUM CHANNEL BLOCKER -Amlodipine , nifedipine , verapamil

5-BETA BLOCKER -Proponalal , atenolol , metoprolal

MIXED ALPHA & BETA BLOCKER -Labetalol , Carvedilol

OTHER DRUGS -Prazosin , terazosin , -hydralazine , sodium nitroprusside

Drug Class	Dental Side Effects
Beta-blockers	Dry mouth,[9] taste changes,[2,9,11] lichenoid reaction,[2,9,11]
ACE inhibitors	Rash,[8] dry cough,[8] loss of taste,[9] taste changes,[2,8,11,22] dry mouth,[2,9] ulceration,[9] angioedema,[9,11] burning mouth,[11] lichenoid reactions,[2] neutropenia → delayed healing, gingival bleeding,[11]
Angiotensin II receptor blockers	Dry mouth,[9] angioedema,[8,9,11] sinusitis,[9] taste loss,[9] cough[8,9]
Calcium channel blockers	Gingival enlargement,[2,9,11,22] dry mouth,[9] altered taste,[2,9] erythema multiforme[22]
Alpha-blockers	Dry mouth,[9] taste changes[11]
Diuretics	Dry mouth,[2,9,11] lichenoid reaction,[2,9,11,22] altered taste (acetazolamide)[2]
Direct-acting vasodilators	Facial flushing,[9] gingival bleeding,[9] infection,[9] lupus-like oral/skin lesions,[8,11] lymphadenopathy[11]
Central-acting agents	Dry mouth,[2,8,9,11] sedation,[8] taste changes,[9,11] linenoid reactions (methyldopa),[2,22] parotid pain,[9] opioids[9]
Combined alpha/beta blockers	Taste changes[11]

Management Recommendations for Patients With Hypertension

Antibiotics Avoid the use of erythromycin and clarithromycin (not azithromycin) with CCBs because the combination can enhance hypotension

Analgesics Avoid long-term (>2 weeks) use of NSAIDs because these agents may interfere with effectiveness of some antihypertensive medications

Anesthesia Modest doses of local anesthetic with1 : 100,000 or 1 : 200,000 epinephrine (e.g., 1 or 2 carpules) at a given time are of little clinical consequence in patients with BP <180/110 mm Hg.
Greater quantities may be tolerated reasonably well but with increased risk.
Levonordefrin should be avoided. In patients with uncontrolled hypertension (BP >180/110 mm Hg), the use of epinephrine should be limited.

Anxiety

Patients with hypertension who are anxious or fearful are especially good candidates for preoperative oral or intraoperative inhalation sedation (or both). Apply good stress management protocols.

Chair position

Avoid rapid position changes owing to possibility of antihypertensive drug-associated orthostatic hypotension

TABLE 3.6 Dental Management and Follow-Up Recommendations Based on Blood Pressure

BLOOD PRESSURE (mm Hg)	Dental Treatment Recommendation	Follow-Up Recommendation
≤120/80	Any required	No physician referral necessary
≥120/80 but <140/90	Any required	Encourage patient to see physician
≥140/90 but <160/100	Any required	Encourage patient to see physician
≥160/100 but <180/110	Any required; consider intraoperative monitoring of BP for upper-level stage 2 hypertension	Refer patient to physician promptly (within 1 month)
≥180/110	Defer elective treatment	Refer to physician as soon as possible; if patient is symptomatic, refer immediately

Drug Interactions between Antihypertensives and Drugs Used in Dentistry

An additional concern when patients with hypertension are treated is the potential for adverse drug interactions between vasoconstrictors and antihypertensive drugs—specifically, the nonselective β-adrenergic blocking agents. propranolol and nadolol).. ???

Topical vasoconstrictors generally should not be used for local hemostasis in patients with hypertension.

Erythromycin and clarithromycin can exacerbate the hypotensive effect of CCBs and result in acute kidney injury.[41]

Long-term use of NSAIDs may antagonize the antihypertensive effect of diuretics, beta-blockers, alpha blockers, vasodilators, ACE inhibitors .

Clinical Notes

Patients with cardiovascular disease have a high risk of complications due to endogenous catecholamines (adrenaline and noradrenaline) released from pain and stress.

These catecholamines may increase dramatically BP and cardiac output.

Local anesthetics with epinephrine produce a longer and more effective anesthesia than plane LA, The maximum recommended dose of epinephrine in a patient with cardiac risk is 0.04 mg, which is equal to that containing about two cartridges of LA with 1 : 100000 epinephrine or 4 cartridges with 1 : 200000 epinephrin.

In patients with severe disease it may be useful to measure BP and heart rate after anesthetic injection.

Slow administration and **aspiration** can prevent undesirable reactions.

A patient with hypertension who has cardiovascular issue, such as previous MI or stroke, may be taking daily aspirin or another antiplatelet agents , additional precautions are advised

Particular attention should be given to accurate measurement of BP in pregnant women, since pregnancy may alter the patient BP values

Relative contraindications of using LA with adrenalin:

1) Sever & very sever uncontrolled hypertension.
2) Refractory cardiac arrhythmia.
3) Recent myocardial infarction (less than 6months).
4) Recent stroke (less than 6months).
5) Unstable angina.
6) Recent coronary artery bypass graft (less than 3months).
7) Uncontrolled congestive heart failure.
8) Uncontrolled hyperthyroidism.

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Acquired Immunodeficiency Syndrome

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

AIDS Acquired Immunodeficiency Syndrome

AIDS is an infectious disease caused by HIV, which is transmitted predominantly through intimate sexual contact and by parenteral means

ETIOLOGY

AIDS is caused by human immunodeficiency virus (HIV)

The most common cause of AIDS throughout the world is HIV

Understanding the Immune System

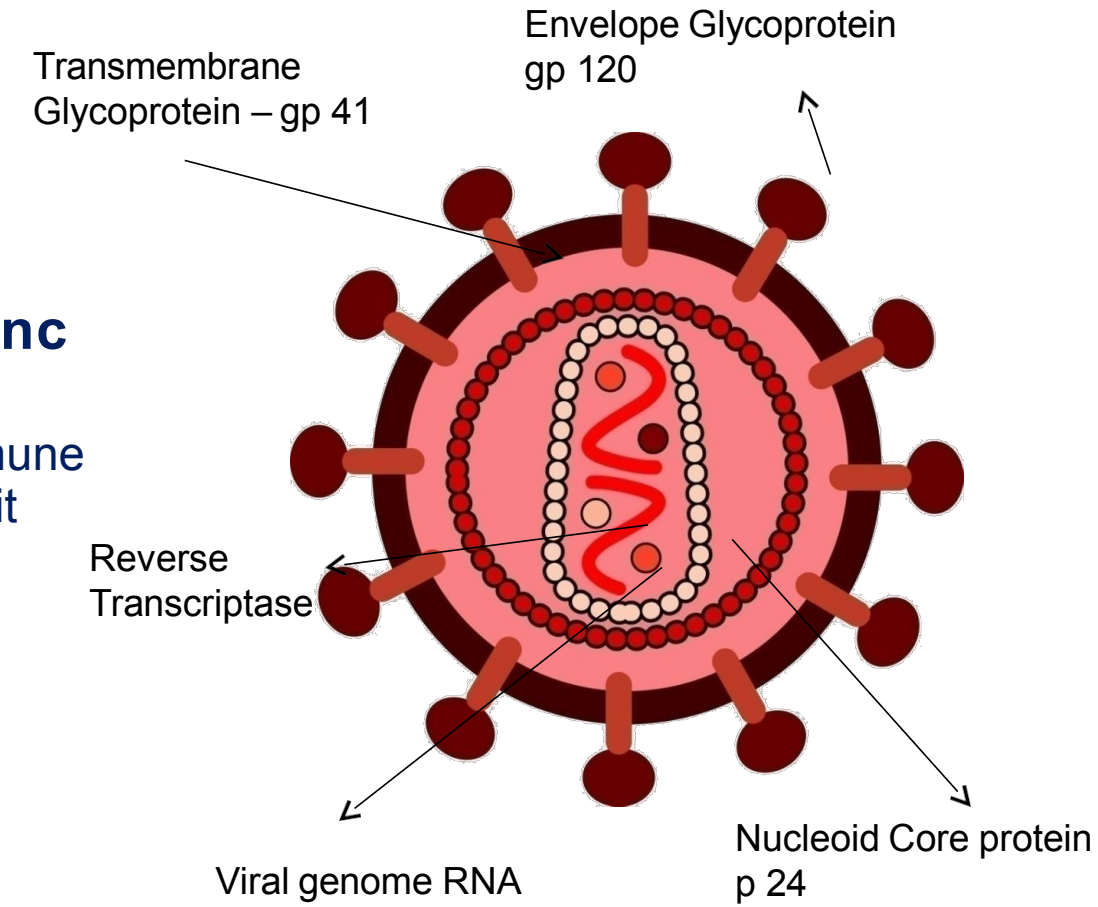
- WBC are the most important part of the immune system
- Neutrophils attack bacteria
- B-lymphocytes make antibodies
- **T-lymphocytes**
  - Responsible for coordinating the immune system's attack on viruses, fungi and some bacteria

Understanding the Immune System

- WBC are the most important part of the immune system
- Neutrophils attack bacteria
- B-lymphocytes make antibodies
- **T-lymphocytes**
  - Responsible for coordinating the immune system's attack on viruses, fungi and some bacteria

Meaning of HIV …….?

- **Human:**
  - Can live only in humans
- **Immunodeficiency:**
  - Damages the immune system of people it infects
- **Virus:**
  - Retrovirus (RNA)



Meaning of AIDS.....?

Acquired
(not born with)

Transmitted from person to person

Immune
(body's defense system)

It affects the body's immune system, the part of the body which usually works to fight off germs such as bacteria and viruses

Deficiency
(not working properly)

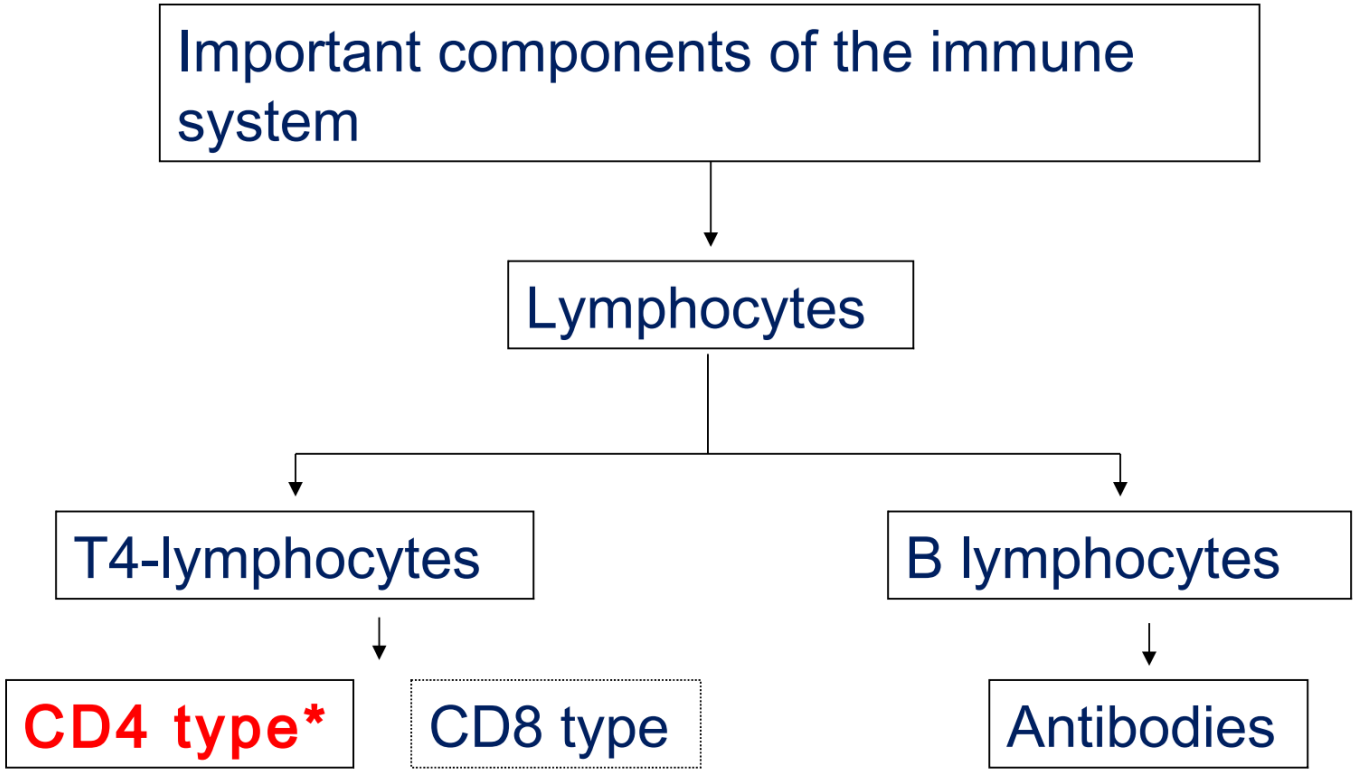
Malfunctioning of the body's immune system

Syndrome
(a group of signs and symptoms)

Someone with AIDS may experience a wide range of different diseases and OIs

What is the ……..AIDS ?

"It is disease in which there is severe loss of body cellular immunity gradually lower in the resistance to infection"



HIV uses CD4 cells for replication

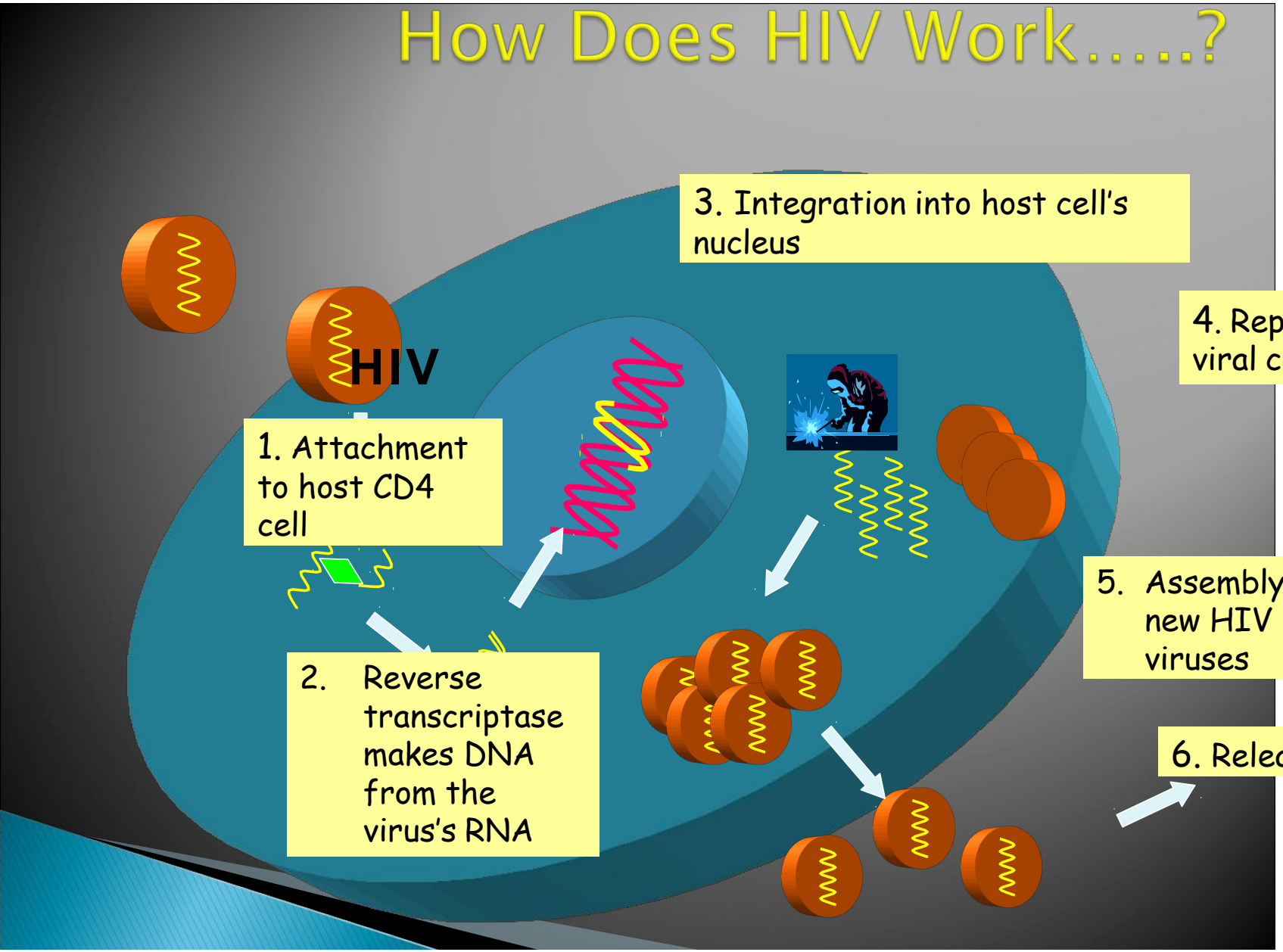
Summary of the global HIV epidemic, 2021

	People living with HIV in 2021	People acquiring HIV in 2021	People dying from HIV-related causes in 2021
Total	38.4 million [33.9–43.8 million]	1.5 million [1.1–2.0 million]	650 000 [510 000–860 000]
Adults (15+ years)	36.7 million [32.3–41.9 million]	1.3 million [990 000–1.8 million]	560 000 [430 000–740 000]
Women (15+ years)	19.7 million [17.6–22.4 million]	640 000 [480 000–870 000]	240 000 [180 000–320 000]
Men (15+ years)	16.9 million [14.6–19.7 million]	680 000 [500 000–920 000]	320 000 [250 000–430 000]
Children (<15 years)	1.7 million [1.3–2.1 million]	160 000 [110 000–230 000]	98 000 [67 000–140 000]

Source: UNAIDS/WHO estimates

World Health

How Does HIV Work…..?



Depletes T 4 helper cells rapidly(particularly CD4 cells.)

The agent – HIV- a retro virus

- A retrovirus is an RNA virus that is replicated in a host cell via the enzyme reverse transcriptase to produce DNA from its RNA genome.

- The DNA is then incorporated into the host’s genome by an integrase enzyme.

- The virus thereafter replicates as part of the host cell's DNA.

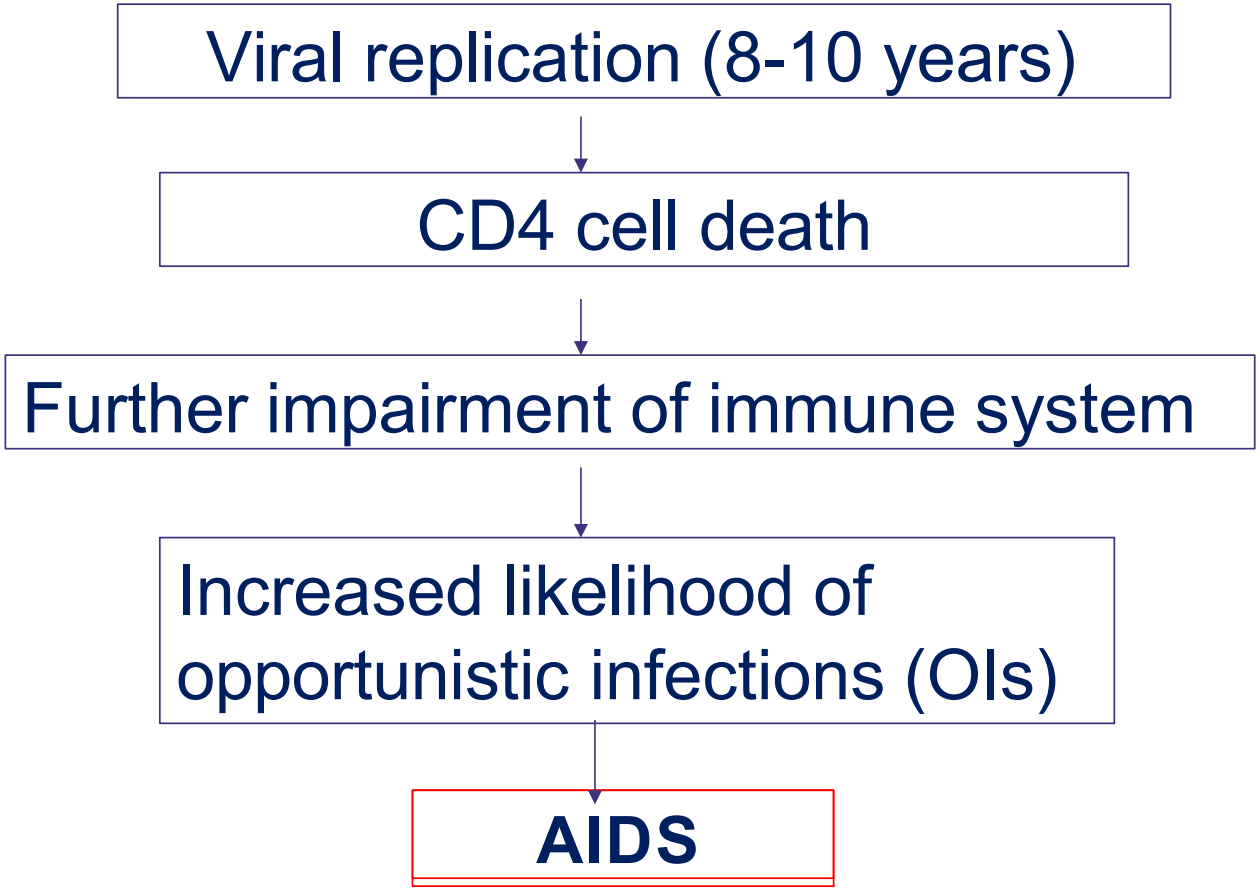
- Rapidly mutates

- Depletes T 4 helper cells rapidly(particularly CD4 cells.)

Over time, CD4 cell counts decline, which results in a poorly functioning immune system(immunodeficiency).

- This eventually leads to AIDS, which is indicated by the opportunistic infections

How Does HIV Cause AIDS ?



MODE OF TRANSMISSION:-

- Blood products
- Vaginal fluids
- Semen
- Breast milk

- Sharing Needles

- Unsterilized blades & razor

- Through Sex

- From mother to baby

How HIV Is NOT Transmitted:-

- Hugging
- Contact with sweat, tears, urine or faeces
- Bathing/Swimming in the same pool
- Sharing cooking utensils, cups, toilet seats, bedding, telephones or towels
- Eating food prepared by an infected person

Mosquitoes

HIV is present in saliva, however, it is not considered a risk factor for transmission.

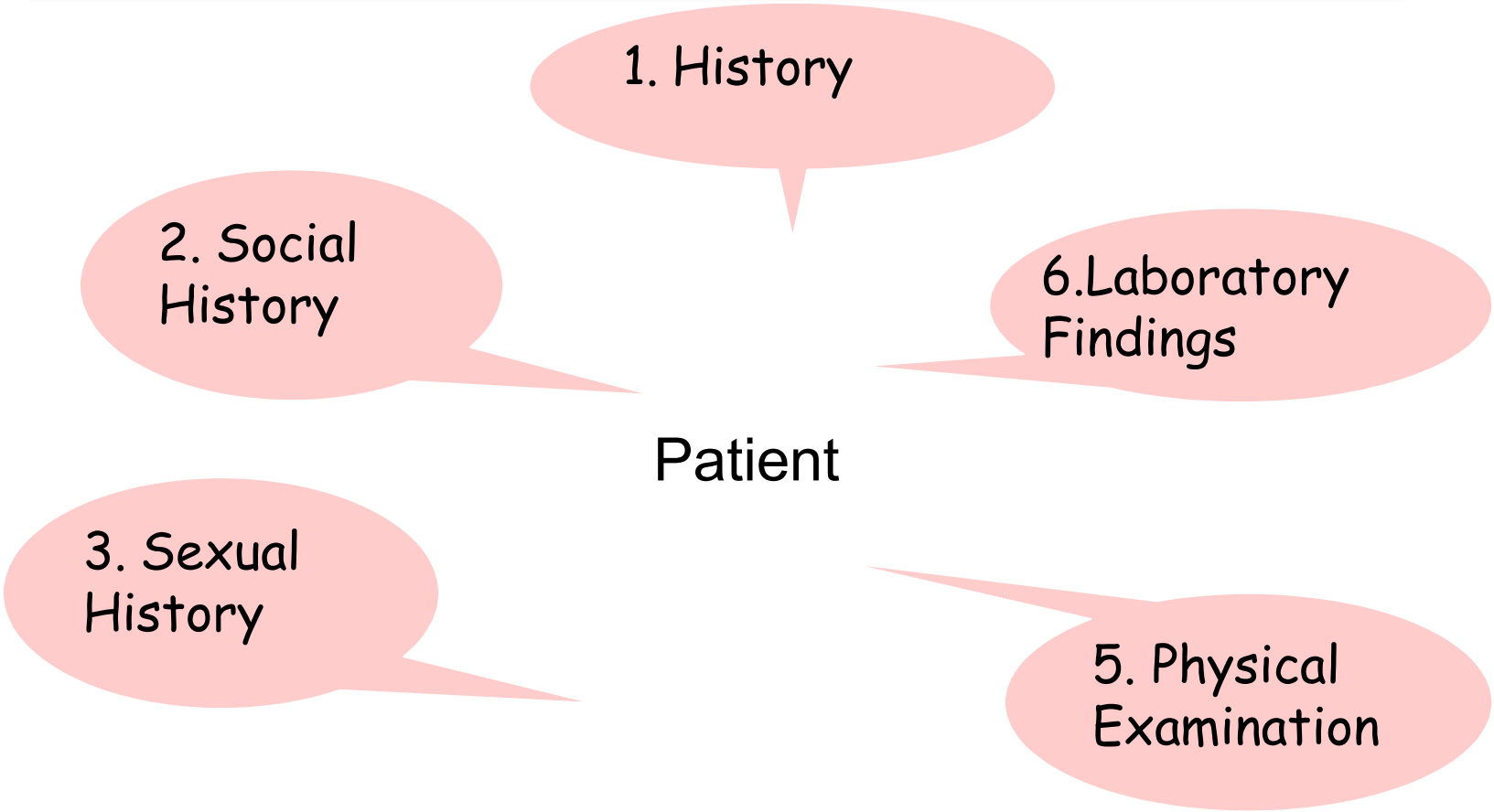
WHO clinical staging in adults/adolescents	
Stage 1	**Asymptomatic. Persistent generalised lymphadenopathy** **CD4>500**
Stage2	**Wt loss<10%, , Herpes zoster, ang cheilitis, recurrent oral ulcers, , dermatitis, fungal nail infections** **CD4--** 500 to 350
Stage3	**Unexplained wt loss >10%, chronic diarrhoea >1 mth, persistent oral candidiasis, oral hairy leukoplakia, severe bact infections, pneumonia** **CD4 350 to 200**
Stage4	**kaposi's sarcoma, retinitis, HIV encephalopathy, etc** **CD4** <200

What are the Sign & Symptoms:-

- Weight Loss
- Frequent Fever and sweating
- Persistence skin rashes & flaky skin

- Severe & persistence Diarrhea
  - Vision loss
  - Nausea
  - Vomiting
- Abdominal cramps

Investigation:-



MEDICAL MANAGEMENT:–

- **1. ART(Anti-retroviral Therapy** (Anti HIV drugs)

Note- (Provide infants with 4-6 weeks of once-daily

2. Palliative care

3. Complimentary therapy

4. Guidance/Counselling

Limitations of ART:-

- Although ART dramatically improves the health and life expectancy for PLHIV

-ART is NOT a cure for AIDS

- **HIV is NEVER entirely eliminated from the body**

- HIV can still be transmitted to others, even when the PATIENT HIV is healthy and taking his/her medication regularly

- **ART is to be taken lifelong**

Oral manifestations of HIV Infection

1-Fungal infections:

Oral candidiasis

Cryptococcoses

Histoplasmosis

2-Viral infections:

Oral hairy Leukoplakia

Herpes simplex stomatitis

3-Aphthus ulcer:

Minor, major , herpetiform

4-Xerostomia

5-Gingival \perio disease:

ANUG

Necrotizing stomatitis

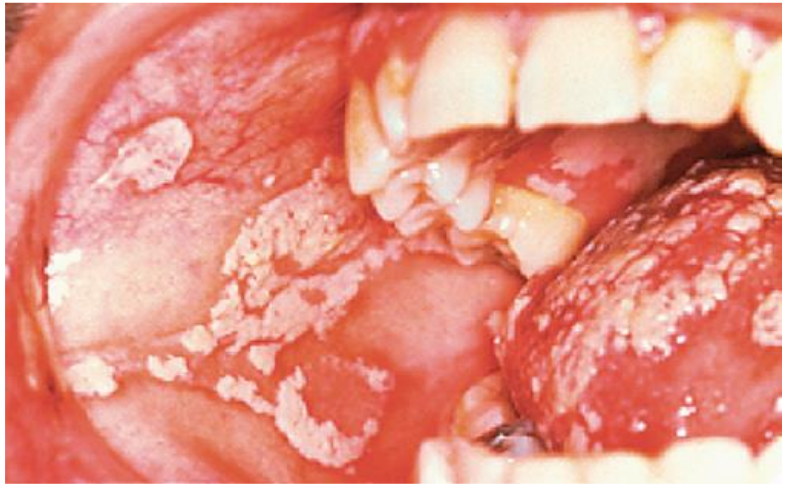
6-Neoplastic disease:

Leukoplakia

Sq. cell ca.

Non-Hodgkin lymphoma

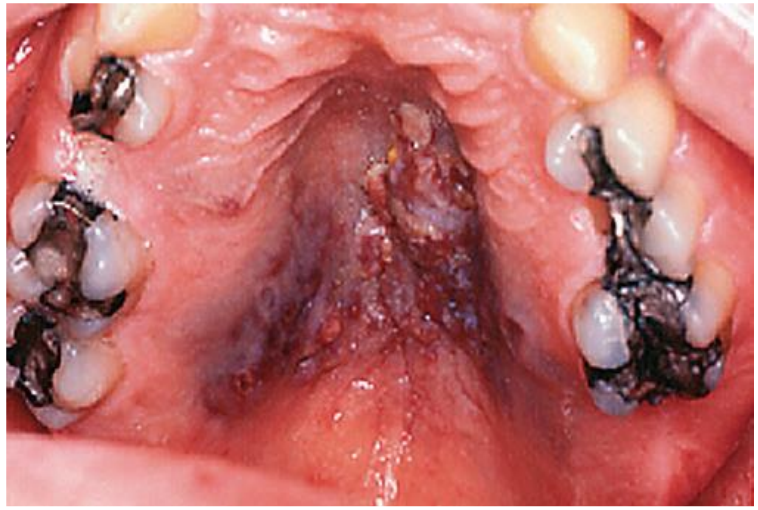
Kaposi sarcoma(KS)



pseudomembranous candidiasis

Kaposi sarcoma of the nose

White lesions on the palate in a patient with AIDS.



Biopsy revealed Kaposi sarcoma.

Kaposi sarcoma(KS)

Kaposi's sarcoma (KS) is a type of cancer that can form masses in the skin, in lymph nodes, in the mouth, or lymph nodes, mouth, or in other organs. The skin lesions are usually painless, purple, and may be flat or raised. Lesions can occur singly, multiply in a limited area, or may be widespread

People with weaker immune systems have a high risk of Kaposi sarcoma.

Diagnosis of AIDS

1-Clinical *At least 2 major and 1 minor*

Major signs

- Wt loss>10% of •body wt
- Chronic diarrhoea>1 mth
- Prolonged fever > 1 mth

Minor signs

- Persistent cough > 1 mth
- Generalised dermatitis
- herpes zoster
- Oro pharyngeal candidiasis
- Chronic progressive or disseminated herpes simplex infection
- Generalised lymphadenopathy

****Kaposi's sarcoma / cryptococcus meningitis alone - sufficient for diagnosis**

2-Serological tests for antibodies

Note

- Oral lesions may be present at all stages of HIV infection.
- As the immunodeficient state gradually impairs humoral and cell mediated immunity it allows other diseases to affect the patient.

Dental Management of the Patient With AIDS

Consult whenever possible with patient's physician to establish current status

Evaluate and determine whether HIV infection exists.
Obtain medical consultation if poorly controlled or undiagnosed problem or if uncertain.

Aspirin and other NSAID use can worsen bleeding in a patient who has thrombocytopenia. Avoid during thrombocytopenic episodes. Check drug interactions before use.

Antibiotics Prophylactic use not required unless severe immune neutropenia (<500 cells/µL) ispresent.
Manage postoperative infections with usual antibiotic use. Check for drug interactions before use of antibiotics.

Ensure that patient does not have a pulmonary infection. Delay treatment until pulmonary infections are resolved.

Dental Management of the Patient With AIDS

1 -ASYMPTOMATIC PATIENT.

2 -SYMPTOMATIC PATIENT.
(HAS OPPORTUNISTIC INFECTION).

3-PATIENT WITH THROMBOCYTOPENIA

4-PATIENT WITH SEVER SYMPTOMES.

ASYMPOMATIC PATIENT

Patients who have been exposed to the virus & HIV seropositive but asymptomatic may receive all indicated dental treatment (CD4+cell count more than 500).

Symptomatic patient

For early stages of AIDS, with advanced immunosuppression and neutropenia (CD4+cell count lower than 200

and or neutrophil count lower than 500/cubic mm) have increased susceptibility to opportunistic infection & need prophylactic drugs for an invasive procedure.

Any source of oral or dental infection should be eliminated

chlorhexidine mouth wash may be helpful.

PATIENT WITH THROMBOCYTOPENIA

Patient with sever thrombocytopenia below 50 000/cubic mm ,may required special measures (platelet replacement) before any surgical treatment including scaling & polishing .

PATIENTS WITH SEVERE SYMPTOMS

Severe symptoms of AIDS are managed by treatment of their more urgent dental needs to prevent pain & infection.

Occupational Exposure to HIV

The risk of HIV transmission from infected patients to health care workers is very low, reportedly about 3 of every 1000 cases (0.3%) in which a needlestick or other sharp instrument transmitted blood from a patient to a health care worker.

The rate of transmission of HIV can be reduced by postexposure prophylaxis (PEP).

The number of PEP drugs recommended is based on the severity of the exposure as well as the HIV status of the source patient

The recommended basic regimen for HIV PEP is tenofovir plus emtricitabine or zidovudine plus lamivudine.

Exposed clinician should be provided expert consultation and follow-up monitoring

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Renal diseases

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

The Human Kidney

- Bean-shaped, reddish-brown organs.
- about the size of your fist.
- It measures 10-12 cm long.
- covered by a tough capsule of fibrous connective tissue
- Adhering to the surface of each kidney-two layers of fat to help cushion them

kidney is composed of about one million anatomical and functional units called **nephrons.**

In turn, each nephron is composed of a **glomerule and tubule**.

The glomerule consists of an interconnected network of capillaries which continues with the proximal convoluted tubule

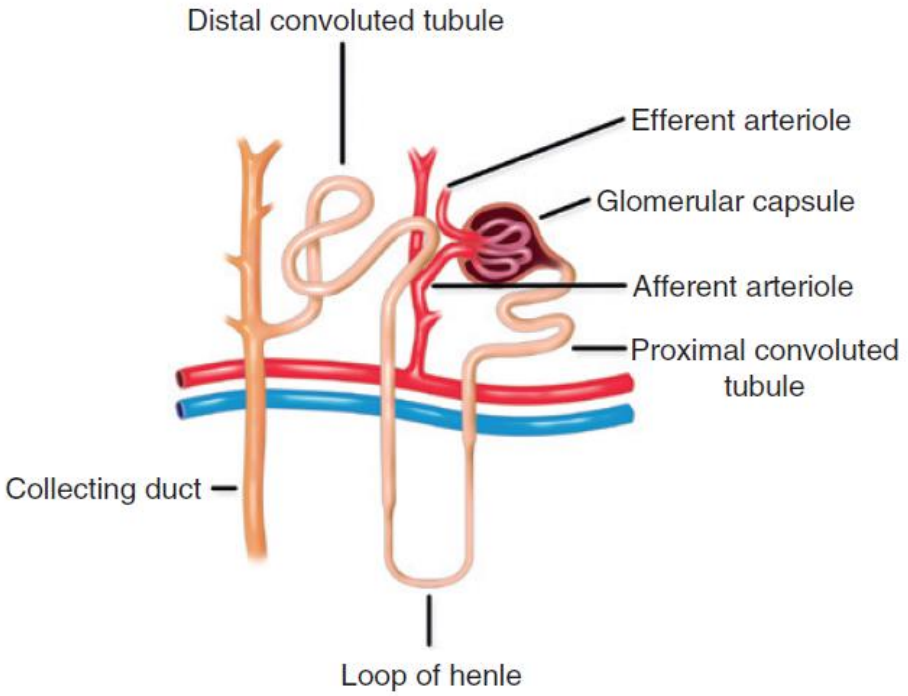
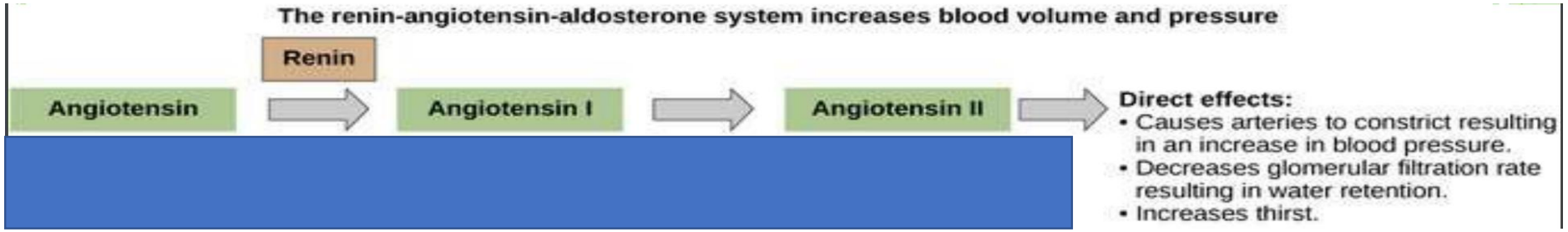


FIG 12.1 The nephron. (Courtesy of Matt Hazzard, University of Kentucky.)

The kidneys have several important functions:

1-Regulate fluid volume
2- Filter waste and toxins
3-Maintain acid–base balance of plasma
4-Synthesize and release hormones (erythropoietin, 1,25-dihydroxycholecalciferol,and renin).
5-Drug metabolism
6- Serve as the target organ for parathormone and aldosterone.
7-Vitamin D,- involved in bone metabolism
8-Regulation of blood glucose level

- Renal PGs systemically lower blood pressure by decreasing systemic vascular resistance
- Erythropoietin stimulates the production of RBCs in the bone marrow.
- Like the liver, the kidneys can use the amino acid glutamine in gluconeogenesis, the synthesis of new glucose molecules.
- One of the functions of the kidney is to monitor blood pressure and take corrective action if it should drop. The kidney does this by secreting the proteolytic enzyme renin



Kidney Disease

1-Acute renal failure

-Sudden decrease in renal function.

-Acute renal failure is often reversible so long as permanent injury to the kidney has not occurred.

2-Chronic kidney disease is defined as abnormalities of kidney structure or function, present for 3 months or longer.

Causes of chronic renal failure

Neoplasms
Obstructive disorders
Autoimmune diseases
Congenital abonramlity
Hepatorenal failure
Drug toxicity
Hypertension
Diabetes
Chronic urinary tract infection
others

CKD Risk Factors*

Modifiable

- Diabetes
- Hypertension
- History of AKI
- Frequent NSAID use

Non-Modifiable

- Family history of kidney disease, diabetes, or hypertension
- Age 60 or older (GFR declines normally with age)
- Race

*Partial list
AKI, acute kidney injury

TABLE 12.2 Laboratory Values for the Assessment of Renal Function and Failure

Laboratory Test	Reference Value	Indicator* of Renal Insufficiency (Stages II–IV)	Indicator of Renal Failure (Stage V)
		URINE	
Albuminuria	<30 mg/g	30–300 mg/g	>300 mg/g
Creatinine clearance (CCr)	85–125 mL/min (women) 97–140 mL/min[34]	50–90 mL/min	Moderate: 10–50 mL/min; severe: <10 mL/min
Glomerular filtration rate (GFR)†	100–150 mL/min	15–89 mL/min	Moderate: <15 mL/min; severe: <10 mL/min
		SERUM	
Blood urea nitrogen (BUN)	8–18 mg/dL (3–6.5 mmol/L)	20–30 mg/dL	Moderate: 30–50 mg/dL; severe: >50 mg/dL
Creatinine	0.6–1.20 mg/dL	2–3 mg/dL	Moderate: 3–6 mg/dL; severe: >6 mg/dL

*Secondary indicators of renal function. Normal reference values: calcium, 8.2–11.2 mg/dL; chloride, 95–103 mmol/L; inorganic phosphorus, 2.7–4.5 mg/dL; potassium, 3.8–5 mmol/L; sodium, 136–142 mmol/L; total carbon dioxide for venous blood, 22–26 mmol/L; and uric acid, 2.4–7.0 mg/dL.

†GFR is often calculated using the Cockcroft-Gault equation, the Modification of Diet in Renal Disease (MDRD) Study equation, or the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation.

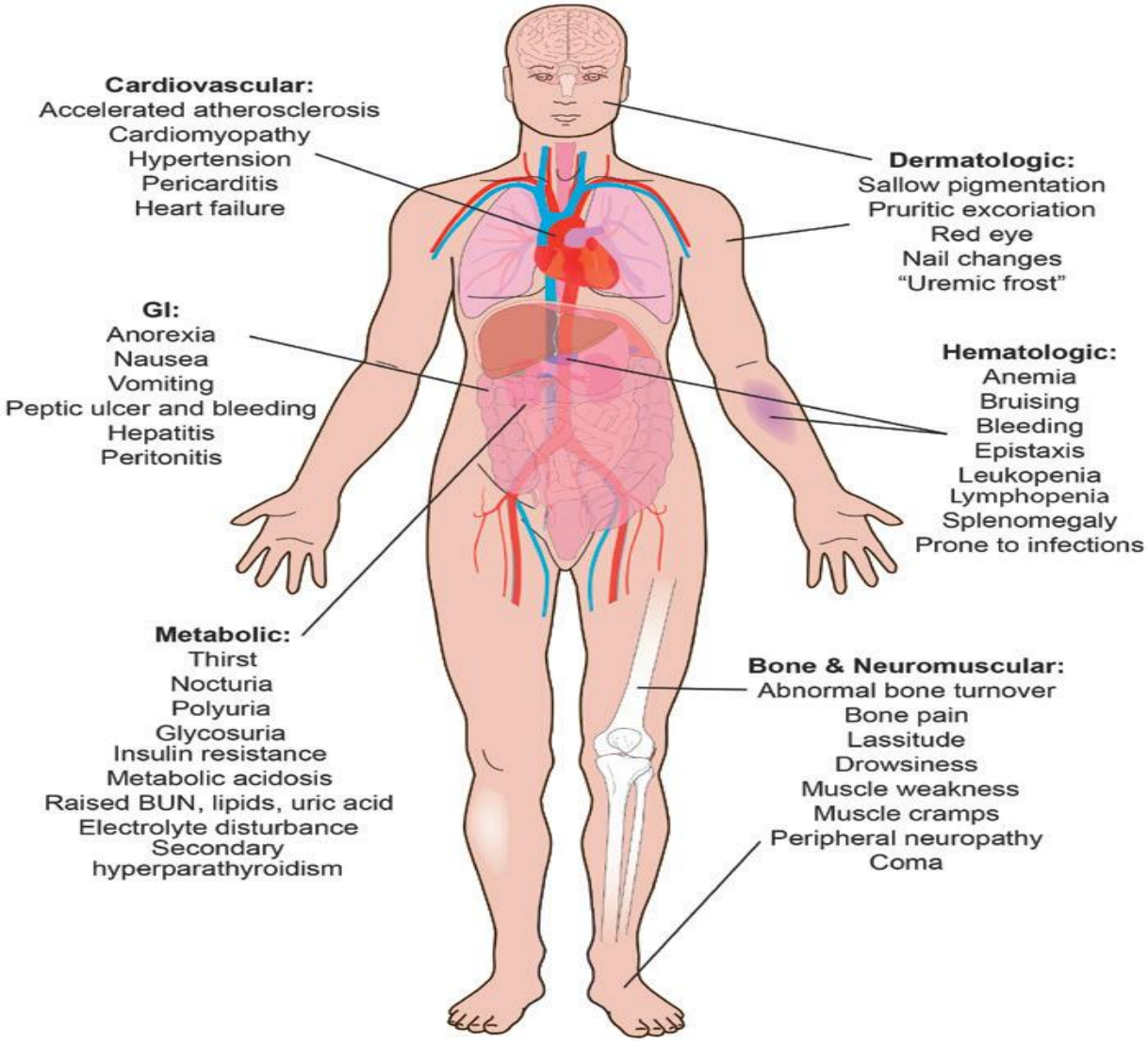
Adapted from National Kidney Foundation: K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification, *Am J Kidney Dis* 39:S1-S266, 2002 and Evaluation and management of chronic kidney disease: synopsis of the kidney disease: improving global outcomes 2012 clinical practice guideline, *Ann Intern Med* 158:825-30, 2013.

Stages of CKD

Stage	Description	GFR ml/min/1.73m²
1	Kidney damage with normal or increased GFR	>=90
2	Kidney damage with mild GFR fall	60-89
3	Moderate fall in GFR	30-59
4	Severe fall in GFR	15-29
5	Established renal failure	<15 or dialysis

Clinical features of chronic renal failure.

- Symptoms develop slowly and are nonspecific
- Pts may remain asymptomatic until renal failure is far-advanced (GFR < 10-15 ml/min.



BOX 12.2 Oral Manifestations of Chronic Kidney Failure

- Pallor; pigmentation, and petechiae (also ecchymosis) of oral mucosa
- Dry mouth (xerostomia), altered taste (dysgeusia), halitosis
- Infections: candidiasis, periodontitis, parotid infections
- Enamel defects of developing dentition (hypoplasia and hypocalcification)
- Osteodystrophy (radiolucent jaw lesions)
- Uremic stomatitis*

*Noted in severe end-stage renal disease.

End Stage Renal Diseases

1-Hematological Effect

Patients with ESRD demonstrate several hematologic abnormalities including

- **Anemia *caused*** *by iron deficiency, decreased erythropoietin production by the kidney, inhibition of red blood cell (RBC) production.*

- Platelet dysfunction Coagulopathy are attributed primarily to abnormal platelet aggregation and adhesiveness, decreased platelet factor 3, impaired prothrombin consumption, loss of clotting factor.

2-Cardiovascular Effects

- The cardiovascular system is affected by hyperlipidemia, atherosclerosis, and arterial hypertension—the latter caused by sodium chloride (NaCl) retention, and fluid Overload.

- Congestive heart failure and hypertrophy of the left ventricle, which may compromise coronary artery blood flow, are relatively common developments.

These complications, along with electrolyte disturbances, put patients with ESRD at increased risk for sudden death from myocardial infarction.

3-bone disorders

A variety of bone disorders are seen in ESRD; these are collectively referred to as *renal osteodystrophy.*

Decreased kidney function results in decreased 1- α-hydroxylation of vitamin D, which leads to reduced intestinal absorption of calcium

DENTAL MANAGEMENT

With CKD graded stage 1 to 3, problems generally do not arise in the provision of outpatient dental care if the patient's disease is well controlled and conservative medical care is being provided.

With CKD of stage 4 or higher, consultation with the patient's physician is suggested before dental care is provided

Patients who have CKD (stages 1–3) and are not receiving dialysis generally have few issues with infection, so they generally do not require additional antibiotic considerations. except in invasive procedures (consultation)

Because of the potential for bleeding problems, if an invasive procedure is planned, the patient should undergo pretreatment screening for bleeding disorders, and a platelet count should be obtained. Use topical hemostatic agents.

Dialysis

Dialysis is a medical procedure that artificially filters blood. Dialysis becomes necessary when the number of nephrons diminishes to the point that azotemia (high levels of nitrogen-containing compounds such as urea, creatinine) is unpreventable or uncontrollable.

The initiation of dialysis is an individual patient decision that becomes important when the GFR drops below 30 mL/minute

Dental mangment of Patients Receiving Dialysis

1- Dialyzed patients are at an increased risk of bleeding. It is advisable to provide dental treatment on non-dialysis days, to ensure the absence of circulating heparin, which has a half-life of about four hours.

Ensure that local hemostatic measures including mechanical compression, sutures, and topical thrombin are available.

2-Contacting the nephrologist, as indicated, to request that the heparin dose be reduced or eliminated

3-Dialyzed patients are subjected to numerous transfusions and blood exchanges, and this increases the risk of infection in the form of HIV, HBV, HCV, and tuberculosis. Periodic monitoring is required, to avoid both personal cross-contamination in the dental clinic.

4-The arteriovenous fistula surgically created for the dialysis procedure in these patients is susceptible to infection (endarteritis) and may become a source of bacteremia, resulting in infective endocarditis.

Infective endocarditis has been associated with hemodialysis even in the absence of preexisting cardiac defects(CONSULTATION)

o Antibiotic prophylaxis remains controversial for these patients. In general, patients with central lines (Central venous catheterization)may receive antibiotics one hour prior to dental treatment to prevent bacterial endocarditis.

5-the arm that contains the arteriovenous shunt should be protected from application of the blood pressure cuff

Pharmacologic modifications

o Avoid aminoglycosides(, tetracycline's due to nephrotoxicity

o Usual doses of penicillin, clindamycin, cephalosporin's may be administered but at a prolonged dosing interval.

o Acetaminophen remains analgesic of choice. Due to the prolonged antiplatelet activity, aspirin should be avoided in patients with uremia. NSAIDs require dose reduction or complete avoidance in advanced renal failure as they have a hypertensive effect

o Benzodiazepines do not require dose adjustments, however excessive sedation may occur

o Medications primarily metabolized by the liver, including narcotics (codeine, morphine, fentanyl) do no not require dose adjustment

Transplant patients

o Elective dental care should be avoided within the first 6 months after transplantation.

o All sources of infection and hopeless teeth must be extraction prior to transplantation.

o Risk of oral infection after transplantation is very high due to concurrent immunosuppressive therapy. Antibiotic prophylaxis is a necessity before invasive dental care.

o Stress dosing may be required for patients receiving prolonged corticosteroids

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Blood disease

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

Blood disease

Bleeding disorders
Disorders of Red blood cells
Disorders of white blood cells

Bleeding disorders

Hemostasis or haemostasis is a process to prevent and stop bleeding, meaning to keep blood within a damaged blood vessel (the opposite of hemostasis is hemorrhage).

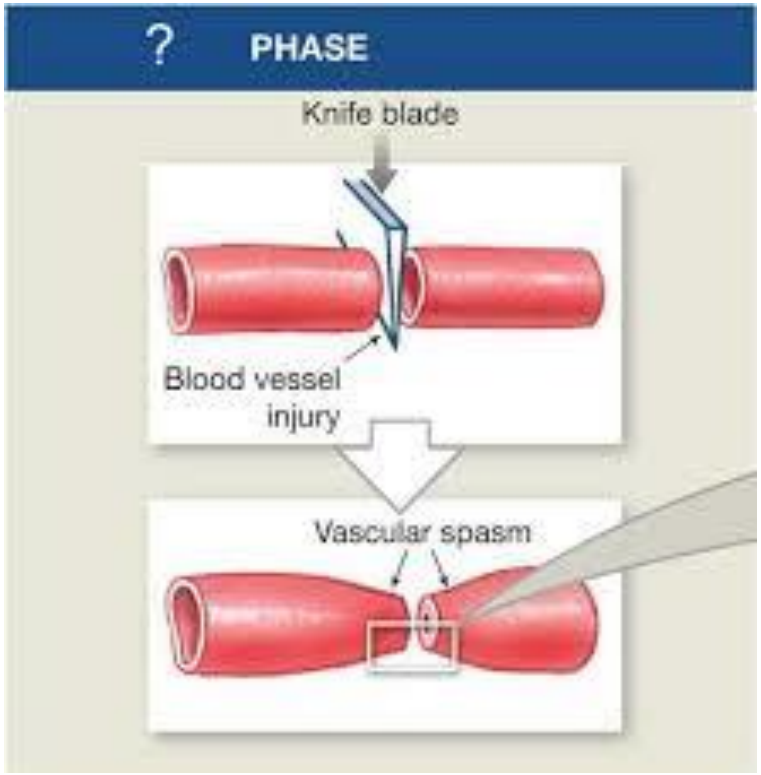
Hemostasis

1. VASCULAR PHASE
2. PLATELET PHASE
3. COAGULATION PHASE
4. FIBRINOLYTIC PHASE

What is meant by Hemorrhage ? Prolonged or uncontrolled bleeding is often referred to as hemorrhage.

1-VASCULAR P H AS E

When A Blood Vessel Is Damaged, Vasoconstriction Results. (Due To Reactants Such As Serotonin Histamine, Prostaglandins.



2-PLATELET PHASE

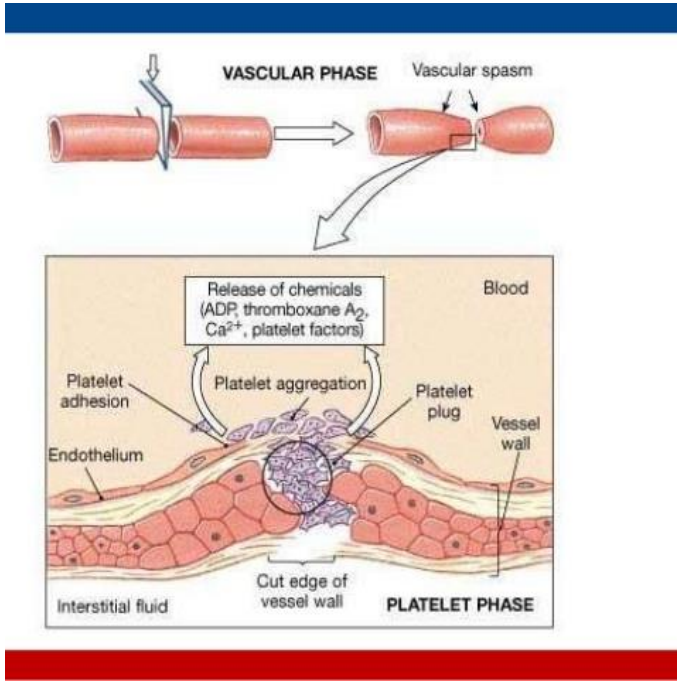
PLATELET: are cellular fragments that don't have a nucleus that stays in circulation for 8-12 days. Nonviable platelets are removed and destroyed by the spleen.

Functions:

1-maintenance of vascular integrity.

2-formation of a platelet plug to aid in the initial control of bleeding.

3-stabilization of platelet plug through involvement in the coagulation process.



Platelets adhere to the damaged surface and form a temporary plug(the platelets become more rounded in shape and develop spikes.)

3-The coagulation cascade phase

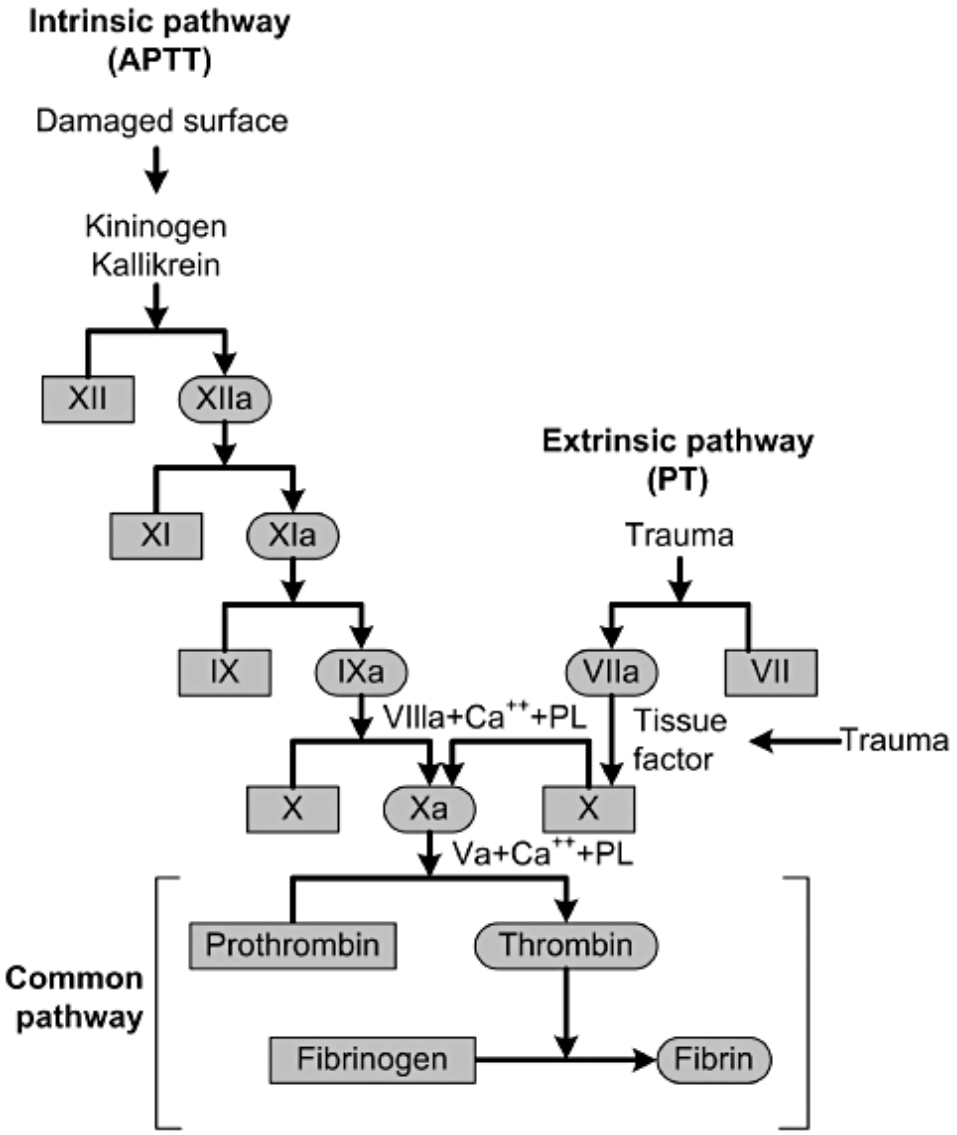
THE CONVERSION OF
FIBRINOGEN TO FIBRIN

classified into three pathways

1. Extrinsic pathway
2. Intrinsic pathway
3. Common pathway.

TABLE 1 Coagulation Factor Synonyms

FACTOR	SYNONYM
I	Fibrinogen
II	Prothrombin
III	Tissue factor, thromboplastin
IV	Calcium
V	Proaccelerin, labile factor
VI	—
VII	Proconvertin, stable factor
VIII	Antihemophilic factor
IX	Christmas factor
X	Stuart-Prower factor
XI	Plasma thromboplastin antecedent
XII	Hageman factor
XIII	Fibrin-stabilizing factor, transglutaminase



4-Fibrinolysis phase

When a blood clot has served its function and the tissue underneath it has been repaired, the clot needs to be removed. In addition, it's important that any clots inside a blood vessel don't become large enough to block the vessel.

Plasmin cuts the fibrin threads up into smaller pieces, which can then be further broken up by other enzymes and removed from the body in the urine.

HEMOSTAS IS DEPENDENT UPON:

1. Vessel Wall Integrity
2. Adequate Numbers of Platelets
3. Proper Functioning Platelets
4. Adequate Levels of Clotting Factors
5. Proper Function of Fibrinolytic Pathway

Clinical Laboratory Tests

Platelet Count NORMAL 100,000 - 400,000 CELLS/MM3 (< 100,000 Thrombocytopenia)

Bleeding Time (BT) Provides an Assessment Of Platelet Count And Function
Normal Value 2-8 Minutes

Prothrombin TIME (PT) Measures the Effectiveness of the Extrinsic Pathway
Normal Value 10-15 SECS

Partial Thromboplastin time (PTT) Measures the Effectiveness of the Intrinsic Pathway
Normal Valu 25-40 SECS

Thrombin Time (TT) Time for the Conversion of Fibrinogen to Fibrin
A Measure of Fibrinolytic Pathway
Normal Value 9-13 SECS

Causes of Bleeding Disorders

Vessel defects
Platelet disorders
Factor deficiencies
Other disorders

Causes of Bleeding Disorders

1-Vessel defects

- Vitamin c deficiency(**Scurvy)**
- Bacterial & viral infections(hemorrhagic fevers)
- Acquired

2-PLATELET DISORDERS

- Thrombocytopenia (Inadequate Number Of Platelets)
- Thrombocytopathy (adequate number but abnormal function)

Thrombocytopenia

- Drug induced (Alcohol.Thiazide Diuretics)

- Bone marrow failure
  - Viral Infections
  - Nutritional Deficiencies
  - Chemotherapy & Radiation Therapy
  - Abnormal Cells

- Hypersplenism(early destruction of cell)

- Other causes
  - Lymphoma
  - HIV Virus
  - Idiopathic Thrombocytopenia Purpura (ITP)

THROMBOCYTOPATHY

- Drug induced
- Other causes

DRUG INDUCED

ASPIRIN

Irreversibly binds to the platelet for its entire lifespan (7-10 days)

The platelets arise from the fragmentation of the cytoplasm of megakaryocytes in the bone marrow and circulate in the blood as disc-shaped particles for 7-10 days.
detectable as prolongation of BT.

NSAIDS

Reversibly binds to the platelet for a limited time period (approx. 6 hours)

3-FACTOR DEFICIENCIES (CONGENITAL)

Hemophilia A

Hemophilia B

Von Willebrand's Disease

HEMOPHILIA A

- HEMOPHILIA A (Classic Hemophilia)

Hemophilia A, also called factor VIII (8) deficiency or classic hemophilia, is a genetic disorder caused by missing or defective factor VIII (FVIII), a clotting protein. Although it is passed down from parents to children, about 1/3 of cases found have no previous family history.
usually effect male.

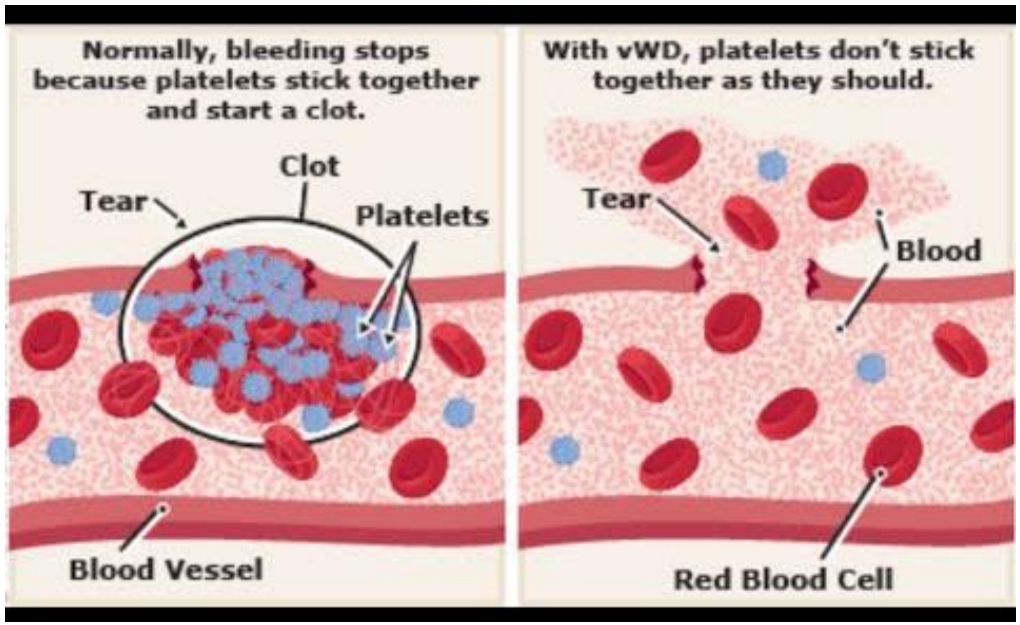
- 80-85% of all Hemophiliacs
- Lab Results - Prolonged PTT

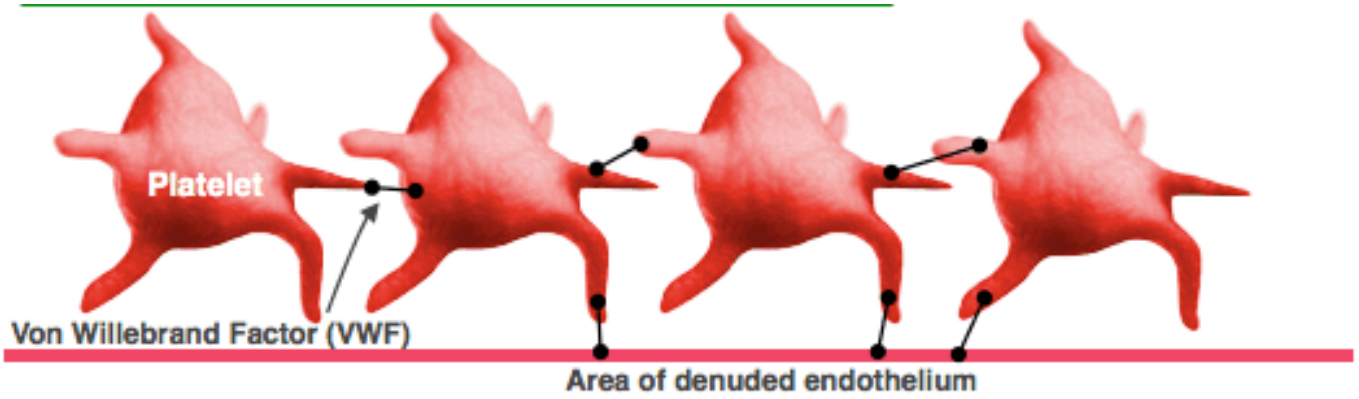
HEMOPHILIA B (Christmas Disease)

10-15% of all Hemophiliacs
Deficiency of Factor IX
Lab Test - Prolonged PTT

VON WILLEBRAND'S DISEASE

Deficiency of VWF
Lab Results - Prolonged BT





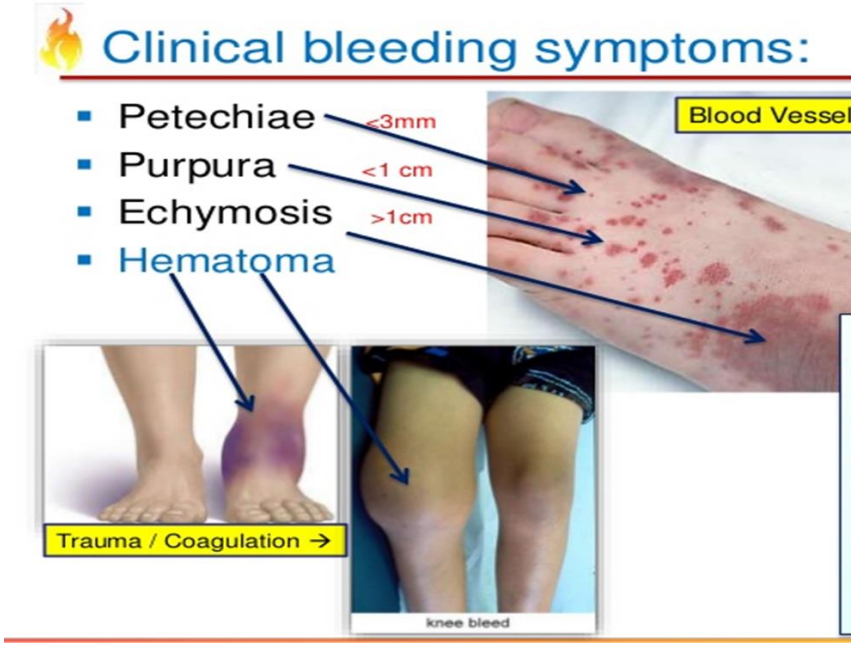
Physical Examination

The dentist should inspect the exposed skin and mucosa of the oral cavity and pharynx of the patient for signs that might indicate a possible bleeding disorder.

Signs

include petechiae, ecchymoses (bruises), spider angioma,telangiectasias, jaundice, pallor, and cyanosis.

When any of these signs are found by the dentist and cannot be explained by the history or other clinical findings, the patient should be referred for medical evaluation.



Oral Manifestations

Petechiae & Ecchymosis
Gingival Hyperplasia
Spontaneous Gingival Bleeding
Ulceration of Oral Mucosa

telangiectasias

spider angioma

DENTAL MANGMENT OF Hemophilias A and B and von willebrand's disease

MISSING Factor must be replaced to a level adequate to ensure hemostasis if bleeding starts or is expected.

Cover for surgery, other than very minor procedures or for mild hemophiliacs, requires maintenance of normal missing Factor levels for approximately one week.(consultation)

The bleeding tendency can be aggravated by NSAIDs and aspirin.

Local anesthetic regional blocks, lingual infiltrations or injections into the floor of the mouth must not be used in the absence of MISSING Factor replacement because of the risk of hemorrhage hazarding the airway and being life-threatening.

Infiltrations, intraligamentary, intraosseous or intra pulpal injections are still safer

Cotton rolls should be wetted before removal.

High-speed vacuum aspirators and saliva ejectors can cause hematomas.
Trauma from the saliva ejector can be minimized by resting it on a gauze swab in the floor of the mouth.

Patients with mild to moderate hemophilia can be managed using desmopressin and aminocaproic acid for many dental procedures.(consultation)

Consultation before any invasive dental procedures are performed TO DETERMINE

- The severity of disease
- Determine if the patient can be managed with desmopressin and aminocaproic acid.
- Establish the type and dosage of factor replacement needed for invasive dental procedures or surgery.
- if the patient can be managed in the dental office or will require hospitalization

4-OTHER DISORDERS (ACQUIRED)

I. ANTICOAGULANTS(WARFARIN , HEPARIN)
II. LIVER DISEASE
III. MALABSORPTION
IV. BROAD-SPECTRUM ANTIBIOTICS

I. ANTICOAGULANTS

WARFARIN (**Warfarin** is a vitamin K antagonist)

Used for anticoagulation to prevent recurren thrombotic phenomena (pulmonary embolism, venous thrombosis, stroke, myocardial infarction), to treat atrial fibrillation, and in conjunction with prosthetic heart valves.

Monitored by PT times

HEPARIN

Heparin therapy used as prophylaxis or treatment for venous thromboembolism.
Heparin is a potent anticoagulant that inhibit activation of Fs IX, X, and XI, thereby reducing thrombin generation and fibrin formation.

Heparin Therapy is Monitored by PTT times

Dental Management Considerations in Patients Taking anticoagulant

Avoid aspirin, aspirin-containing compounds, and other NSAIDs; acetaminophen with or without codeine is suggested for most patients.

In patient taking warfarin risk for excessive bleeding after invasive dental procedures depends on the level of the patient's INR.

If the INR is greater than 3.5, significant bleeding may occur after invasive dental and surgical procedures.

These procedures can be performed with little risk of significant bleeding if the INR is between 2.0 and 3.5.

with major oral surgery the INR may have to be reduced to 3.0 or lower.

The dentist should consult with the patient's physician to determine the level of anticoagulation being maintained with warfarin therapy

II-LIVER DISEASE

Jaundice Results in Malabsorption of Vit K.

Liver Disease can Result in Reduced Production of Coagulation Factors (I,II,V,VII,IX,X)

III- MALABSORPTION

Malabsorption syndrome refers to a number of disorders in which the small intestine can’t absorb enough of certain nutrients and fluids.

IV-BROAD-SPECTRUM ANTIBIOTICS

Change in Intestinal Flora which Might Decrease Vitamin K Production.

Vitamin K is Necessary for the Liver to Produce Coagulation Factors II,VII,IX,X

Types of Hemorrhage

1-Primary Hemorrhage

- This occurs during the surgery, as a result of injury like cutting or laceration of the artery or bleeding from bone.

- This also occurs when surgery is done in an infected area with a lot of granulation tissue.

- It can also occur after a very short period of time immediately after surgery. This type of bleeding is really normal and can be controlled easily.

2-Intermediate / Reactionary Hemorrhage

-This type of bleeding occurs within a few hours after surgery.

-This type of bleeding occurs as a result of the failure of coagulation to occur (as in patients with systemic bleeding problems or those on anticoagulants).

-Patients who have unknowingly disturbed / dislodged the clot are also prone to this type of bleeding.

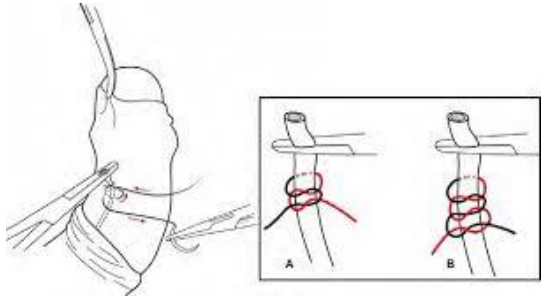
3-Secondary Hemorrhage.

- This occurs 7 to 10 days after surgery.
- This is mainly due to the partial division of blood vessels in combination with infection of the wound (Like patients who undergo radical neck dissection e.t.c.,).
- This may be due to the sloughing of vessels due to infection, pressure necrosis, or malignancy.
- This type of bleeding is not very frequently encountered after oral surgery procedures.

Methods of haemostasis Mechanical Chemical Thermal

Mechanical haemostasis

1. Direct pressure
2. Gauze pack
3. Suture and ligation
4. Staples



THERMAL HAEMOSTASIS

1. Heat (Cautery)
2. Electro cautery:
3. Ultrasonic device
4. Lasers

CHEMICAL HAEMOSTASIS

pharmacological

1. Sterile haemo coagulase solution(speeds up the formation of blood clots)
2. Epinephrine
3. Vitamin k(warfarin)
4. Protamine(heparin)
5. Desmopressin(**von Willebrand's disease**
6. Lysin analogs(anti-fibrinolytics)

Topical

1. Collagen based product (**attracts platelets)**
2. oxidized regenerated cellulose

swelling from blood absorption, and it activates coagulation on the collagen surface

3-Gelatine sponge

Disorders of Red Blood Cells

Anaemia
which is defined as a reduction in the oxygen carrying capacity of the blood due to a decrease number of circulating RBCs or an abnormality in the Hb contained within the RBCs.

- Iron Deficiency Anemia
- Folate Deficiency Anaemia
- Pernicious Anaemia
- Hemolytic Anaemia
- Sickle Cell Anaemia
- Aplastic Anaemia

Iron Deficiency Anemia

Is the state in which a body lacks enough iron to supply its needs. Iron is present in all cells in the human body and has several vital functions, such as carrying oxygen to the tissues from the lungs.

Folate-deficiency anemia is the lack of folic acid in the blood. Folic acid helps the body make red blood cells. If you don't have enough red blood cells, you have anemia.

Pernicious anemia is a type of vitamin B12 anemia. The body needs vitamin B12 to make red blood cells.

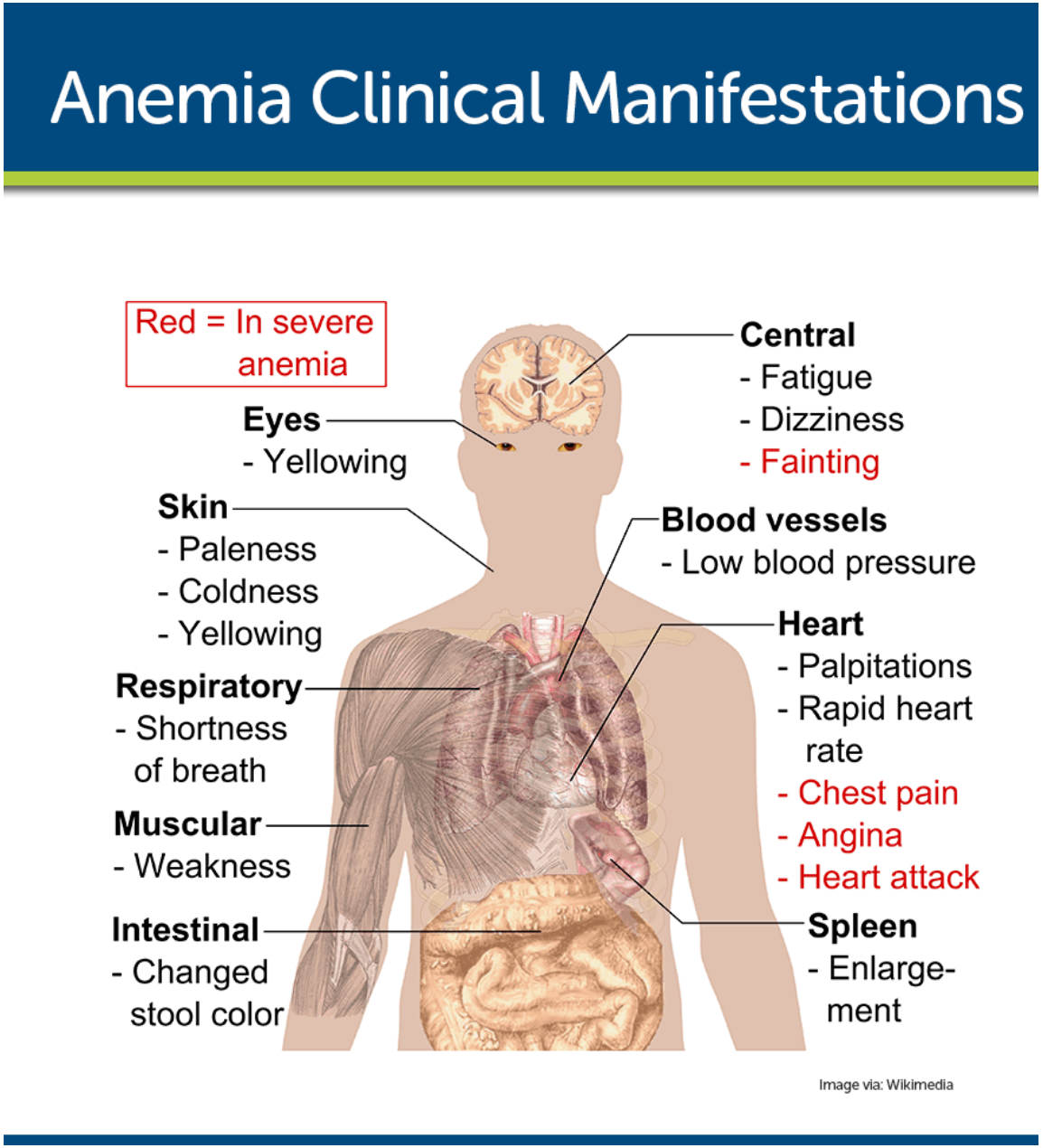
Hemolytic anemia is a disorder in which red blood cells are destroyed faster than they can be made. The destruction of red blood cells is called hemolysis

Sickle cell anemia is an inherited red blood cell disorder in which there aren't enough healthy red blood cells to carry oxygen throughout your body. Normally, the flexible, round red blood cells move easily through blood vessels. In sickle cell anemia, the red blood are shaped like sickles

Aplastic anemia is a disease in which the body fails to produce blood cells in sufficient numbers. Blood cells are produced in the bone marrow by stem cells

ORAL MANIFESTATION OF ANEMIA:

- Generalized stomatitis
- Mucosal pallor
- Atrophy of filiform papillae of tongue
- Glossitis
- Disturbed taste sensations
- Angular cheilitis
- Gingivitis
- Susceptibility to infections
- Candidial infections



Iron-deficiency Anemia

Tongue is red, smooth, depapillated with angular cheilitis due to Candida infections

Bilateral angular cheilitis with stomatitis

Dental Management of Patients With Anemia

Screening laboratory tests

If the dentist identifies a patient with signs or symptoms of suggestive anemia, this patient should be sent to laboratorty tests for complete blood count or referred to a physician for evaluation

To minimize the risk of medical complications, Hb levels should be above 11 g/dL, and the patient should be free sign and symptoms

Antibiotic prophylaxis is recommended for major surgical procedures.
Avoid strong narcotics and high doses of aspirin. Use acetaminophen with or without small doses of codeine

Persons with aplastic anemia are susceptible to infection and bleeding, so clinical recognition of such patients before invasive dental procedures are performed is important.(consultation)

Patients who are short of breath or have Hb levels below 11 g/dL, an abnormal heart rate, or oxygen saturation less than 91% are considered medically unstable, and routine treatment should be deferred until their health status improves.

Patients with hemolytic anemia (e.g., sickle cell anemia) may show pallor and oral evidence of jaundice caused by hyperbilirubinemia caused by excessive erythrocyte destruction.

Intravenous sedation must be used with extreme caution in patients who have a history of sickle cell anemia.
Barbiturates and narcotics should be avoided because of suppression of the respiratory center.

Consider using local anesthetic without epinephrine for routine dental care because some authors believe it may impair circulation and cause vascular occlusion. For surgical procedures use 1:100,000 epinephrine in local anesthetic. Avoid general anesthesia particularly if the haemoglobin level is below 10 g/dl.
Stronger concentrations of epinephrine must be avoided.

Disorders of White Blood Cells

1-leukocytosis is a condition in which the white cell (leukocyte count) is above the normal range in the blood. It is frequently a sign of an inflammatory response, most commonly the result of infection, but may also occur following certain parasitic infections or bone tumors as well as leukemia

2-Leukopenia decreased number of circulating WBCs *Leukopenia* may occur in the early phase of leukemia and lymphoma .*Leukopenia* occurs from toxic effects of drugs and chemicals.

Leukopenia is a common complication that results from the use of chemotherapeutic (anticancer) drugs.

3-Leukemia is cancer of the WBCs that affects the bone marrow and circulating blood and occurs in both acute and chronic forms.

Signs and symptoms may include

- Bleeding
- Purpura
- Fatigue, anemia
- Lymphadenopathy

Oral manifestations

- Petechial hemorrhages of the tongue, lips, posterior hard and soft palate
- Gingival hyperplasia
- Spontaneous gingival bleeding
- Oral ulcerations
- Mucosal pallor

4-lymphoma is a cancer of the lymphatic system, which is part of the body's germ-fighting network. The lymphatic system includes the lymph nodes (lymph glands), spleen, thymus gland and bone marrow. Lymphoma can affect all those areas as well as other organs throughout the body

- Lymphomas (Hodgkin lymphoma which malignant growth of B lymphocytes primarily in lymph nodes).
- Non-Hodgkin lymphoma is B or T lymphocyte malignant neoplasm.
- Burkitt lymphoma is a non-Hodgkin B cell lymphoma involving bone and lymph nodes.

- Intraoral findings:
  Ulcerations, pain, swelling, tooth mobility
- Extraoral findings:
  Cervical/submandibular/submental lymphadenopathy

(*Painless, non tender, firm and rubbery)*

Dental Management of Patients With Leukemia and Lymphoma

Evaluate and determine whether leukemia or lymphoma exists

Obtain medical consultation if undiagnosed, poorly controlled or uncertain

Antibiotic sensitivity testing should be done for oral infections.

Chlorhexidine rinse may be helpful to promote healing of mucositis.

Provide antifungal medications for oral candidiasis.

Consult a physician regarding the need for antibiotics when invasive procedures are planned

IF the platelet count is less than 50,000/µL, platelet transfusion may be needed before certain invasive and surgical procedures.Confirm by medical consultation

Radiation and chemotherapeutic agents can cause cardiac damage to the myocardium, valves, and coronary arteries.
They also can be associated with serious cardiac arrhythmias. Consult with patient's physician to determine if there is cardiac damage and take appropriate action to avoid complications

Patients who have WBC disorders and are in a state of remission can receive most indicated dental treatment .
Patients who have advanced disease and a limited prognosis, should receive emergency care only; and other procedures usually are not indicated for these patients

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Dental considerations in patients with liver disease

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

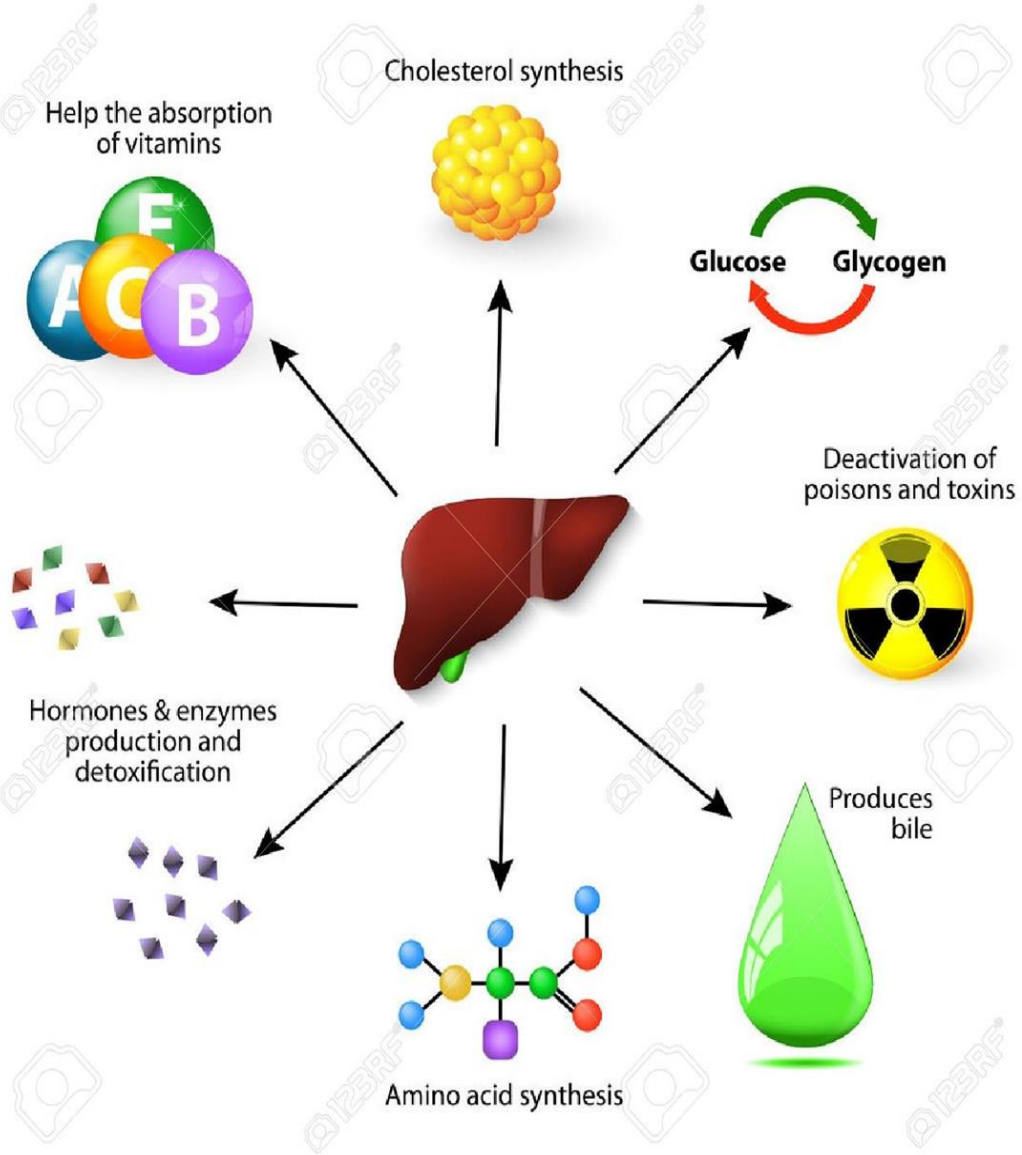
Function of the Liver

Metabolism

- Glucose regulation
- Vitamin storage
- Metabolizes products of digestion
- Metabolizes drugs and alcohol
- Breaks down bilirubin

Storage and Filtration of Blood

- Acts as a blood reservoir
- Contains phagocytic cells
- Part of the reticuloendothelial system.



Synthesis and Secretion

- Components of clotting factors
- Cholesterol, triglyceride synthesis
- Bile production
- Other proteins and hormones

Manifestations of Liver Disease

Jaundice

A yellowing of the skin and eyes from excessive bilirubin in the blood.

- Ascites(The accumulation of excess fluid in the peritoneal cavity)
- Hepatic encephalopathy(Disturbances in consciousness_Elevated levels of ammonia)
- Splenomegaly
- Blood abnormalities
- Light stools/Dark urine(Bilirubin gives stool its characteristic color)
- Peripheral edema
- itching
- Abdominal pain
- Vomiting, Nausea
- Fatigue, weakness and weight loss may also be occur.

Oral Manifestations of Liver Disease

- Oral candidiasis
- Sialadenitis
- Angular cheilitis
- Atrophic glossitis
- Petechiae – Thrombocytopenia
- Lichen planus
- Some forms of oral cancers

Types of Liver Disease

- Hepatitis – infectious & non-infectious
- Alcoholic liver disease (ALD)
- Hepatocellular Carcinoma (HCC)
- Cirrhosis

Hepatitis:

Hepatitis is inflammation of the liver that may result from infectious or other causes.

Non-infectious

Drugs:

- Acetaminophen
- Methotrexate
- Methyldopa
- Halothane
- Ketoconazole
- Narcotics
- Alcohol

Hepatitis:

Hepatitis is inflammation of the liver that may result from infectious or other causes.

Infectious

Viral

- Hepatitis A
- Hepatitis B
- Hepatitis C
- Hepatitis D, E

Bacterial

- Tuberculosis
- Secondary syphilis

VIRAL HEPATITIS

Acute viral hepatitis is the most common form of infectious hepatitis.

jaundice is associated with hepatitis in

- 70% of cases of HAV,
- 30% of cases of HBV
- 25% of cases of HCV and HEV.

- This is caused by an accumulation of bilirubin in the plasma, epithelium, and urine.
- Jaundice usually becomes clinically apparent when the plasma level of bilirubin approaches 2.5 mg/100 mL (normal is less than 1 mg/100 mL).

- If plasma bilirubin does not reach this level, the patient is an icteric(without jaundice), thus explaining non icteric hepatitis.

Hepatitis A Virus

- Hepatitis A is caused by RNA virus that, in older children and adults, causes typical symptoms of viral hepatitis, including anorexia, malaise, and jaundice. Young children may be asymptomatic.
- Fulminant hepatitis and death are rare in developed countries.
- Chronic hepatitis does not occur.
- Vaccination and previous infection are protective.

- Food, water borne
- Fecal – oral contamination
- Usually self limited, lasting days to weeks
- 99% spontaneous recovery, no treatment

Diagnosis

- HAV immunoglobulin M (IgM) test

Hepatitis B Virus

- Hepatitis B is caused by a DNA virus that is often parenterally transmitted. It causes typical symptoms of viral hepatitis, including anorexia, malaise, and jaundice.
- Fulminant hepatitis and death may occur.
- Chronic infection can lead to cirrhosis and/or hepatocellular carcinoma. (5 to 10%)
- Treatment is supportive.
- Vaccination is protective and postexposure use of hepatitis B immune globulin may prevent or attenuate clinical disease.

can result from mucosal contact with other body fluids.

Diagnosis

- Hepatitis B surface antigen (HBsAg)
  Indicates currently infectious, with acute or chronic infection
- Hepatitis B surface antibody (HBsAb)
  Indicates recovery or successful immunization

Hepatitis C Virus

- Hepatitis C is caused by an RNA virus that is often parenterally transmitted.

- Transmission from mucosal contact with other body fluids and perinatal transmission from infected mothers are rare.

- It sometimes causes typical symptoms of viral hepatitis, including anorexia, malaise, and jaundice but may be asymptomatic.

- Fulminant hepatitis and death rarely occur.
- Chronic hepatitis develops in about *75%* and can lead to cirrhosis and rarely hepatocellular carcinoma.
- Diagnosis is by serologic testing.
- Treatment is with antiviral drugs.
- *No vaccine is available.*

Hepatitis D

It is caused by a defective RNA virus (delta agent) that can replicate only in the presence of hepatitis B virus.

It occurs uncommonly as a coinfection with acute hepatitis B or as a superinfection in chronic hepatitis B.

Hepatitis E

It is caused by an enterically transmitted RNA virus and causes typical symptoms of viral hepatitis,

Fulminant hepatitis and death are rare, except during pregnancy.

vaccine for hepatitis E is now available in China

cases have been associated with consumption of pork,

PATHOPHYSIOLOGY AND COMPLICATIONS

- Most cases of viral hepatitis, especially types A and E, resolve with no complications.
- HBV, HCV, and HDV may persist and can replicate in the liver when the virus is not completely cleared from the organ.

The consequences of hepatitis include

- Recovery
- Persistent infection (or carrier state)
- Dual infection, chronic active hepatitis
- Fulminant hepatitis(severe liver function impairment)
- Cirrhosis
- Hepatocellular carcinoma
- Death.

TREATMENT

- As with many viral diseases, basic therapy is palliative and supportive.
- Bed rest and fluids may be prescribed, especially during the acute phase.
- A nutritious, high-calorie diet is advised.
- Alcohol and drugs metabolized by the liver are not to be ingested.
- Viral antigen should be monitored for 6 months
- Standard therapy for patients with chronic hepatitis is interferon
- Liver transplantation is a last resort for patients who develop cirrhosis

Prevention

- Patients should be advised to avoid high-risk be Zhavior (eg, sharing needles to inject drugs, having multiple sex partners).
- Blood and other body fluids (eg, saliva, semen) are considered infectious.
- Spills should be cleaned up using dilute bleach.
- Screening has decreased the incidence of posttransfusion hepatitis B and hepatitis C.
- Vaccination At 0, 1, and 6 months

PRECAUTIONARY *MEASURES* TO PREVENT CROSS INFECTION

1. Using two pairs of disposable gloves.
2. Special protective glasses and disposable surgical masks.
3. Special protective surgical gown and cap covering scalp hair.
4. Great care during the use of Disposable needles in order to avoid accidental puncture.
5. Discard surgical blades and disposable needles in a rigid sharp container.
6. After the surgical procedure, disinfect the dental chair, the dentist's stool, and the spittoon with a virus-active disinfectant.


DISPOSAL SAFE
DANGER

DO NOT
throw loose
sharps in trash

DO NOT
put sharps
in recycling

DO NOT
flush sharps
down toilet

KEEP OUT
of reach
of children

DO NOT
force sharps
into container

DO NOT
put fingers
inside container

DO NOT
remove needle

DO NOT
bend or
break needle

DO NOT
recap needle

DENTAL MANAGEMENT

Patients With Active Hepatitis.

- No dental treatment other than urgent care should be rendered unless the patient is clinically and biochemically recovered.

- Urgent care should be provided only in adherence to strict standard precautions.

- Aerosols should be minimized

- Drugs metabolized in the liver should be avoided as much as possible.

- If surgery is necessary, preoperative prothrombin time and a bleeding time should be obtained and abnormal results discussed with the physician.

- The dentist should refer the patient who has acute hepatitis for medical diagnosis and treatment.

Analgesics: NSAIDs, including aspirin, and acetaminophen, as well as codeine , should be avoided or their use very limited in persons who have end-stage liver disease.

Antibiotic prophylaxis is not recommended; however, patients who have severe liver disease may be more susceptible to infection. Selection of antibiotic agent is based on risk and severity of dental infection. Avoid use of metronidazole and vancomycin.

Blood pressure Monitor blood pressure because it may be significantly increased with portal hypertension in patients with end-stage liver disease.

Epinephrine (1 : 100,000, in a dose of no more than 2 carpules) in local anesthetics generally is not associated with any problems, but patients should be monitored

Bleeding :Excessive bleeding may occur in patients with end-stage liver disease.
Most such patients will have reductions in coagulation factors and thrombocytopenia, so they are at greater risk for postsurgical bleeding; they may need vitamin K or platelet or clotting factor replacement (or both).

Patients With a History of Hepatitis.

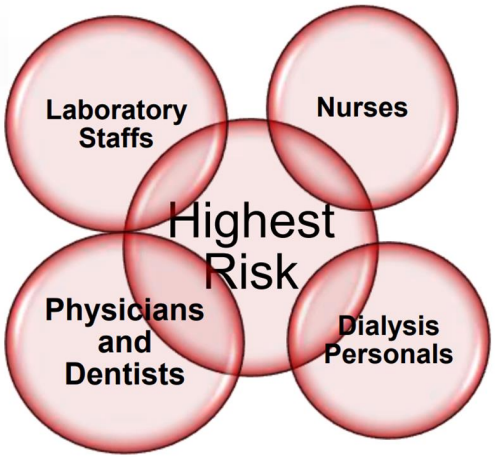
- Most carriers of HBV, HCV, and HDV are unaware that they have had hepatitis.

- For those patients who report a positive history of hepatitis, additional historical information to determining the type of disease.

the only practical method of protection from exposure to potential infection associated with providing dental care for persons with undiagnosed hepatitis or with other undetected infectious diseases is to adopt a strict program of clinical asepsis for all patients

Patients at High Risk for HBV or HCV Infection.

- Health care providers and emergency responders
- Sexually active individuals (more than 1 partner in the past six months)
- Individuals diagnosed with a sexually transmitted disease
- Illicit drug users
- Those living in close contact with an infected person
- Individuals born in countries where hepatitis B is common (Asia, Africa, South America, Pacific Islands, Eastern Europe, and the Middle East)



note :Screening for HBsAg is recommended for individuals who fit into one or more of these categories unless they are already known to be seropositive.

Complications

Abnormal bleeding is associated with hepatitis and significant liver damage.
This may result from

- ✓ Abnormal synthesis of blood clotting factors.
- ✓ Abnormal polymerization of fibrin.
- ✓ Inadequate fibrin stabilization.
- ✓ Excessive fibrinolysis.
- ✓ Thrombocytopenia associated with splenomegaly that accompanies chronic liver disease.

Complications

- Before any surgery is performed, the platelet count should be obtained

- If surgery is necessary, an injection of vitamin K usually corrects the problem and should be discussed with the physician.

- Chronic viral hepatitis increases the risk for hepatocellular carcinoma.

- Oral metastases primarily present as hemorrhagic masses

ACCIDENTAL EXPOSURE:

1. Carefully washing the wound without rubbing for several minutes with soap and water.

2. Using a disinfectant (iodine solutions or chlorine formulations) To reduce the number of viral units.

3. Complete detailed medical and clinical history of the patient .

4. Immediate administration of **Hepatitis B Immune Globulin**
HBIG and initiation of the vaccine are recommended.

Note :HBIG and hepatitis B vaccine are very effective when given within 7 days after contact with an infected person’s blood or 14 days after sexual contact.

Alcoholic Liver Disease ALD

DEFINITION

Alcoholism is a chronic addiction to ethanol in which a person consumes ethanol, becomes tolerant to its intoxicating effects, and has symptoms of alcohol withdrawal when the drinking stops.

alcohol is hepatotoxic

The pathologic effects of alcohol on the liver

- The earliest change seen in alcoholic liver disease is a fatty infiltrate.
- A second and more serious form of alcoholic liver disease is alcoholic hepatitis.
- The third and most serious form of alcoholic liver disease is cirrhosis, which is an irreversible condition

ORAL COMPLICATIONS AND MANIFESTATIONS ALD

- Poor oral hygiene
- Oral neglect: caries, periodontitis
- Glossitis
- Angular or labial cheilosis
- Candidiasis
- Gingival bleeding
- Oral cancer
- Petechiae
- Ecchymoses
- Jaundiced mucosa
- Parotid gland enlargement
- Alcohol (sweet musty) breath odor
- Impaired healing
- Bruxism
- Dental attrition
- Xerostomia

Dental Management of the Patient With Alcoholic Liver Disease

Major dental treatment considerations apply for a patient with alcoholism:

1. Bleeding tendencies
2. Unpredictable metabolism of certain drugs
3. Risk or spread of infection

A patient with untreated alcoholic liver disease is not a candidate for elective, outpatient dental care and should be referred to a physician

MILD TO MODERATE ALCOHOLIC LIVER DISEASE

Significant enzyme induction is likely to have occurred, leading to an increased tolerance of :

1. local anesthetics,
2. Sedative and hypnotic drugs
3. General anesthesia.

- Thus, larger than normal doses of these medications may be required to attain the desired effects.

- with advanced liver destruction, drug metabolism may be markedly diminished, which may lead to an increased or unexpected effect.

- The dentist should use the drugs primarily metabolized in liver with caution when treating patients with chronic alcoholism and should consider adjusting doses or avoiding their use, as advised by the patient's physician.

Hepatocellular Carcinoma

- Hepatocellular carcinoma accounts for the vast majority of liver cancers.
- Globally, HCC is the 3rd most frequent cause of cancer death.
- 78% of HCC cases caused by chronic HBV and HCV infections.

Cirrhosis of the Liver

It is Irreversible damage to liver and Fibrosis with areas of nodular regeneration.

Primary causes:

- Alcoholic liver disease
- Chronic infection with hepatitis B virus and hepatitis C virus

BOX 10.3 Dental Drugs Metabolized Primarily by the Liver

Local Anesthetics*
Lidocaine (Xylocaine)
Mepivacaine (Carbocaine)
Prilocaine (Citanest)
Bupivacaine (Marcaine)

Analgesics
Aspirin†
Acetaminophen (Tylenol, Datril)‡
Codeine‡
Meperidine (Demerol)‡
Ibuprofen (Motrin)†

Sedatives
Diazepam (Valium)‡
Barbiturates‡

Antibiotics
Ampicillin
Tetracycline
Metronidazole§
Vancomycin§

*Most of these agents appear to be safe for use in patients with liver disease when given in appropriate amounts.
†Limit dose or avoid if severe liver disease (acute hepatitis and cirrhosis) or hemostatic abnormalities are present.
‡Limit dose or avoid if severe liver disease (acute hepatitis and cirrhosis) or encephalopathy is present, or if taken with alcohol.
§Avoid if severe liver disease (acute hepatitis and cirrhosis) is present.

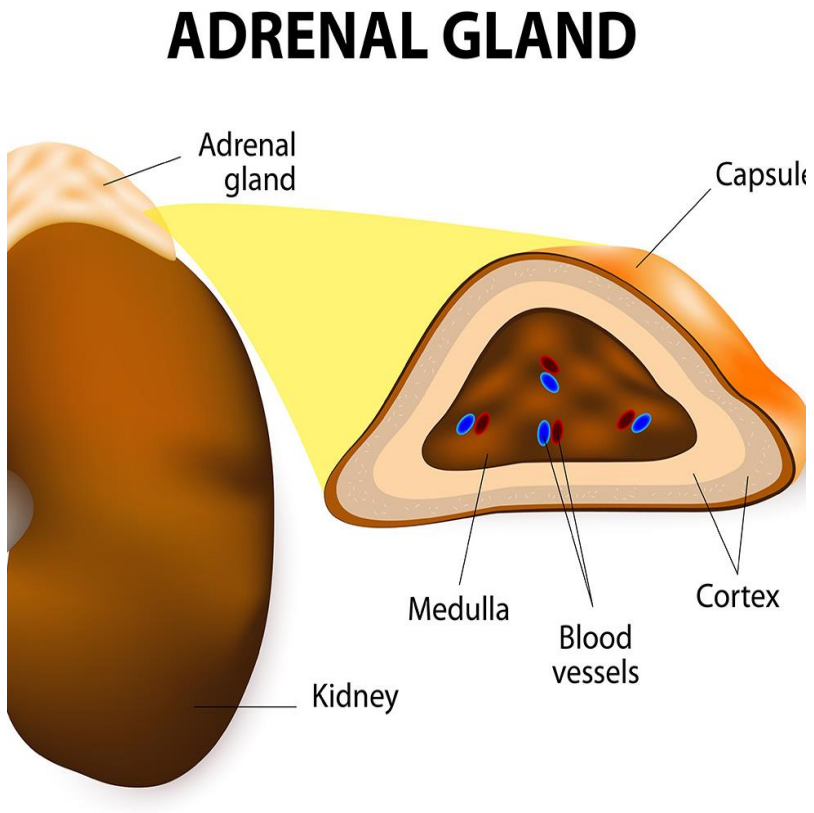
DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

The adrenal glands disease

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

The adrenal glands

- Small (6–8 g) endocrine glands
- located bilaterally at the superior pole of each kidney.
- Each gland contains an outer cortex and an inner medulla.
- The adrenal medulla functions as a sympathetic ganglion and secretes catecholamines, primarily epinephrine.
- The adrenal cortex secretes several steroid hormones with multiple actions



The adrenal cortex makes up about 90% of the gland and consists of three zones

The cortex manufactures three classes of adrenal steroids:

1-glucocorticoids

2-Mineralocorticoids

3-androgens.

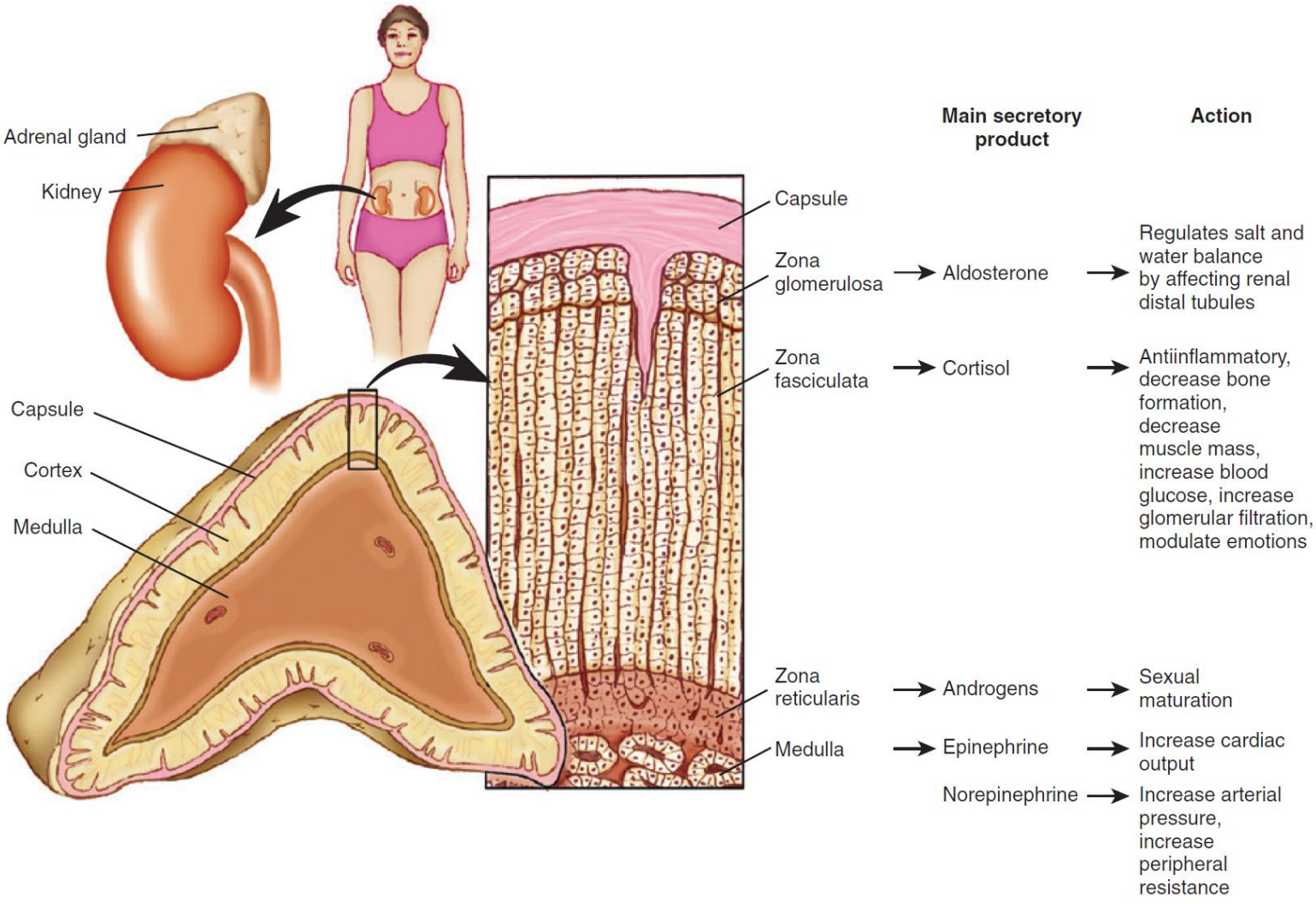
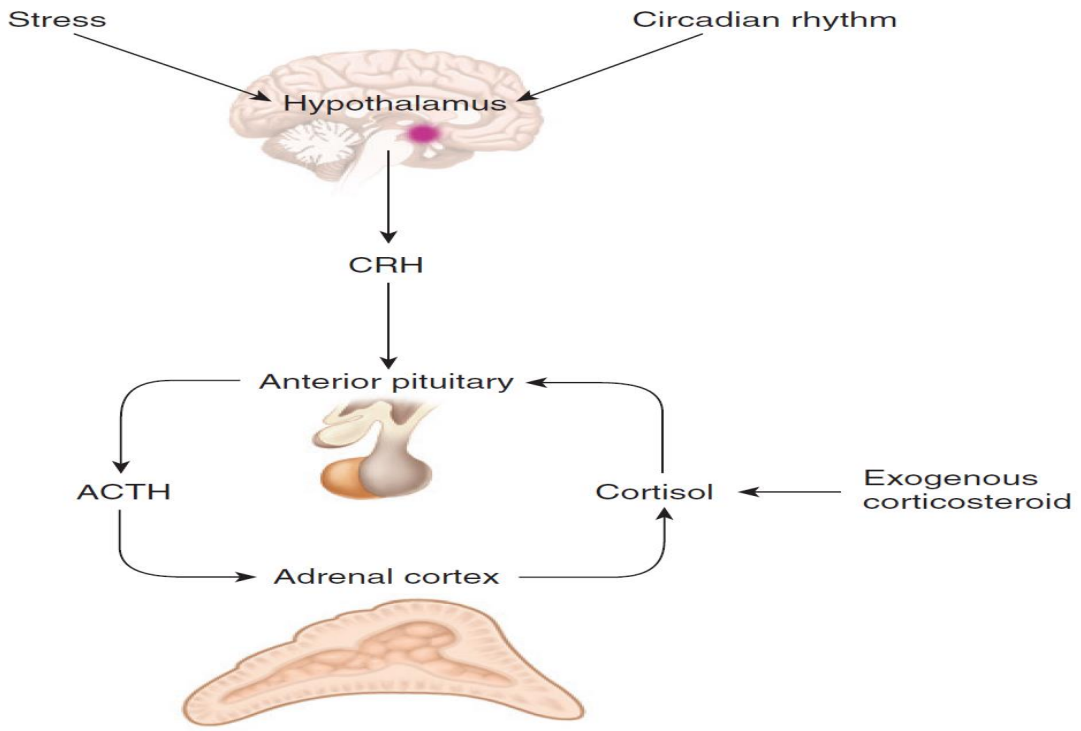


FIG 15.1 Structure of the adrenal gland, representative zones, and their main secretory products



Hypothalamic–pituitary–adrenal axis and the regulation of cortisol secretion. ACTH, Adrenocorticotropic hormone;CRH, corticotropin-releasing hormone.

FUNCTIONS OF MINERALO-CORTICOIDS

(ALDOSTERONE) :

- Mineralocorticoid Deficiency Causes Severe Renal disorders like Sodium Chloride Wasting and Hyperkalemia.

- Aldosterone Increases Renal Tubular Reabsorption of Sodium and Secretion of Potassium.

- Aldosterone Stimulates Sodium and Potassium Transport in Sweat Glands, Salivary Glands, and Intestinal Epithelial Cells.

FUNCTIONS OF GLUCO-CORTICOIDS

(CORTISOL):

- Stimulate gluconeogenesis (formation of carbohydrate from proteins) by the liver.
- Cortisol also causes a moderate decrease in the rate of glucose utilization by most cells in the body.
- Decreased protein synthesis and increased catabolism of protein already in the cells.
- It promotes mobilization of fatty acids from adipose tissue.

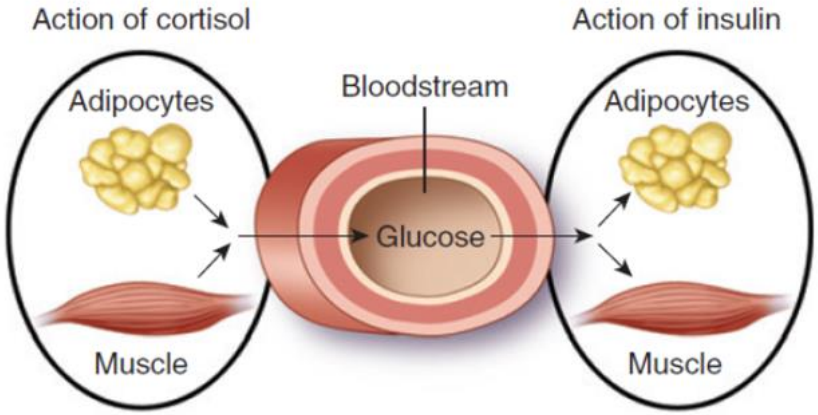


FIG 15.2 Effects of cortisol and insulin on glucose in the bloodstream.

Cortisol acts as an insulin antagonist increasing blood levels of glucose

Cortisol increases blood pressure by potentiating the vasoconstrictor action of catecholamines

Cortisol also activates osteoclasts and inhibits osteoblast

Cortisol basic anti-inflammatory effects:

- It can block the early stages of the inflammation process before inflammation even begins.
- If inflammation has already begun, it causes rapid resolution of the inflammation and increased rapidity of healing.
- Cortisol reduces lymphocyte production and hence, suppresses immunity.
- Cortisol Blocks the Inflammatory Response to Allergic Reactions.

In dentistry, corticosteroids may be used during the perioperative period for the reduction of pain, edema, and trismus after oral surgical .

ADRENAL GLANDS DISORDER

Disorders of the adrenal glands can result in overproduction (hyperadrenalism) or underproduction (hypoadrenalism or adrenal insufficiency) of adrenal products

Hyperadrenalism

is characterized by excessive secretion of

- Adrenal cortisol
- Mineralocorticoids
- androgens, or estrogen in isolation or combination.

The most common type of overproduction is due to glucocorticoid excess.

When this is caused by pathophysiologic processes, the condition is known as Cushing disease.

The term Cushing syndrome is a generalized state caused by excessive cortisol in the body, regardless of the cause.

Adrenal insufficiency is divided into three categories

Primary adrenocortical insufficiency

Also known as Addison disease, occurs when the adrenal cortex is destroyed or the gland is removed.

Secondary adrenocortical insufficiency

It is the consequence of pituitary disease or a lack of responsiveness of the adrenal glands to ACTH (corticotrophin) or caused by critical illness.

Tertiary adrenal insufficiency

it is the processes that impair function of the hypothalamus, which is most commonly caused by chronic use of corticosteroids.

Diagnostic Measures

Specific LAB test

- Serum cortisol
- Plasma ACTH

– If the ACTH level is high, the person probably has primary adrenal insufficiency.

– If the ACTH level is low, the person probably has secondary or tertiary adrenal insufficiency.

- Serum glucose
- Serum electrolytes level
- Complete blood count
- CT, MRI: To rule out pituitary and adrenal mass

Primary adrenal insufficiency (Addison disease) is caused by the lack of the major hormones of the adrenal cortex:

1. Cortisol
2. Aldosterone
3. lesser degree the androgens.

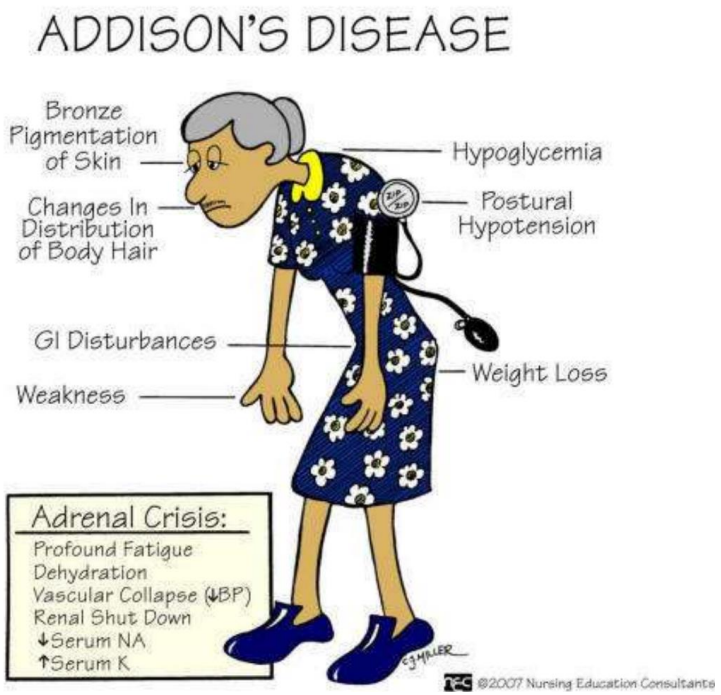
Lack of cortisol results in

- Impaired metabolism of glucose, fat, and protein.
- Hypotension.
- Increased ACTH secretion.
- Impaired fluid excretion.
- Excessive pigmentation.
- an inability to tolerate stress.

.

Signs and symptoms of Addison disease

- weakness
- fatigue
- abdominal pain
- hyperpigmentation of the skin (i.e., skin areas subjected to pressure: elbows, knuckles, palmar creases) and mucous membranes
- vomiting
- postural hypotension
- Weight loss
- syncope, coma.

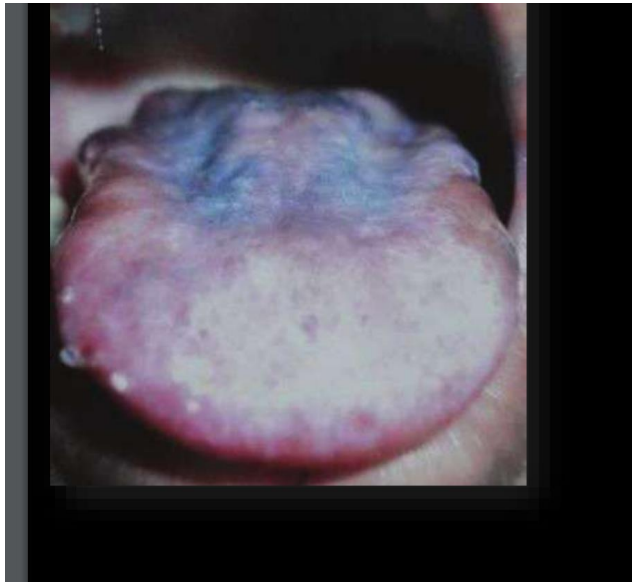


Oral Manifestations

- Diffuse or focal brown macular pigmentation of the oral mucous membranes

- Patients with secondary or tertiary adrenal insufficiency may be prone to delayed healing and may have increased susceptibility to infection but do not develop hyperpigmentation

- Tongue Appears To Be Smooth With Loss Of The Papilla With Pigmentation On The Posterior Surface



Medical management of primary adrenal insufficiency

(1)Management of the adrenal disease (e.g., elimination of the infectious agent or malignant disease)

(2) lifelong hormone replacement therapy.

(3)Glucocorticoid replacement is accomplished at levels that correspond to normal physiologic output of the adrenal cortex, usually about 20 to 25 mg/day of hydrocortisone or cortison acetate, with a range of 12.5 to 50 mg/day.

(4) Current practice recommends that half to two thirds of the dose be given in the morning and one third in the later afternoon in an attempt to reflect the normal diurnal cycle

Dental Management Considerations

➢ Patient Evaluation and Risk Assessment

- Evaluate and determine whether primary adrenal sufficiency or secondary adrenal insufficiency exists.

- Obtain medical consultation if condition is poorly controlled (e.g.,acute infection), if clinical signs and symptoms clear, or if diagnosis is uncertain.

- The dentist should be aware that a past or present history of tuberculosis, histoplasmosis, or HIV infection increases the risk for primary adrenal disease(insufficiency) because opportunistic infectious agents may attack the adrenal glands

➢ Anesthesia

- Provide adequate operative and postoperative anesthesia; routine use of epinephrine(1 : 100,000) is appropriate.

- Consider using long-acting local anesthetics (e.g., bupivacaine) at the end of the procedure to provide longer postoperative pain control.

- General anesthesia increases glucocorticoid demand and could render an adrenal insufficient patient susceptible to adrenal crisis(Obtain medical consultation)

➢ Anxiety

- stress increase the risk of adrenal crisis if adrenal insufficiency is present. Proper stress reduction should be provided because fear and anxiety increase cortisol demand.
- Surgery should be scheduled in the morning when cortisol levels are highest.
- Nitrous oxide–oxygen inhalation and benzodiazepine sedation are helpful in minimizing stress and reducing cortisol demand.
- Analgesics Provide good postoperative pain control to avoid adrenal crisis.

- Blood pressure

Continuously monitor blood pressure throughout stressful and invasive procedures.

Postoperative monitoring for at least 8 hours is recommended for procedures involving moderate or major surgery.

If blood pressure drops below 100/60 mm Hg, consider fluid replacement,, and supplemental steroid administration, as needed proper patient positioning (i.e., head lower than feet),

Factors affecting level of cortisol after surgery

- The Magnitude Of The Surgery
- Whether General Anaesthesia Is Used.
- The Duration And Severity Of Surgery
- Level Of Pain Control
- The Overall Health Of The Patient Who Takes Daily Steroids

The relationship between corticosteroids and response to stress involves the maintenance of vascular reactivity to vasoactive agents and the maintenance of normal blood pressure and cardiac output.

TABLE 15.1 Glucocorticoids and Their Relative Potency

Compound	Antiinflammatory Potency	Mineralocorticoid Potency	Equivalent Dose* (mg)
SHORT ACTING (<12 HOURS)			
Cortisol	1	2	20
Hydrocortisone	0.8	2	20
INTERMEDIATE ACTING (12–36 HOURS)			
Prednisone	4	1	5
Prednisolone	4	1	5
Triamcinolone	5	0	4
Methylprednisolone	5	0.5	4
Fludrocortisone	15	200	1.4
LONG ACTING (>36 HOURS)			
Betamethasone	25	0	0.75
Dexamethasone	25	0	0.75
INHALED			
Beclometasone dipropionate†	8 puffs 4 times a day equals 14 mg oral prednisone once a day	—	—

*Approximate.

†Fluticasone propionate is roughly twice as potent as beclometasone dipropionate and budesonide.

Data from Barnes N: Relative safety and efficacy of inhaled corticosteroids, *J Allergy Clin Immunol* 101:S460-S64, 1998; Schimmer BP, Parker KL: In Brunton LL, Lazo JS, Parker KL et al, editors: *Goodman and Gilman's the pharmacological basis of therapeutics,* ed 11, New York, 2006, McGraw-Hill; and Kroenberg HM, et al: *Williams textbook of endocrinology,* ed 11, Philadelphia, 2008, Saunders.

- Capacity to tolerate care Provide adequate supplemental corticosteroids according to following table

TABLE 15.3 Recommendations for Steroid Supplementation During Surgery*

Procedure	Target Dose: Primary Adrenal Insufficiency†	Target Dose: Secondary Adrenal Insufficiency‡
Routine dentistry	None	None
Minor surgery	25 mg of hydrocortisone equivalent, preoperatively on the day of surgery	Daily therapeutic dose
Moderate surgical stress	50–75 mg on day of surgery and up to 1 day after Return to preoperative glucocorticoid dose on postoperative day 2	Daily therapeutic dose
Major surgical stress	100–150 mg per day of hydrocortisone equivalent given for 2–3 days After preoperative dose, 50 mg of hydrocortisone IV every 8 hours after the initial dose for the first 48–72 hours after surgery	Daily therapeutic dose

*Guidelines based on patient's adrenal insufficiency status; however, requirements could increase if the patient's health is poor; if concurrent fear or anxiety, infection that is poorly managed, fever, or cirrhosis is present; and if major surgery or general anesthesia is being performed. Frequent monitoring of blood pressure during the first 8 hours postoperatively is recommended.

†Data from Salem M, et al: Perioperative glucocorticoid coverage. A reassessment 42 years after emergence of a problem, *Ann Surg* 219:416-25, 1994.

‡Data from Marik PE, Varon J: Requirement of perioperative stress doses of corticosteroids: a systematic review of the literature, *Arch Surg* 143:1222-26, 2008. Supplemental doses can be provided if signs or symptoms of adrenal insufficiency (e.g., hypotension, abdominal pain, fatigue) appear.

IV, Intravenous.

Surgical procedures lasting longer than 1 hour are more stressful than shorter procedures and are considered major surgery.

Adrenal Crisis

Adrenal crisis is a potentially life-threatening complication resulting from adrenal insufficiency triggered by emotional and physical stress like:

1-Infection
2-fever
3- sepsis
4- surgery
5- Abrupt withdrawal from glucocorticoids

It manifests as

1- Hypotensive collapse
2- Abdominal pain
3-Myalgia
4-fever.
5- Unexplained hypoglycemia

EMERGENCY MEASURES

1-Establish intravenous access
2- Draw blood for stat serum electrolytes and glucose and routine measurement of plasma cortisol and ACTH. Do not wait for laboratory results.

3-Infuse 0.9% saline solution or 5% dextrose in 0.9% saline solution as quickly as possible to reverse the hypotension

4-Inject intravenous hydrocortisone (100 mg immediately and every 6 hr)

5-Continue iv 0.9% saline solution at a slower rate for next 24 to 48 hr

6-Search and treat possible infectious precipitating causes of the adrenal crisis

7-Taper the glucocorticoids (gradually lowering of the dose)

Hyperadrenalism. Patients with hyperadrenalism or who take corticosteroids for prolonged periods have an increased likelihood of having

1-Hypertension

2-diabetes

3-delayed wound healing

4-osteoporosis

5-peptic ulcer disease.

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Diabetes Mellitus

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

Diabetes mellitus

- Diabetes mellitus is a group of metabolic diseases characterized by high blood glucose levels (hyperglycemia) and the inability to produce and/or use insulin.

- Diabetes is a chronic condition that may affect persons of all ages

- Persistent hyperglycemia leads to metabolic and vascular complications

- The vascular complications include premature
  Macrovascular disease and serious microvascular disease.
- The metabolic component involves
  The elevation of blood glucose associated with alterations in lipid protein metabolism.

Diabetes mellitus is of importance because:

- Dentists will have many patients who have diabetes.
- Detect many persons who are not yet diagnosed or poorly controlled.
- Diabetes affects oral health, and oral health affects diabetes (it is bidirectional).
- To render care to patients already under medical management for their disease without endangering their health

Current Classification of Diabetes

Type 1

- Beta cell destruction, usually leading to absolute insulin deficiency
- Immune mediated: presence of islet cell or insulin antibodies that identify the autoimmune process, leading to beta cell destruction
- Idiopathic: no evidence of autoimmunity

Type 2

Insulin resistance with relative insulin deficiency or insulin secretory defect with insulin resistance

3-Gestational:Any degree of abnormal glucose tolerance during pregnancy

ETIOLOGY

Diabetes Mellitus may be the result of any of the Following

1. A Genetic disorder
2. Primary destruction of islet cells through inflammation , cancer or surgery
3. An endocrine condition such as hyperpituitarism or hyperthyroidism
4. An iatrogenic disease that occurs after steroid have been administered

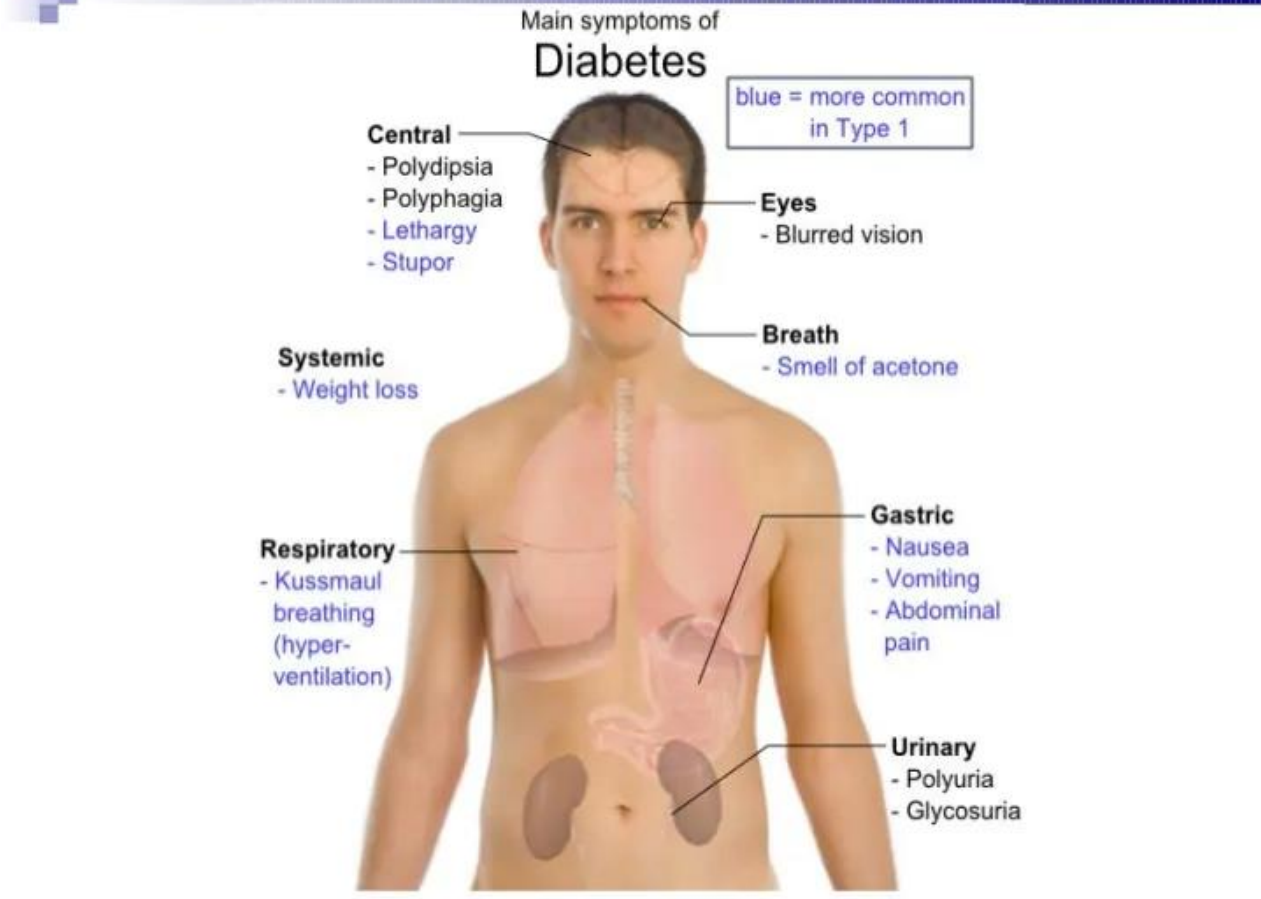
EPIDEMIOLOGY

More than 250 million persons worldwide have diabetes mellitus, and health officials estimate that this figure will exceed 300 million by 2020.

Clinical Manifestations of Diabetes

signs and symptoms

- polydipsia
- polyuria
- polyphagia
- weight loss
- loss of strength
- paresthesias
- Recurrence of bed wetting,
- Repeated skin infections
- Marked irritability
- Headache
- Drowsiness
- Malaise
- Dry mouth
- Gingivitis
- Periodontitis



Pathophysiology

1-Glucose is rapidly taken up by the pancreatic beta cell and serves as stimulus for insulin secretion.

2-insulin then interacts with target tissues (e.g., muscle, liver, fat cells) and binds with cell surface insulin receptors.

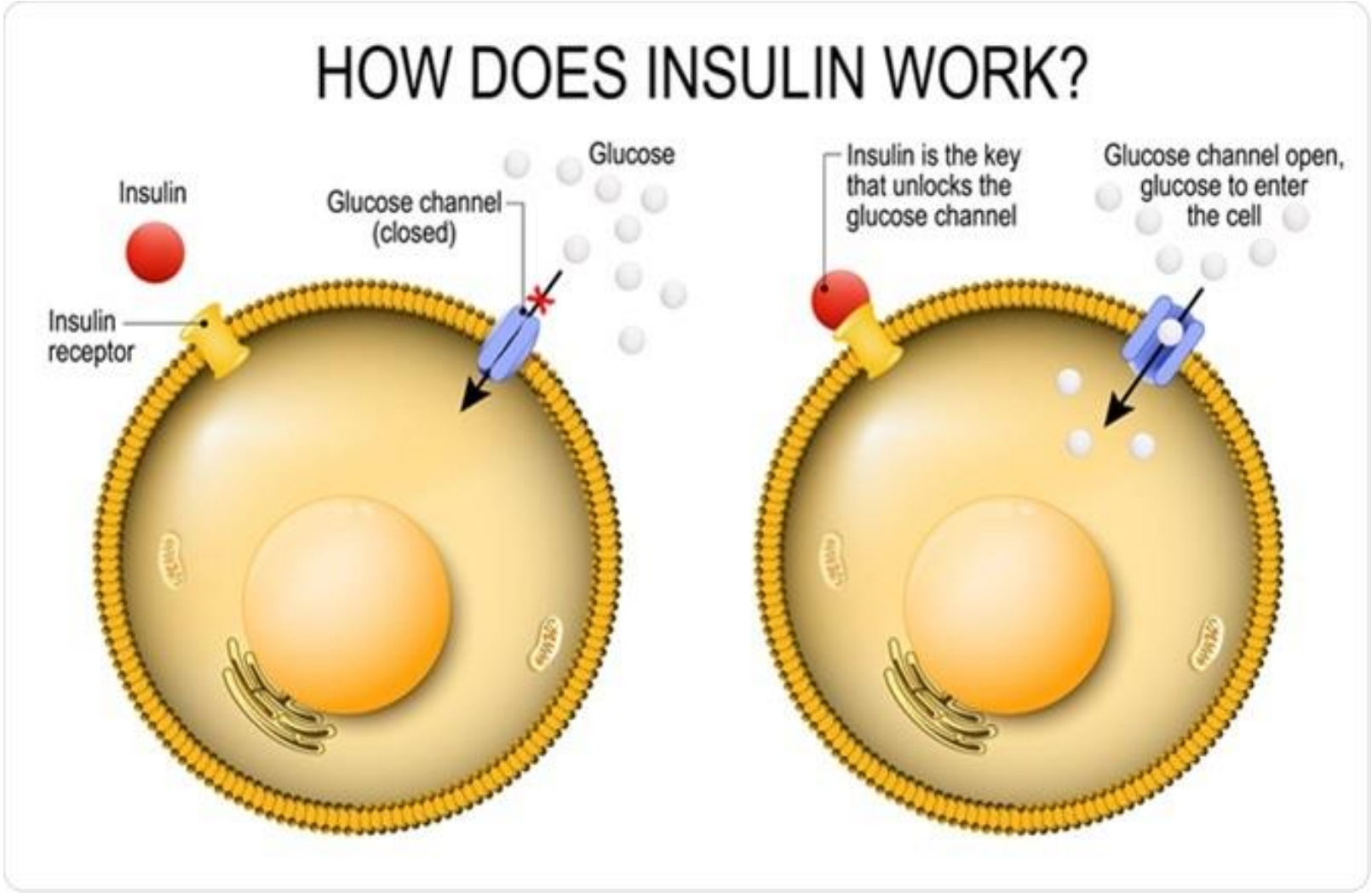
3-Lack of insulin or deficient action of insulin leads to abnormalities in carbohydrate, fat, and protein metabolism

4-This combination of underutilization and overproduction of glucose results in glucose accumulation in the tissue fluids and in blood.

5-Hyperglycemia leads to glucose excretion in the urine, which results in increased urinary volume and that may lead to dehydration and loss of electrolytes.

6-Lack of glucose utilization by many cells of the body leads to cellular starvation.

7-The patient often increases intake of food but in many cases still loses weight


HOW DOES INSULIN WORK?
Insulin
Insulin receptor
Glucose channel (closed)
Glucose
Insulin is the key that unlocks the glucose channel
Glucose channel open, glucose to enter the cell

General complications

- **Metabolic disturbances:** ketoacidosis

- **Cardiovascular:** accelerated atherosclerosis (coronary heartdisease[1]); two thirds have high blood pressure; risk for stroke and heart disease death is two to four times higher among people with diabetes

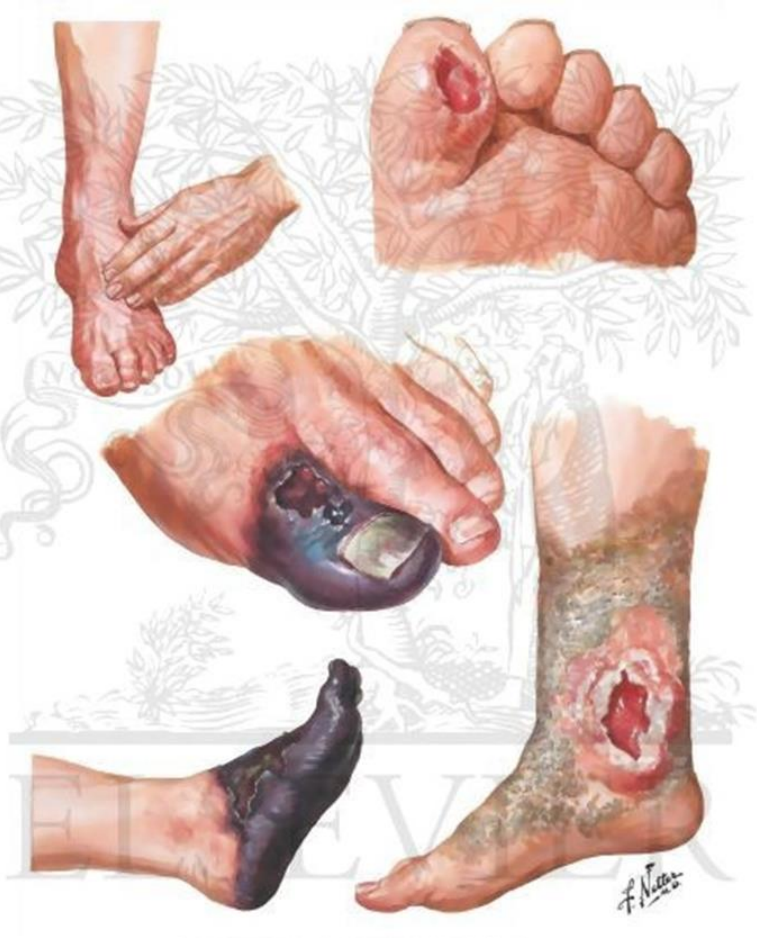
- **Eyes:** retinopathy, cataracts; diabetes is leading cause of new cases of blindness among adults

- **Kidney:** diabetic nephropathy; diabetes is leading cause of renal failure

- **Extremities:** ulceration and gangrene of feet; diabetes is leading cause of non–accident-related leg and foot amputations

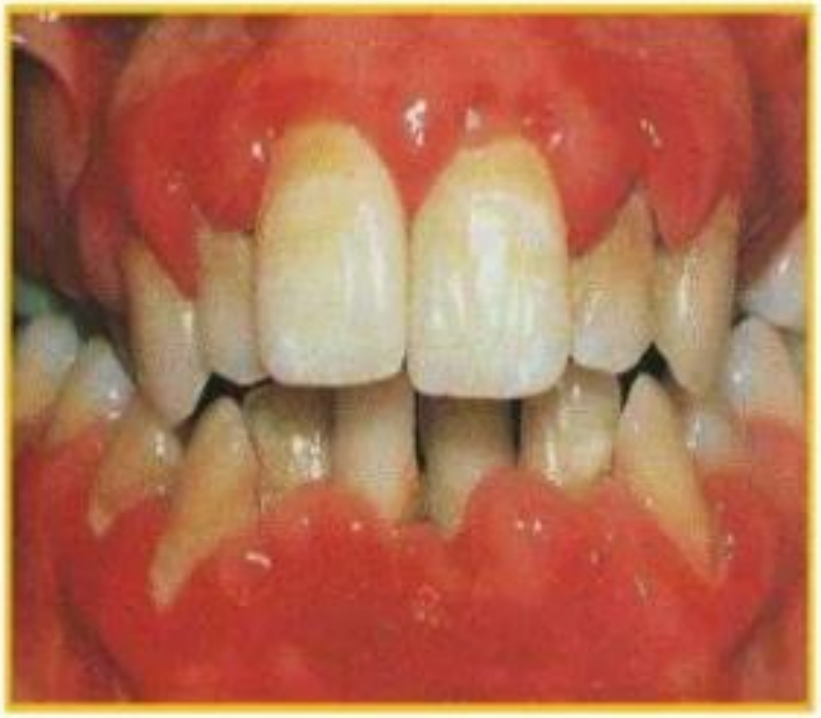
- **Diabetic neuropathy:** dysphagia, gastric distention, diarrhea, impotence, muscle weakness , numbness, tingling,deep burning pain

- **Early death:** diabetes is the seventh leading cause of death in the United States, most commonly caused by cardiovascular disease



DIABETES & PERIODONTIUM ORAL MANIFESTATIONS:

- Diminished salivary flow
- Burning mouth & tongue
- Enlargement of parotid gland (Alteration in basement mem.)
- Cheilosis
- Alterations in flora of oral cavity (Predominance by Candida albicans)
- Increase rate of dental caries
- Tendency towards enlarged gingiva.
- Abscess formation
- Periodontitis
- Loosened teeth



Gingivitis in a 19-year-old women
with uncontrolled diabetes mellitus

The diagnostic criteria for diabetes

1- Random sampling non-fasting subject., a result of200 mg/dL or above

2- After fasting (Fasting is defined as no caloric intake for at least 8 hours.)

less than 100 mg/dL is normal

100 to 125 mg/dL indicates prediabetes

126 mg/dL or above indicates diabetes

3- The oral glucose tolerance test :2-Hour post load glucose ≥200 mg/dL during an OGTT. The test should be performed as described by a glucose load containing the equivalent of 75 g of anhydrous glucose dissolved in water.

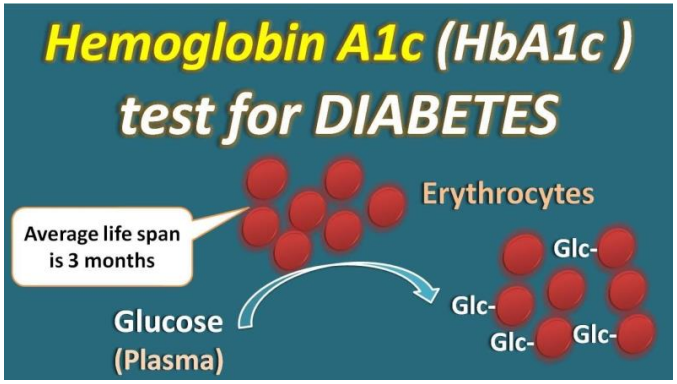
4- glycosylated hemoglobin test

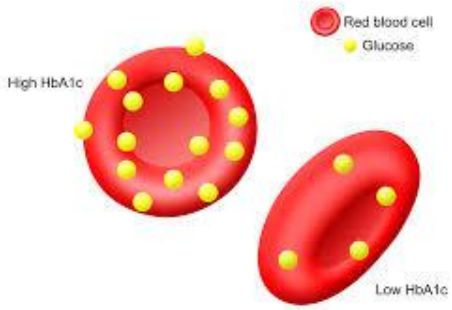
In health, patients should have HbA1c levels less than 6%.

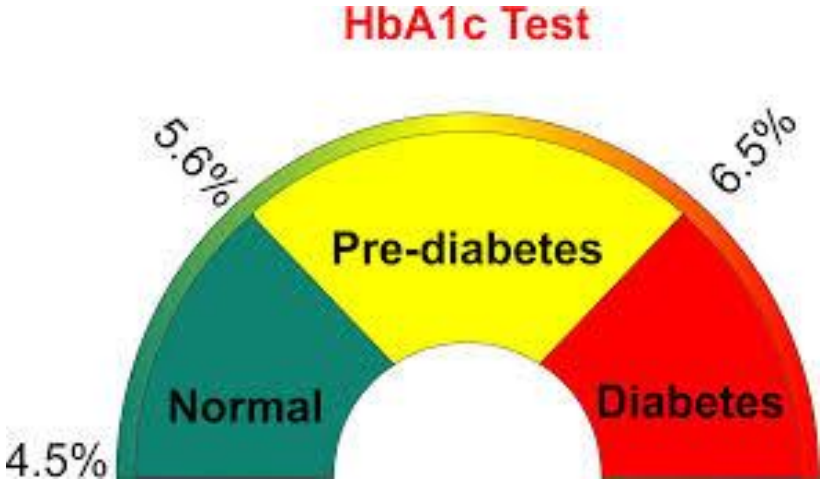
In well-controlled diabetes, the level should stay below 7%

HbA1c is known as the A1C assay

This assay measures the amount of sugar attached to hemoglobin; levels increase in the presence of hyperglycemia. The A1C reflects glucose levels in the blood over the preceding 3 months, which is the approximate life span of a red blood cell







Medical Management of Diabetes Mellitus

Type 1 Diabetes

- Diet and physical activity
- Insulin
  - Conventional
  - Continuous infusion
- Pancreatic transplantation

Type 2 Diabetes

- Diet and physical activity
- Oral hypoglycemic agents(Metformin/Glucophage\.....)
- Insulin plus oral hypoglycemic agents

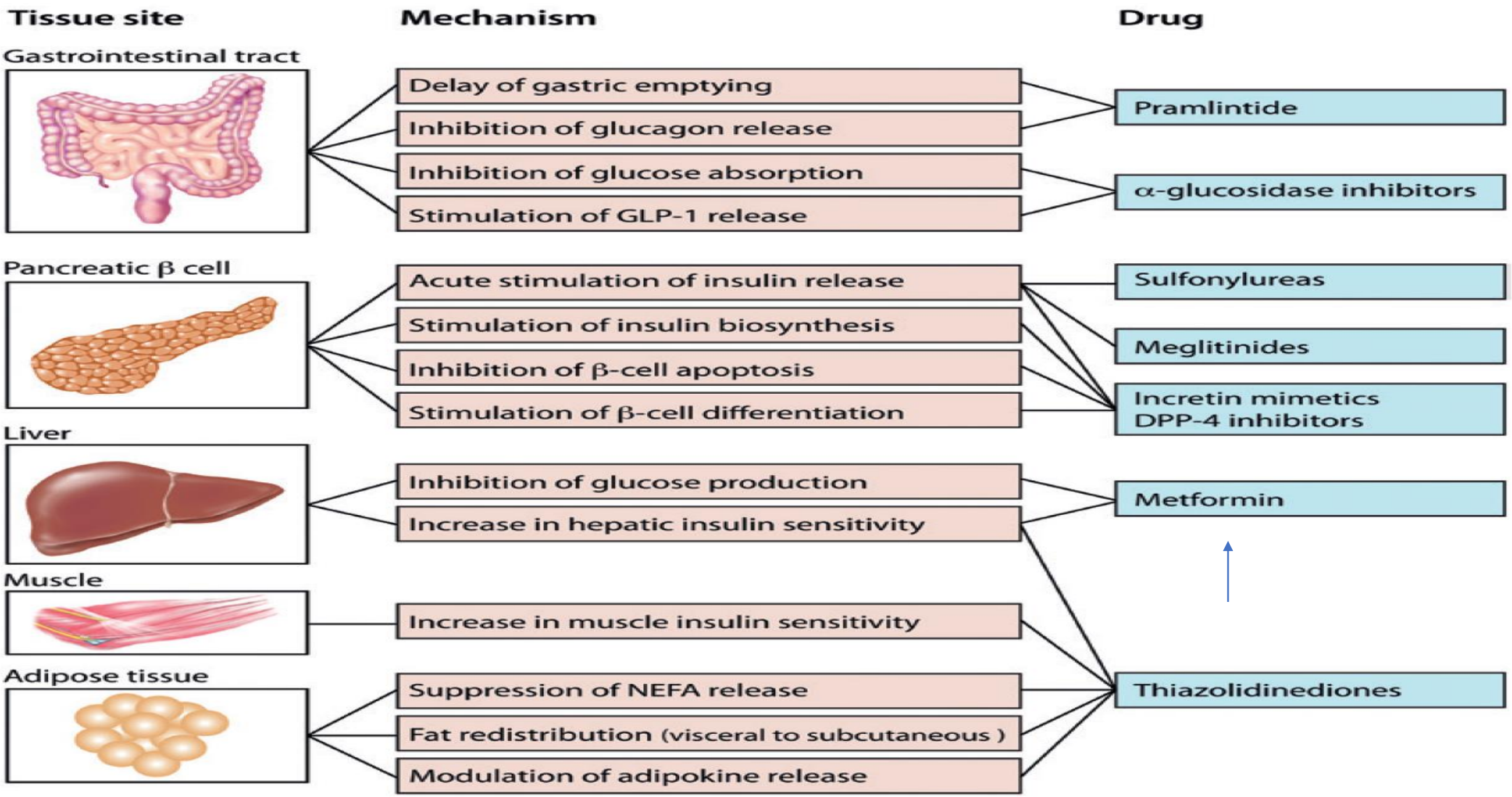


FIG 14.9 Antidiabetic agents used to treat hyperglycemia according to site and mechanism of action. *GLP-1*, Glucagon-like peptide-1; *NEFA*, nonesterified ("free" or unsaturated) fatty acids. (Courtesy Medtronics, Diabetes, Minneapolis, MN.)

Dental Management of Patients With Diabetes

Patient Evaluation and Risk Assessment

- Evaluate and determine whether diabetes exists.

- Obtain medical consultation if glycemic control is poor or if signs and symptoms point to an undiagnosed problem or if the diagnosis is uncertain.

If diabetes is well controlled, all routine dental procedures can be performed without special precautions.

Morning appointments usually are best.

Analgesics Avoid use of aspirin and other NSAIDs in patients taking sulfonylureas because they can worsen hypoglycemia.

Anesthesia No issues if diabetes is well controlled. For diabetic patients with concurrent hypertension or history of recent MI or with a cardiac arrhythmia, the dose of epinephrine should be limited to no more than two cartridges containing 1 : 100,000 epinephrine

Cardiovascular Confirm cardiovascular status. Beta-blocker drugs can exacerbate hypoglycemia in patients taking sulfonylureas

The risk for infection and antibiotic

1-The fasting blood glucose level is below 206 mg/100 mL, increased risk is not predicted.

2- If the fasting blood glucose level is between 207 and 229 mg/100 mL, the risk is predicted to be increased by 20% if surgical procedures are being performed.(give antibiotics ?)

3- If the fasting blood glucose level rises to above 230 mg/100 mL, an 80% increased risk of infection postoperatively has been reported. (give antibiotics)

Dental Management of Patients With Diabetes and Acute Oral Infections

1. Non–insulin-controlled patients may require insulin; consultation with physician is indicated.

2. Insulin-controlled patients usually require increased dosage of insulin; consultation with physician is indicated.

3. Patient with brittle diabetes or receiving high insulin dosage should have culture(s) taken from the infected area for antibiotic sensitivity testing.

- **a.** Culture is sent for testing.
- **b.** Antibiotic therapy is initiated.
- **c.** In cases of poor clinical responses to the first antibiotic, a more effective antibiotic is selected according to sensitivity test results.

4. Infection should be treated with the use of standard methods:

- **a.** Warm intraoral rinses
- **b.** Incision and drainage
- **c.** Pulpotomy, pulpectomy, extractions
- **d.** Antibiotics

Drugs Patient advised to take usual insulin dosage and normal meals on day of dental appointment; information confirmed with patient at appointment.

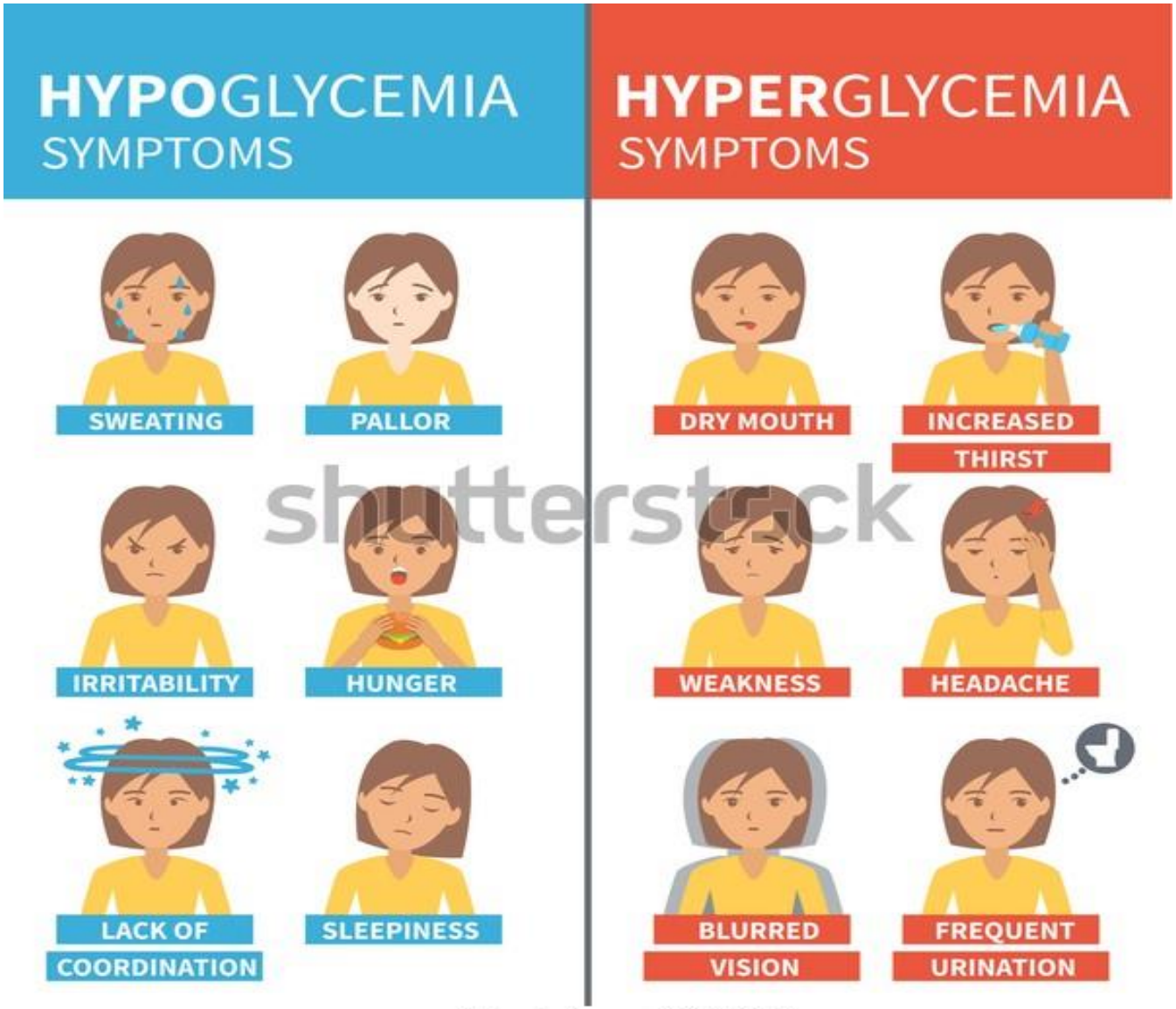
Equipment Use office Glucometer to ensure good glucose control.

Advise patient to inform dentist or staff if symptoms of insulin reaction occur during dental visit. Have glucose source (orange juice, soda, cake icing) available; give to the patient if symptoms of insulin reaction occur.

A major goal in dental management of diabetes are:

1- Prevention insulin shock.
2-Management of insulin shock when occur.

3- insulin shock occurs when concentration of blood glucose drops below 60 mg/dl



Insulin shock occurs when you have too much insulin in your blood. This can lead to hypoglycemia, also called low blood sugar.

Insulin Shock May Occur If Someone:

- Ignores Mild Hypoglycemia
- Takes Too Much Insulin By Mistake
- Misses A Meal Completely
- Does excessive unusual exercise without changing their carbohydrate intake

Insulin shock is a diabetic emergency.

If left untreated, it can lead to diabetic coma, brain damage, and even death.

Treatment of Insulin shock

As soon as such signs or symptoms are present the dentist should check the glucose by the glucometer

- Establishing airway ,breathing, and circulation
- Turn on the fans, conditioner,
- Place the patient in the supine position

- **if the patient is conscious** and she is able to take her food by mouth so give 15 g of the carbohydrate in the following form
  - orange juice
  - 3-4tablespoon of sugar
  - A small amount of sweet/honey it can be placed in buccal fold

In unconscious patient

50ml of the dextrose in 50% of the concentration iv infusion

or

1mg of the glucagon I/V

Or

1mg of the glucagon intramuscularly.

- Increased risk of infection
  - Reasons unknown, but macrophage metabolism altered with inhibition of phagocytosis.
  - Peripheral neuropathy and poor peripheral circulation
  - Immunological deficiency
  - High sugar medium
  - Decrease production of Antibodies

  - Candidal infection are more common and adding effects with xerostomia

Oral manifestations and complications

- Delayed healing of wounds
  - Due to microangiopathy and ultilisation of protein for energy, may retard the repair of tissues.
  - Increase prevalence of dry socket.
- Miscellaneous conditions
  - Pulpitis : degeneration of vascular.
  - Neuropathies : may affect cranial nerves. (facial)
  - Drug side-effects : lichenoid reaction may be associated with sulphonylureas (chlopropamide)
  - Ulcers

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Ischemic heart disease

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

Ischemic heart disease(IHD)

Coronary Artery Disease (CAD) •

Ischemic heart disease is a condition in which there is an inadequate supply of blood and oxygen to a portion of the myocardium.

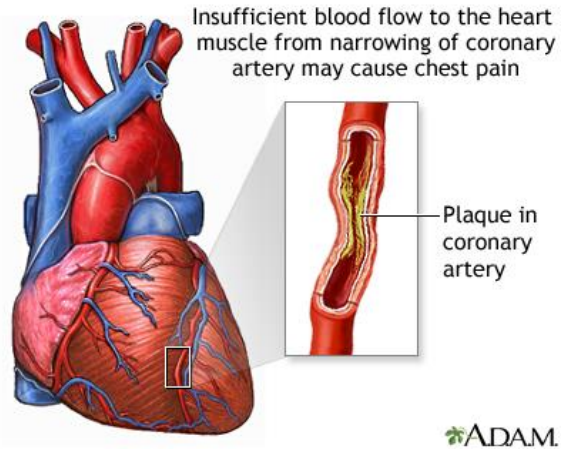
It is Imbalance between myocardial oxygen supply and demand.

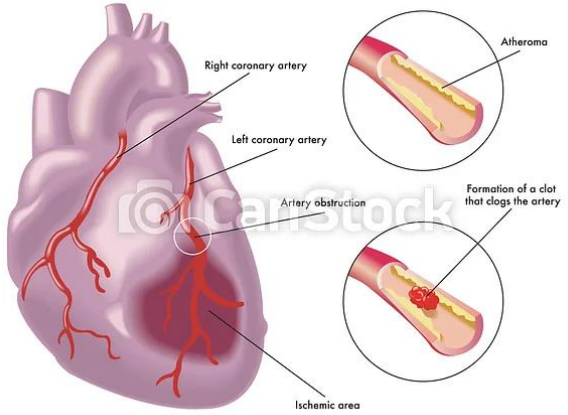
It includes

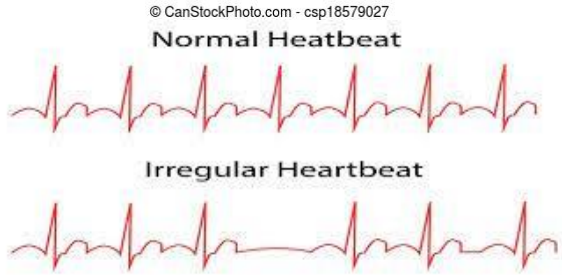
1-Angina: Stable & Unstable

2-Myocardial infarction

3-Heart failure & Arrhythmia





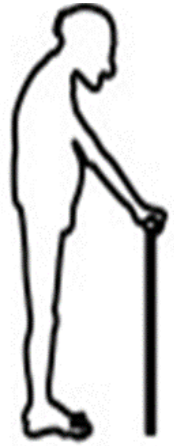


Risk Factors for Coronary artery disease

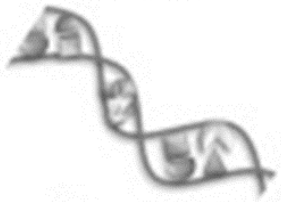
1-Non-modifiable

- Age
- Family history
- Sex

.



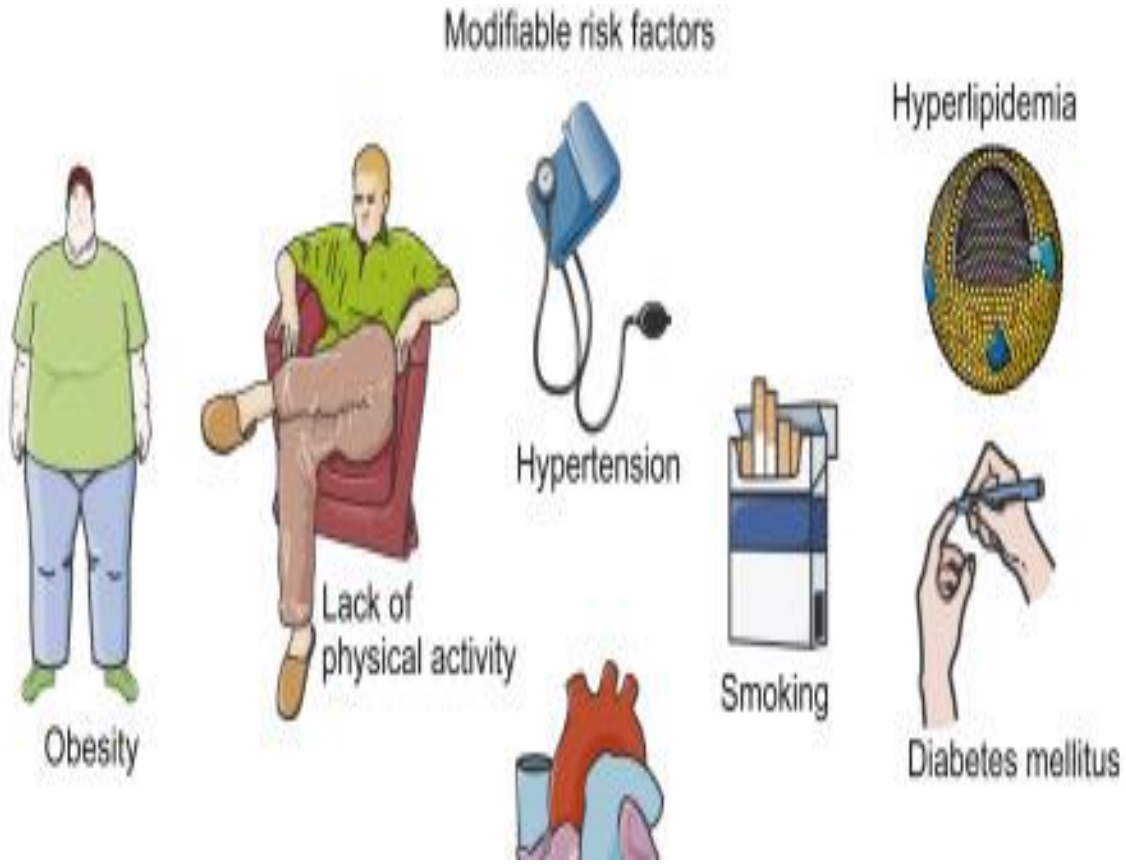
Male gender



Genetic predisposition

2-modifiable

- obesity
- Lack of physical activity
- Hypertension
- Smoking diabetes melitus
- hyperlipidemia



Pathogenesis of coronary artery disease

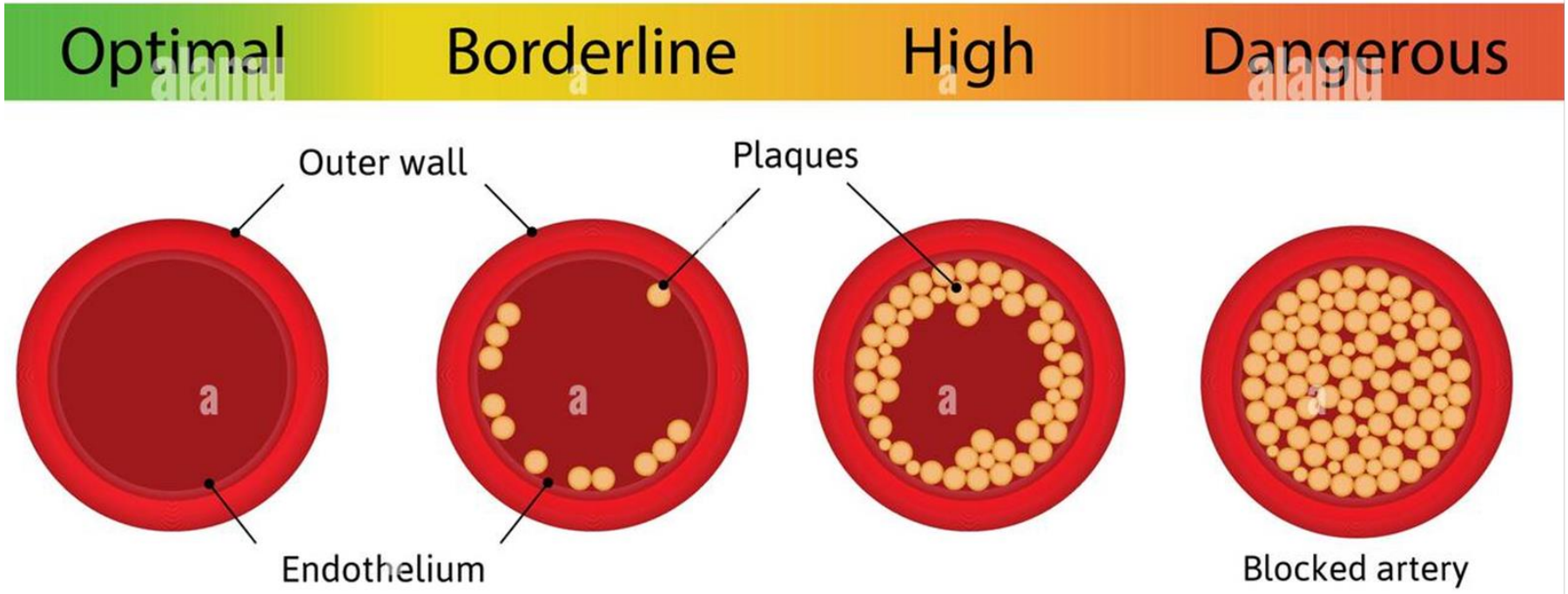
Caused mainly by Atherosclerosis of Coronary Artery

Atherosclerosis The underlying pathogenesis of coronary arterial disease

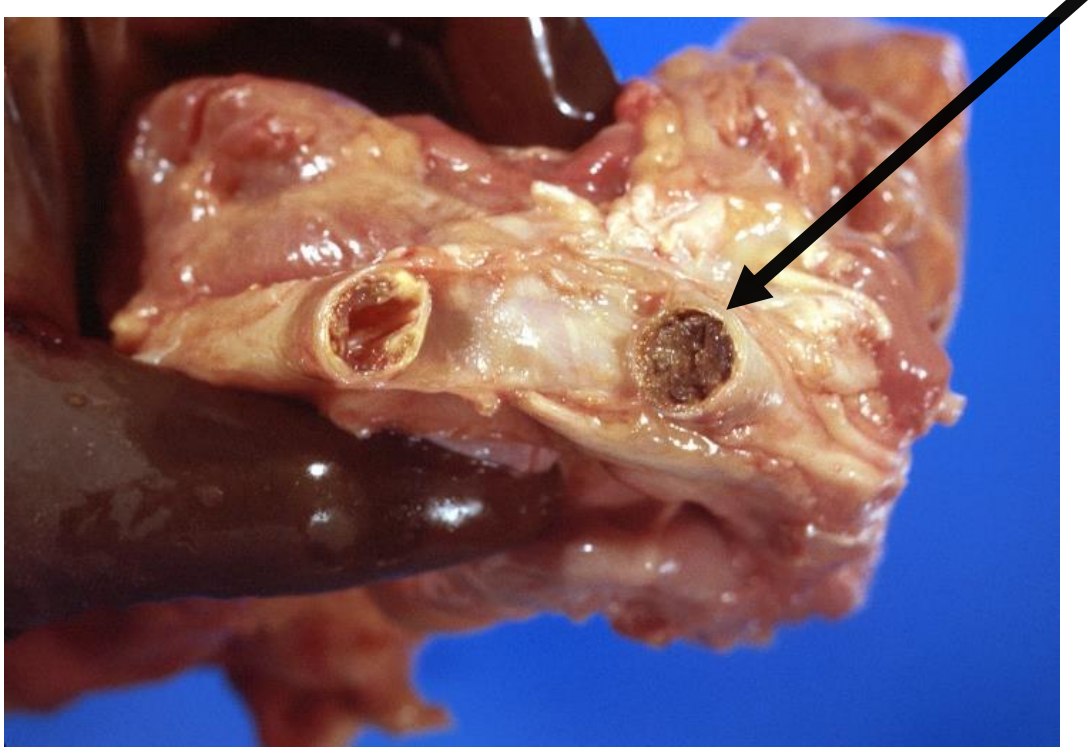
The condition in which an artery wall thickens as the result of a build-up of fatty materials such as cholesterol

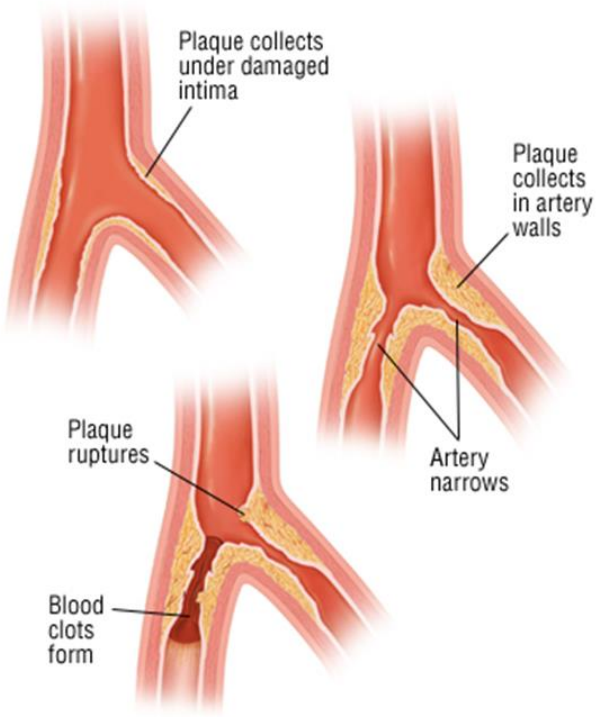
Atherosclerosis = “Hardening of the vessels”

Atherosclerosis Levels



Atherosclerosis • The key processes in atherosclerosis are
– intimal thickening
– lipid accumulation
• These processes will produced the atheromatous plaque



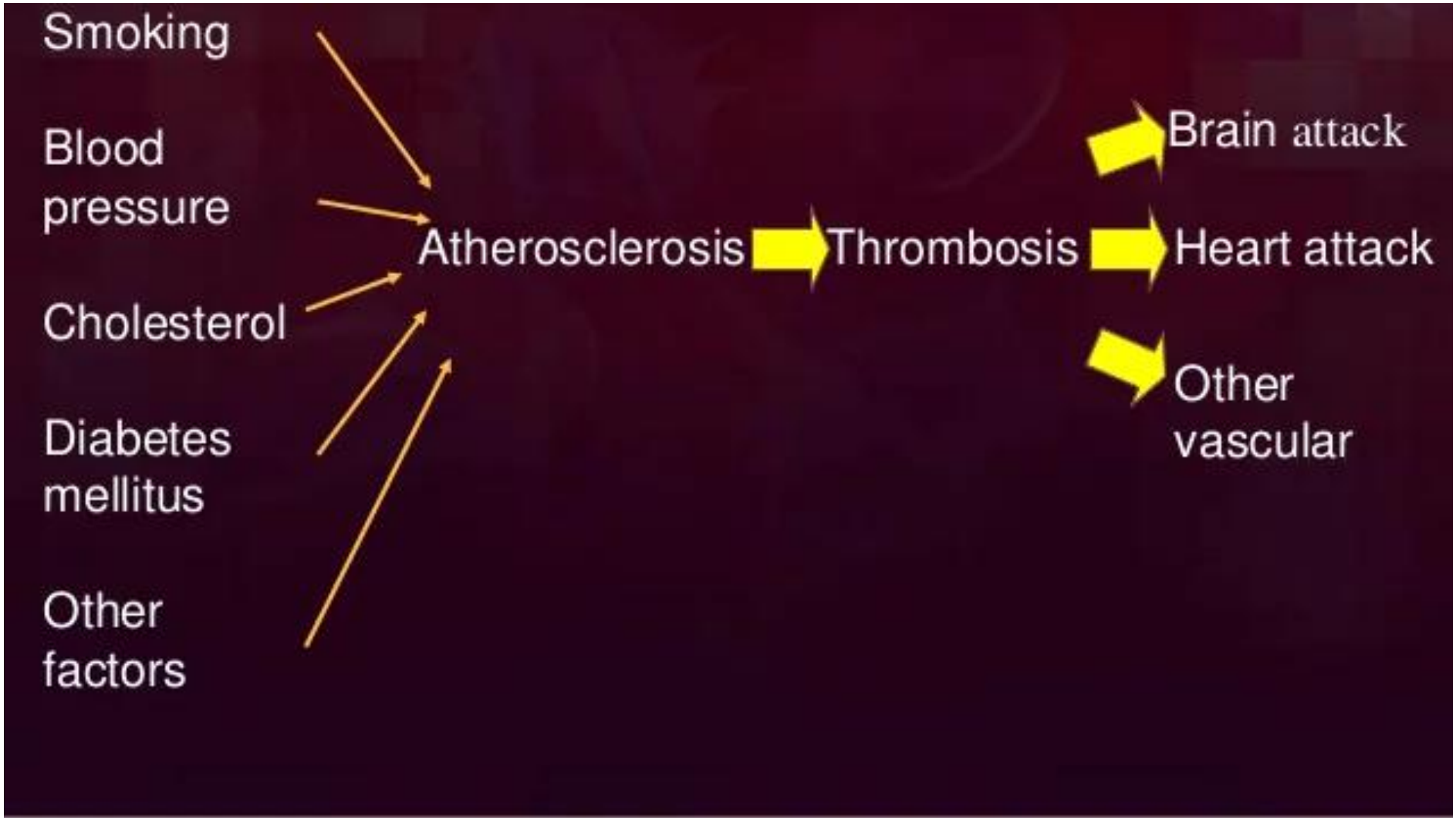


Atherosclerosis

- Can affect any artery in the body
- Heart: angina, MI and sudden death; (Coronary artery disease)
- Brain: stroke and transient ischaemic attack.
- Limbs: claudication and critical limb ischaemia.

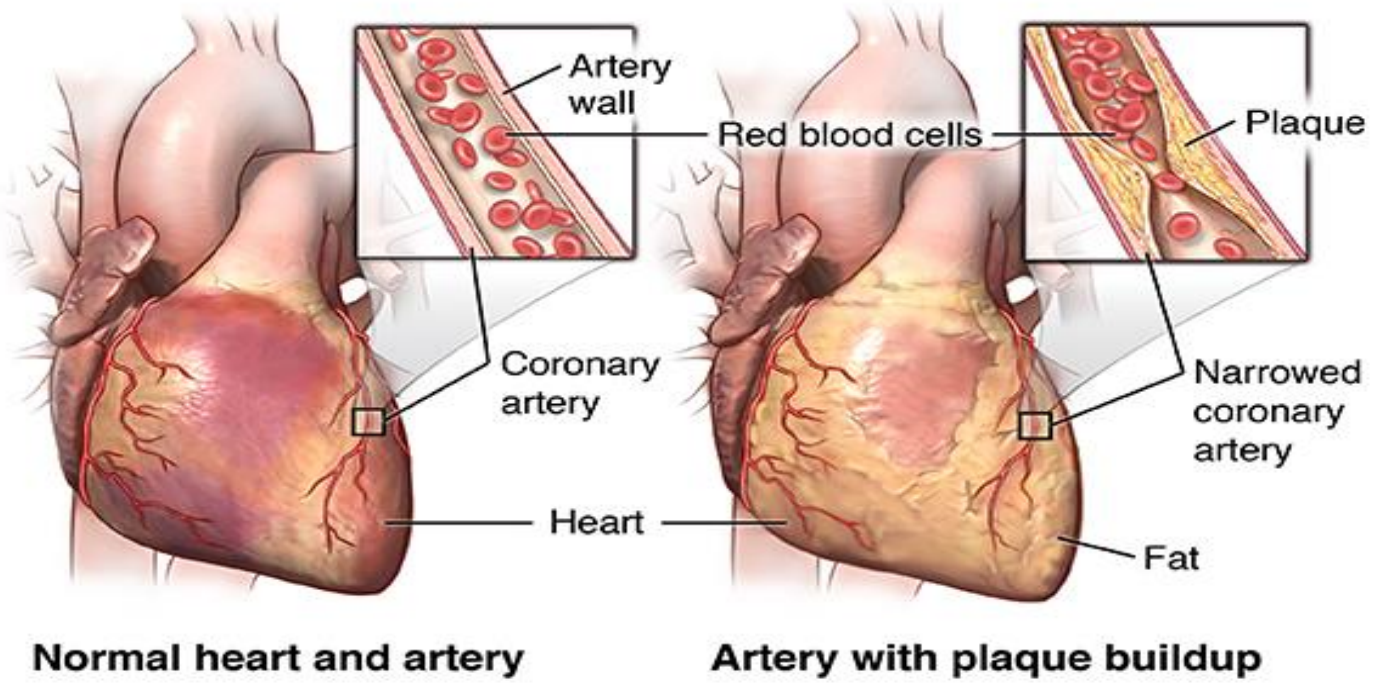
Major Risk Factors in at :

Tobacco use.
Physical inactivity.
Obesity
High blood pressure.
Diabetes
High levels of cholesterol


Smoking
Blood pressure
Cholesterol
Diabetes mellitus
Other factors
Atherosclerosis
Thrombosis
Brain attack
Heart attack
Other vascular

Angina Pectoris

It is a transient myocardial ischemia resulting from imbalance between coronary blood flow & oxygen demand



INCIDENCE:

10 million people in the US suffer from angina.

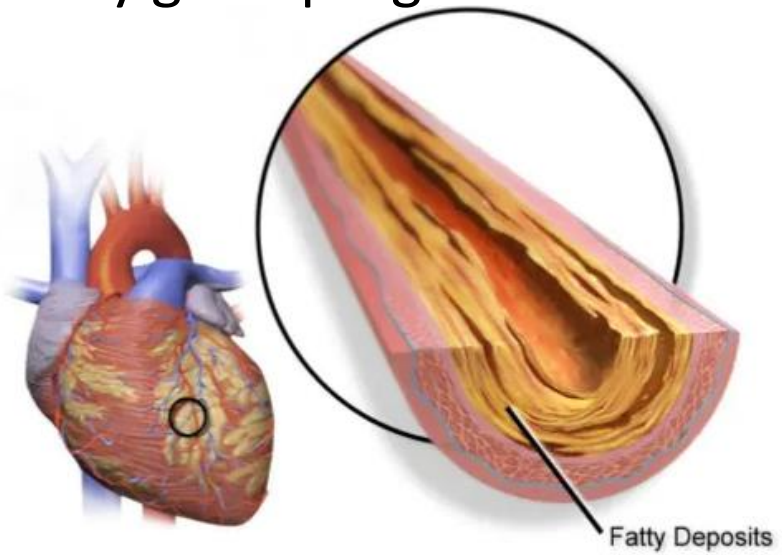
500,000 new cases of stable angina occur each year.

Types of Angina

- Stable
- Unstable
- Variant

Stable Angina

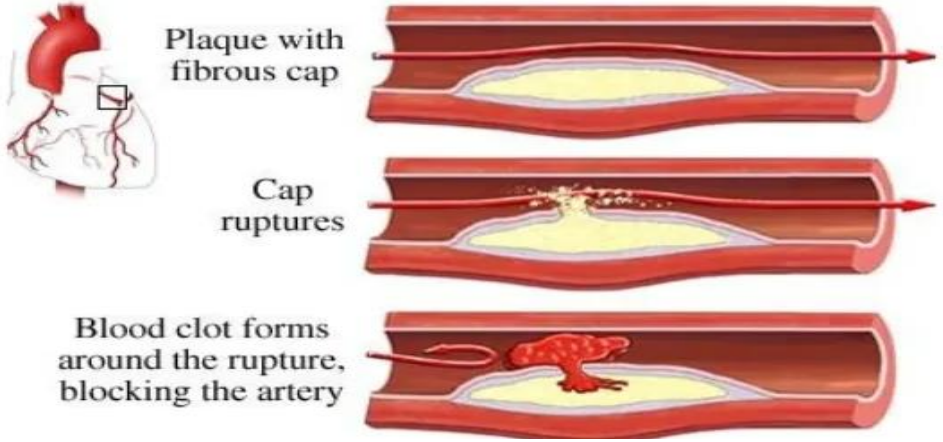
- Pain that is predictably reproducible, unchanging, and consistent over time
- Pain typically is precipitated by exertion such as walking or climbing stairs but also may occur with eating or stress.
- Pain relieved by rest or with the use of nitroglycerine
- Patients with stable angina have a relatively good prognosis



Partially Blocked Coronary Artery

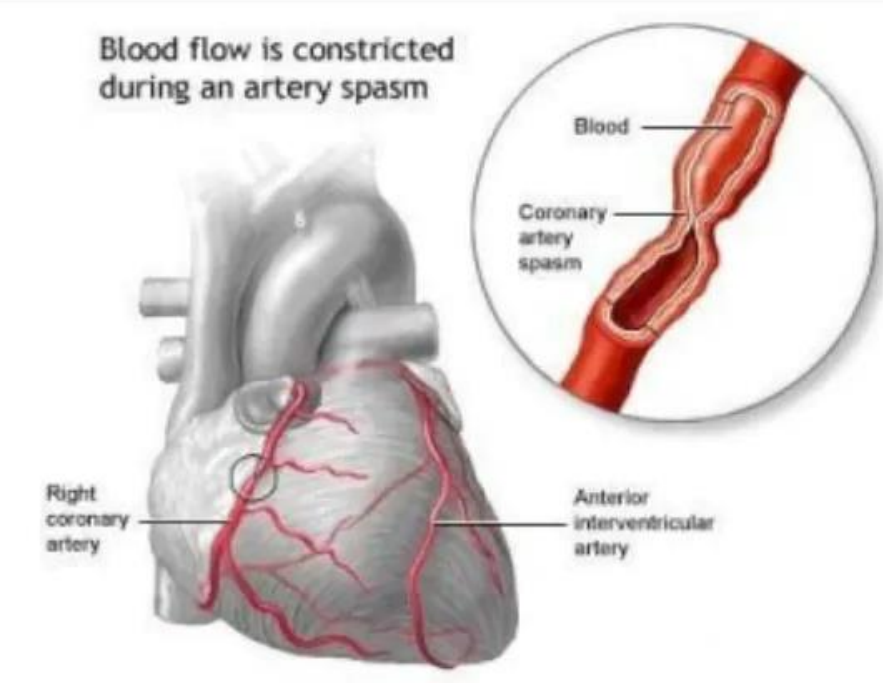
Unstable Angina

- Pain occurs with increasing frequency, increasing in intensity.
- Occurring at rest and often experience an acute MI within a short time.
- Diminishes patient's ability to work.
- Has decreasing response to therapy
- Often experience an acute MI within a short time.



Variant Angina

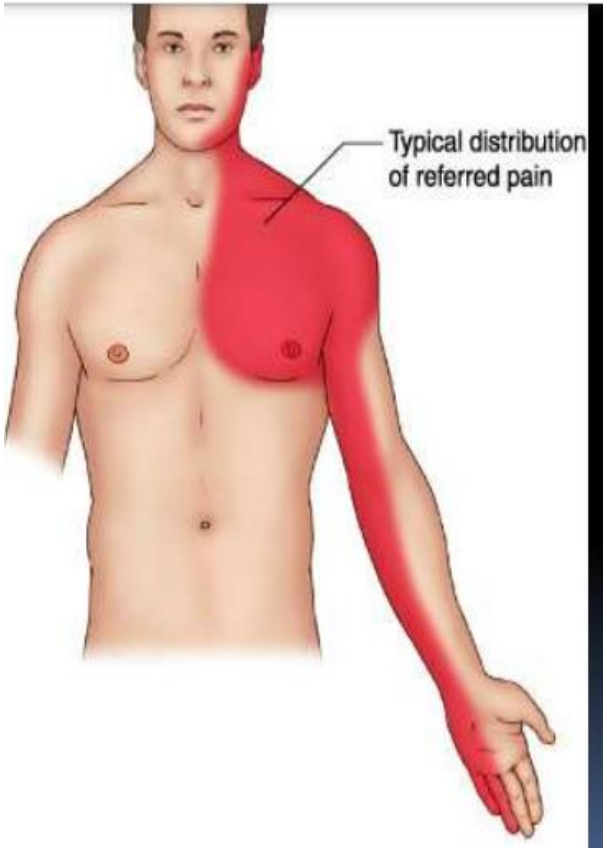
- Pain due to coronary artery spasm
- Pain may occur at certain times of the day, but is not stress induce
- Occurs when a person is at rest or sleep
- Usually affects arteries already narrowed by atherosclerosis
- The pain is fluctuated during the day (come and goes)



Clinical Features

1-Pain - over sternum and spreads down the left arm also to backsides , upper abdomen, neck , jaw or even teeth. Type –dull ache , heaviness or a crushing sensation

2-breathlessness
3-Chest Discomfort
4-Nausea
5-Fatigue
6-Dizziness
7-Profuse sweating
8-Anxiety



Medical Management of Angina

Medications

- Nitrates (Angised, Isordil))
- Beta blockers (Tenormin)
- Calcium channel blockers (Adalat)
- Anti-platelet agents (aspirin)
- Antihyperlipidemics (Simvastatin)

Surgery

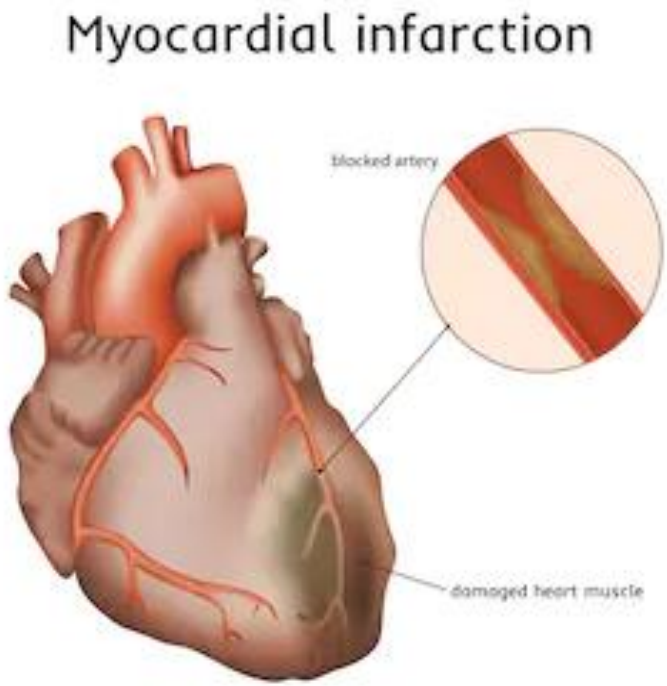
1- Mechanical revascularization

2-Coronary angioplasty/ “balloon” / stent

3-Coronary artery bypass graft

Myocardial infarction

It Is a complete obstruction of blood flow of one or more coronary arteries by a thrombus & there is rupture of athermanous plaque which lead to necrosis & cardiac damage & may lead to sudden death due to arrhythmia (ventricular fibrillation)



Predisposing Factors:

1-Coronary artery disease

2-Male built. 50 – 70 years.

3- obesity

4-Prolonged stress.

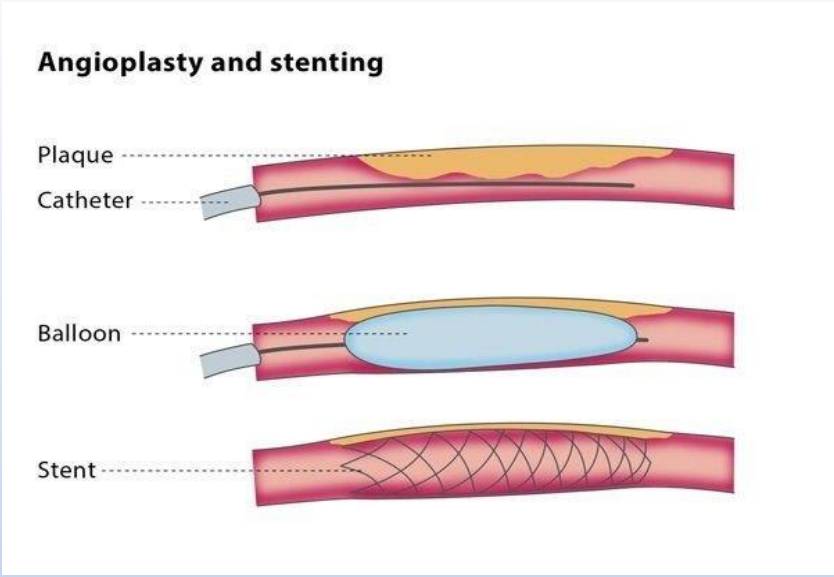
5-Family history

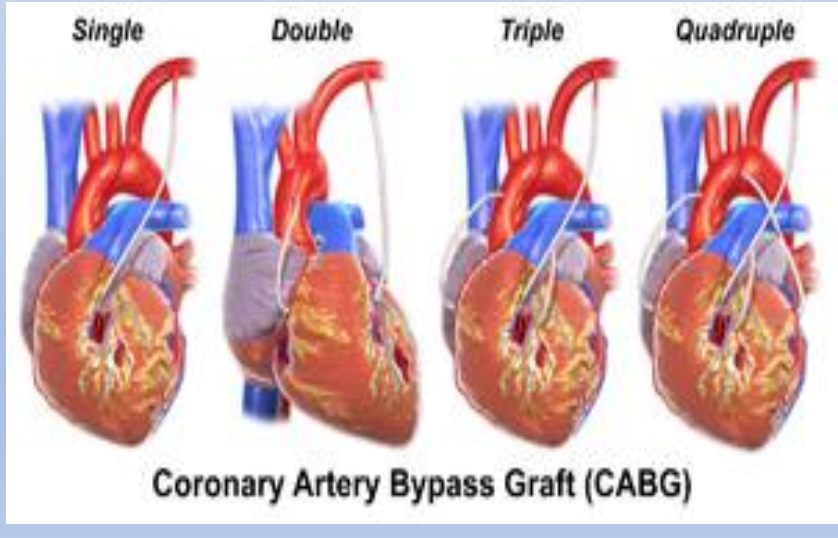
Signs & symptoms of Acute MI

1-Sever retroseternal chest pain lasting from 1\2 – 1 hour.
2- pallor, sweating, tachycardia.
3- vomiting .
4-Breathlessness.
5-Syncope or collapse.
6-Extreme tiredness & weakness.

Medical Management of Acute MI

1-Early prehospital supportive care.
2-Coronary care unit monitoring(DC shock to treat VF)
3-Early use of thrombolytics (streptokinase, Alteplase)
4-Coronary angioplasty .
5-Coronary artery by-pass graft (CABG).
6-Adjunctive pharmacologic therapy (O2, narcotics morphine, plasil , anxiolytics, beta-blockers, aspirin, heparin, warfarin, nitrates, calcium-channel blockers, digitalis,)





Dental Management of
Stable Angina &Post-MI more than 6 months

- Antibiotics: No issues. Patients with ischemic heart disease, coronary artery stents(consult with physician)

- Analgesics :Ensure adequate postoperative pain control

- Anesthesia :Avoid use of excessive amounts of epinephrine; limit to 2 carpules of 1 : 100,000 epinephrine at a time (within 30–45 minutes); greater quantities may be tolerated well but increase risk.

- Anxiety: Use stress reduction protocol .Consider the use of preoperative oral sedation (short-acting benzodiazepine) 1 hour before procedure, as well as using N2O-O2 inhalational sedation intraoperatively.

- Bleeding :If the patient is taking aspirin or other antiplatelet medication, anticipate some increased bleeding, but modification of drug regimen is not required.

- If INR Is within the therapeutic range (2.0–3.5), dental treatment, including minor oral surgery, can be performed without stopping or altering the warfarin regimen.Or if not Consult with physician regarding planned dental procedure and patient’s coagulation status

- Breathing No issues

- Blood pressure Monitor blood pressure and the use of a pulse oximeter if oral sedation is used or if the patient becomes symptomatic

- Capacity to tolerate care :Patients who have stable angina that is relieved by nitrates can received routine dental care. Have nitroglycerin available.

- Chair position :Ensure a comfortable chair position and avoid rapid position changes.

- Drugs: Use of excessive amounts of epinephrine with nonselective beta-blockers can potentially cause a spike in blood pressure and appears to be dose dependent; avoid the use of epinephrine-impregnated retraction cord.

Emergencies

Precipitation of an angina attack, MI, arrhythmia, or cardiac arrest is possible.

if Intraoperative Chest Pain occure

- Give nitroglycerin
- If after 5 minutes pain still present, give another nitroglycerin
- If after 5 more minutes pain still present, give another nitroglycerin

2-oxygen.

Dental Management of
Unstable Angina or MI less than 6 months

- Avoid elective care
- Consultation with physician .
- For urgent care: be as conservative as possible; do only what must be done (e.g. infection control, pain management)
- Prophylactic nitroglycerin.
- Consider treating in hospital.

- Anesthesia Avoid use of vasoconstrictor if possible. If vasoconstrictor is needed, limit to 2 carpules of 1 : 100,000 epinephrine at a time (within 30–45 minutes); greater quantities may be tolerated but increase risk. May need to discuss use with physician

- Equipment Recommended management includes placement of IV line, continuous ECG monitoring, ongoing monitoring of vital signs, and use of a pulse oximeter.

General Stress Reduction Protocol

- Open communication about fears or concerns
- Short appointments (preferably morning)
- Preoperative sedation: short-acting benzodiazepine (e.g., triazolam 0.125–0.25 mg or diazepam 5 mg) 1 hour before the appointment and possibly the night before the day of the appointment
- Intraoperative sedation (N2O-O2)
- Profound local anesthesia: use topical before injection
- Adequate operative and postoperative pain control

Drugs Used in the Management of Angina

Drug	Oral Adverse Effects	Dental Considerations
NITRATES	Dry mouth	Orthostatic hypotension, headache Vasoconstrictor interactions: none
BETA-BLOCKERS(**Nonselective)**	Taste changes, lichenoid reactions	Orthostatic hypotension Vasoconstrictor interactions: increase in BP possible with sympathomimetics, cautious use recommended (maximum, 0.036 mg epinephrine; 0.20 mg levonordefrin)
CALCIUM CHANNEL BLOCKERS	Gingival overgrowth, dry mouth, lichenoid eruptions (rare)	None. Vasoconstrictor interactions: none
PLATELET AGGREGATION INHIBITORS Aspirin Clopidogrel (Plavix)	non	Increased bleeding, but not clinically significant with daily doses ≤325 mg. Vasoconstrictor interactions: none (some time need consultation)

Drug Considerations. Nonsteroidal anti-inflammatory drugs (NSAIDs) (except for aspirin) should be avoided in patients with established hypertension and coronary artery disease, especially those whose cardiac history includes an MI. Only naproxen did not increase the risk.

a dentist should not prescribe erythromycin or clarithromycin to patients who take ?????????

cholesterol-lowering medications, such as simvastatin

calcium channel blockers

For patients at all levels of cardiac risk, the use of gingival retraction cord impregnated with epinephrine should be avoided because of the rapid absorption of a high concentration of epinephrine and the potential for adverse cardiovascular effects.

As an alternative, plain cord saturated with tetrahydrozoline HCl 0.05% (Visine; Pfizer, New York, NY) or oxymetazoline HCl 0.05% (Afrin; Schering-Plough, Summit, NJ) provides gingival effects equivalent to those of epinephrine without adverse cardiovascular effects

Many patients who have ischemic heart disease take cholesterol-lowering medications, such as simvastatin (Lipitor). Concurrent use of macrolide antibiotics has been shown to increase the plasma level of statin drugs (i.e., β-Hydroxy β-methylglutaryl-CoA (HMG-CoA) reductase inhibitors) and increases the risk of rhabdomyolysis (myalgia and muscle weakness). Similarly, macrolide antibiotics can increase the plasma level of CCBs, resulting in severe hypotension.

Thus, a dentist should not prescribe erythromycin or clarithromycin to patients who take either HMGCoA reductase inhibitors (e.g., simvastatin, atorvastatin, pravastatin) or CCBs

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Infective Endocarditis

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

٢٠٢٣-٢٠٢٢

LEC.1

The dental management of Medically Compromised

Refers to dental patients with impaired health status like

- Pregnancy
- Patients with systemic diseases like ischemic heart disease
- congenital heart disease
- Liver disease
- Renal disease, asthma
- Immunodeficiency
- Side effects of a course of treatment
- Or any thing can do some interaction during dental treatment

Remember you are treated ONE problem and do not make it MANY problems

Infective Endocarditis(IE)

Definition of Infective Endocarditis

a serious infection of the endocardium of the heart, particularly the heart valves, is associated with a high degree of illness and death.

It generally occurs in patients with altered and abnormal heart architecture, in combination with exposure to bacteria through Trauma.

and other potentially high-risk activities involving transient bacteraemia.

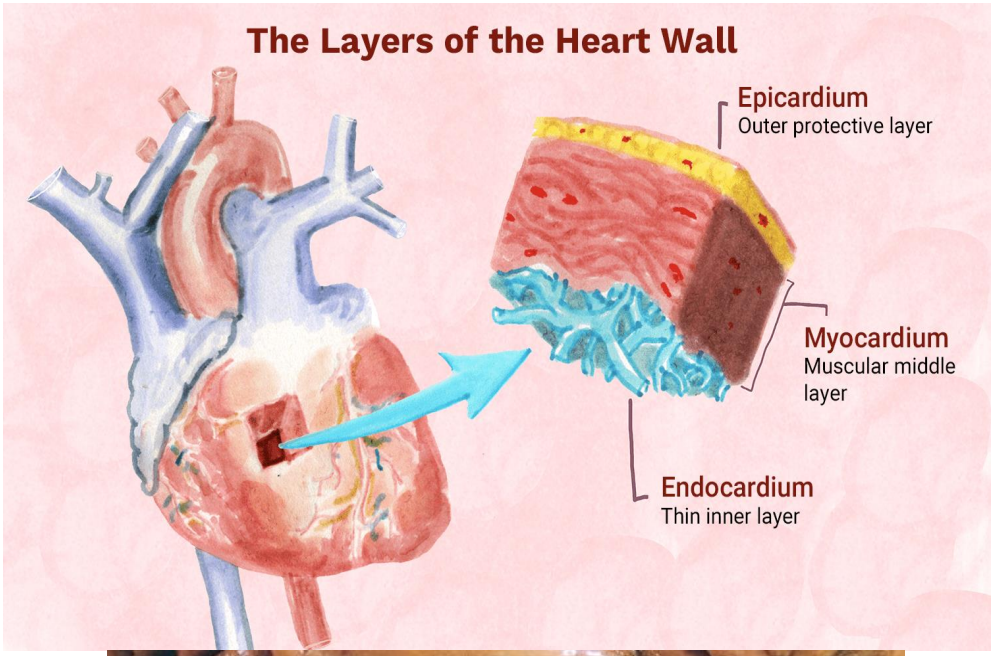
Types of Bacteraemia

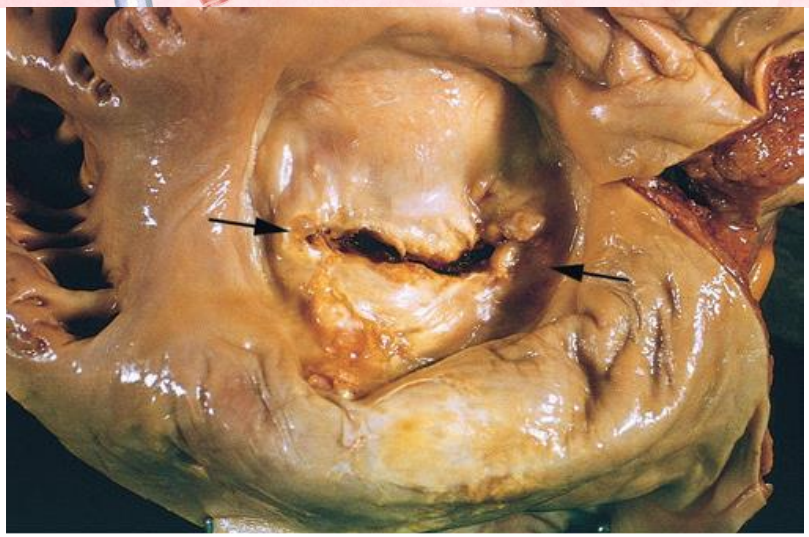
1-Transient: Disruption of mucosal surfaces (dental or surgical procedures)

2- Intermittent: Associated with abscesses

3- Continuous: Infective endocarditis

- Its intracardiac effects include severe valvular insufficiency, which may lead to congestive heart failure and myocardial abscesses





Mitral stenosis with diffuse fibrous thickening and distortion (arr

Epidemiology

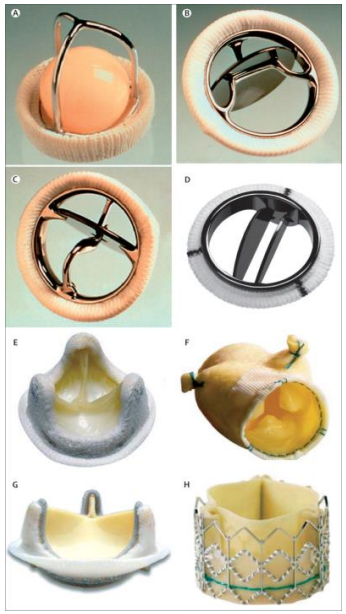
More common in males than in females

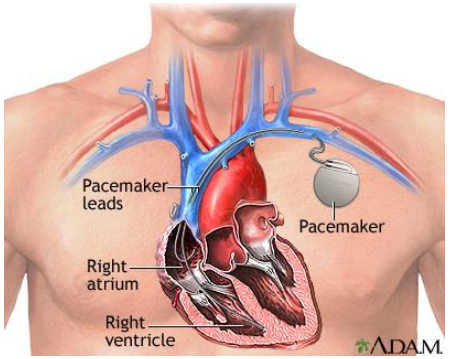
May occur in persons of any age and increasingly common in elderly

Mortality ranges from 20-30%

Risk Factors

Artificial heart valves
Pacemakers
Acquired heart defects
Congenital heart defects
Intravascular catheters





Classification

INFECTIVE ENDOCARDITIS INCLUDES

1- acute bacterial endocarditis

*Affects normal heart

*Rapidly destructive

* If not treated fatal within 6 weeks

2- subacute bacterial endocarditis

* Often affects valves damaged heart

*Slow in nature

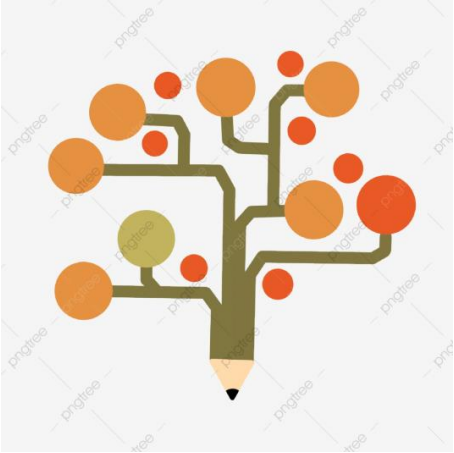
* If not treated fatal within 1 year

streptococcal viridans group infection is more common after dental procedures.

Recent classification that is the Based on:-

Causative Microorganism

1- streptococcal endocarditis
2- staphylococcal endocarditis
3-candidal endocarditis



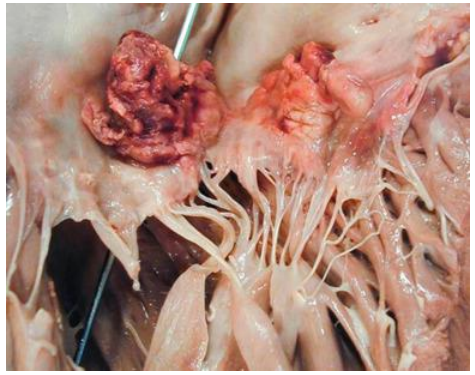
Type of valve that is infected

1- native valve endocarditis [NVE]
2- prosthetic valve endocarditis [PVE]).

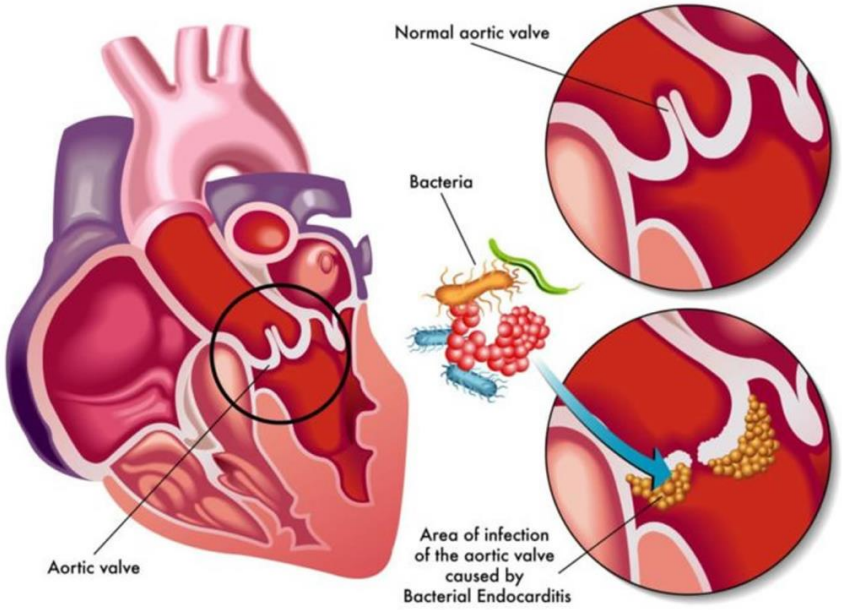
Pathophysiology Infective endocarditis

1-Turbulent blood flow due to a hole or stenotic orifice, are most susceptible to endocarditis.

2-This turbulent flow traumatizes the vascular endothelium, creating a substrate for deposition of fibrin and platelets, leading to the formation of a nonbacterial thrombotic embolus (NBTE) that is thought to be the initiating lesion for infective endocarditis.



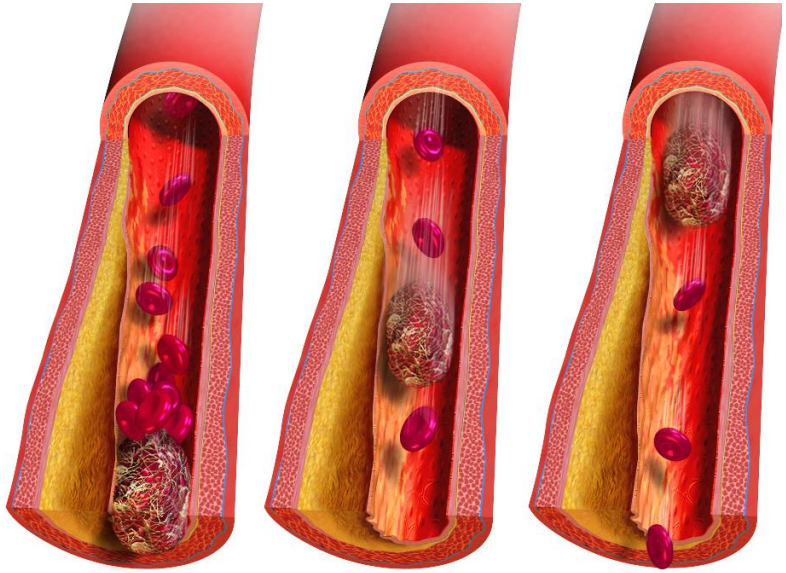
3-Bacteremia – delivers organisms to the damaged (sticky)endocardial surface resulting in adherence & colonization



4-Eventual invasion of valve leaflets results in infected vegetation (sheath of fibrin & platelets, ideal conditions for further bacterial multiplications)

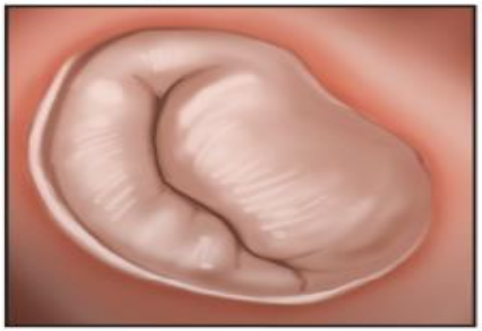
6- Avascular valve tissue - protect proliferating organisms from host defence mechanism.

7- When the infection is established, vegetations composed of organisms, fibrin and platelets grow and may become large enough to cause obstruction or embolism

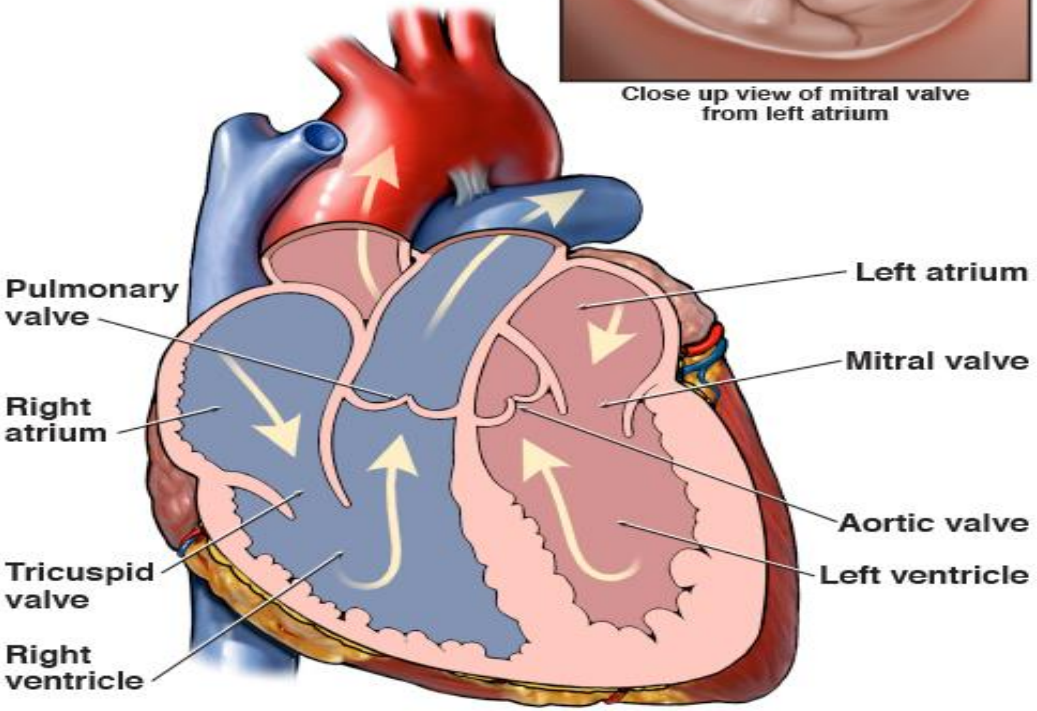


Endocarditis of the Mitral Valve

Normal Anatomy

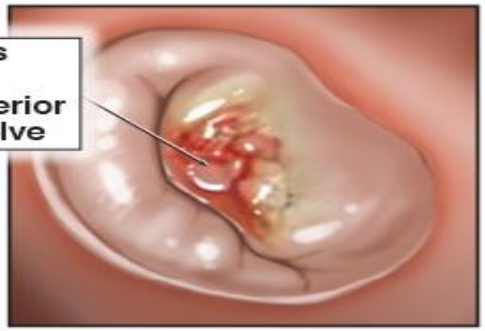


Close up view of mitral valve from left atrium

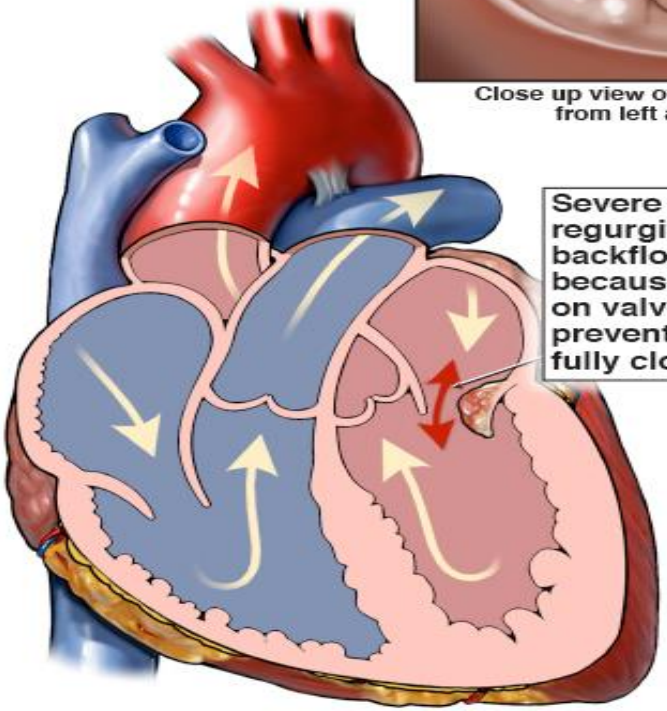


Patient's Anatomy

Strep endocarditis resulting in large vegetation on anterior leaflet of mitral valve



Close up view of mitral valve from left atrium



Severe mitral regurgitation with backflow of blood because vegetation on valve leaflet prevents valve from fully closing

PATHOGENESIS OF INFECTIVE ENDOCARDITIS

- Valve abnormality
- Prosthetic valves
- Native valve damage

Thrombi with fibrin and platelets

Source of bacteria
- IV drug abusers
- Dental procedures
- Skin infections
- Open wounds
- Surgical procedures

Bacteria in blood stream

Bacteria adhere to thrombi and proliferate

Endocarditis (usually on valves)

Vegetations

Signs & Symptoms of Infective Endocarditis :

Symptoms:(primary)

Weakness

Weight loss

Fever, chills night sweats

Arthralgia

Myalgia

secondary to septic emboli

Paralysis

Chest pain

Bone pain

Blindness

Haematuria

stroke

Signs:

1-petechial haemorrhages on skin & mucous membrane

2-Osler`s nodes (reaction to endotoxins)

3-Clubbing of fingers

4-Janeway lesions

5-Linear hemorrhage nails

6-Murmur

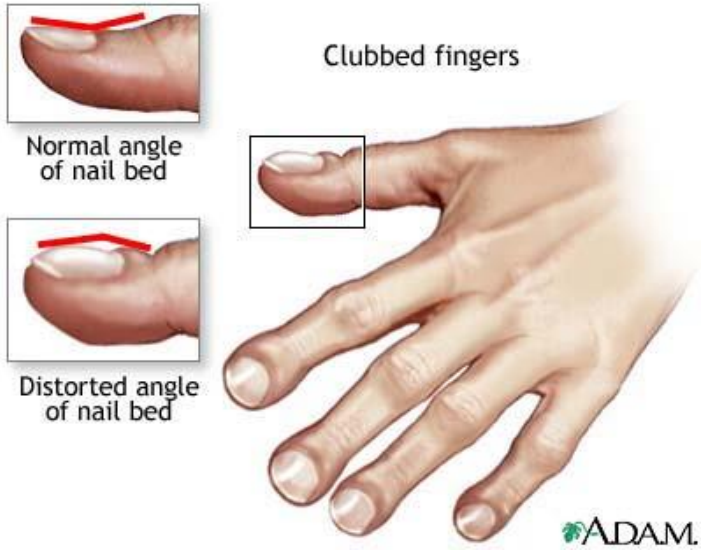
7-Anemic pallor

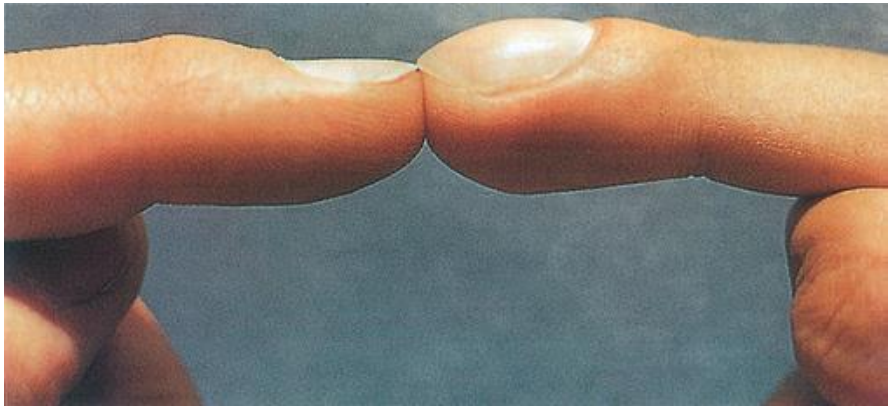
petechial haemorrhages on skin & mucous membrane

Osler`s nodes (reaction to endotoxins)

small, raised, swollen, tender areas, bluish or sometimes pink or red, occurring commonly in the pads of the fingers or toes, they are practically pathognomonic of subacute bacterial endocarditis.

Clubbing of fingers

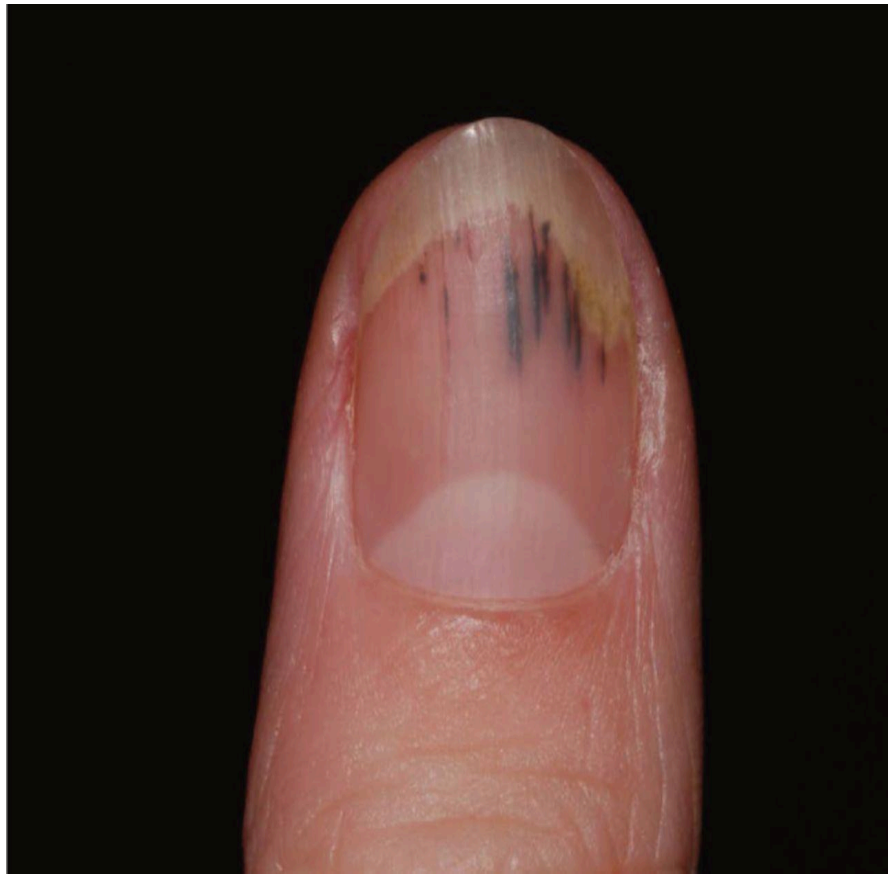




Janeway Lesions

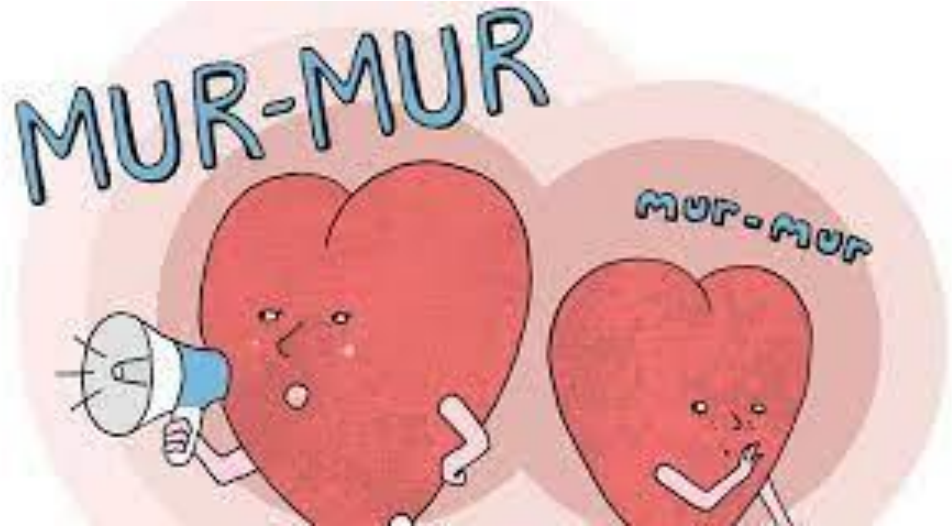
- Hemorrhagic, infarcted macules and papules on the volar fingers in a patient with S. aureus endocarditis

Linear Hemorrhage nails



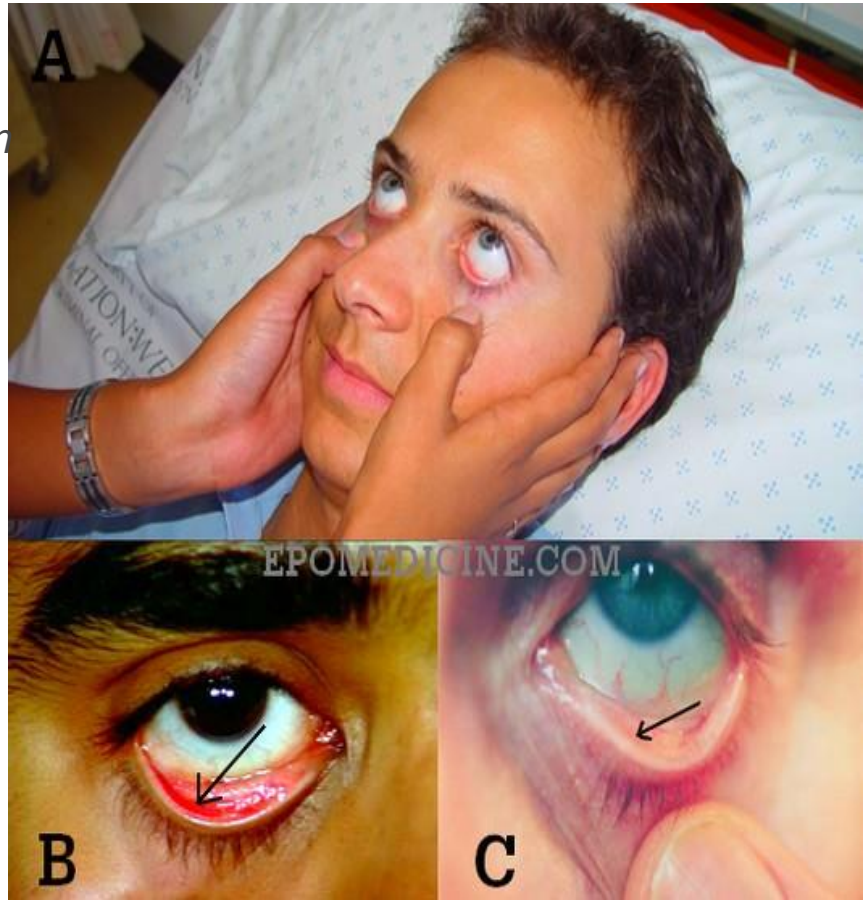
Murmur

Heart murmurs are sounds made by turbulent blood in or near the heart.



Anemic pallor

A-Technique of exminaing for pallor in lower palpebral conjunctiva
B. Normal conjunctiva (Note the demarcation shown by arrow)
C. Pale conjunctiva (Loss of demarcation)



No pallor

Pallor

Severe pallor

Investigations & Diagnosis:

1. blood culture (+ve)
2. Complete blood picture (leukocytosis) & ESR
3. General urine examination
4. ECG changes
5. Echocardiogram (+ve)

Medical treatment

1. Early treatment
2. Culture & sensitivity tests
3. Use bactericidal agents
4. I.V route administration
5. Adequate dosage antibiotic
6. Continue treatment long enough

TABLE 2.2 Predisposing Conditions Associated With Infective Endocarditis (IE)

Underlying Condition	Frequency of IE (%)
Mitral valve prolapse	25–30
Aortic valve disease	12–30
Congenital heart disease	10–20
Prosthetic valve	10–30
Intravenous drug abuse	5–20
No identifiable condition	25–47

The Duke criteria were developed and later modified to facilitate the definitive diagnosis of IE

Major criteria :

- Positive blood cultures
- Evidence of endocardial involvement (e.g., positive findings on echocardiography)

Minor criteria include the following factors:

- Predisposing heart condition or IV drug use
- Fever
- Vascular phenomena, including embolic events
- Immunologic phenomena
- Microbiologic evidence other than positive blood culture

Definitive diagnosis of IE requires the presence of two major criteria, one major and three minor criteria, or five minor criteria

Bacteremia Associated With Various Dental Procedures and Oral Manipulation

Dental Procedure or Oral Manipulation	Reported Frequency of Bacteremia (%)
Tooth extraction	10–100
Periodontal surgery	36–88
Scaling and root planing	8–80
Teeth cleaning	≤40
Rubber dam matrix or wedge placement	9–32
Endodontic procedures	≤20
Toothbrushing and flossing	20–68
Use of wooden toothpicks	20–40
Use of water irrigation devices	7–50
Chewing food	7–51

Little and Falace's Dental Management of the Medically Compromised Patient

Dental management:

The goal is to prevent endocarditis that occurs in susceptible dental patients during dental procedure that causes injury to the soft tissue or bone resulting in bleeding & transient bacterimia results in endocarditis.

DENTAL MANAGEMENT

1-Antibiotic Prophylaxis

TABLE 2.6 Antibiotic Regimens for Dental Procedures

		REGIMEN: SINGLE DOSE 30–60 MINUTES BEFORE PROCEDURE	
Situation	**Agent**	**Adults**	**Children**
Oral	Amoxicillin	2 g	50 mg/kg
Unable to take oral medication	Ampicillin or	2 g IM or IV	50 mg/kg IM or IV
	cefazolin or ceftriaxone	1 g IM or IV	50 mg/kg IM or IV
Allergic to PCNs or ampicillin (oral)	Cephalexin*† or	2 g	50 mg/kg
	clindamycin	600 mg	20 mg/kg
	Azithromycin or clarithromycin	500 mg	15 mg/kg
Allergic to PCNs or ampicillin and unable to take oral medication	Cefazolin or ceftriaxone†	1 g IM or IV	50 mg/kg
	Clindamycin phosphate	600 mg IM or IV	20 mg/kg IM or IV

*Or other first- or second-generation oral cephalosporin in equivalent adult or pediatric dosage.
†Cephalosporins should not be used in a person with a history of anaphylaxis, angioedema, or urticaria after receiving penicillins or ampicillin.
IM, Intramuscular; *IV*, intravenous; *PCN*, penicillin.

Patient should receive prophylactic antibiotic :

- Artificial heart valves.
- Mitral valve prolapse with valvular regurgitation and/or thickened leaflets valves.
- Previous endocarditis.
- Surgically constructed systemic pulmonary shunt .
- Congenital heart defects.
- Acquired heart valve disease (rheumatic heart disease).
- Hypertrophic cardiomyopathy.
- Cardiac transplantation recipients with cardiac valvular disease

BOX 2.2 Dental Procedures in Patients With Cardiac Conditions* for Which Endocarditis Prophylaxis Is Recommended

- All dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa
- This includes all dental procedures except the following procedures and events:
  - Routine anesthetic injections through noninfected tissue
  - Taking of dental radiographs
  - Placement of removable prosthodontic or orthodontic appliances
  - Adjustment of orthodontic appliances
  - Shedding of deciduous teeth and bleeding from trauma to the lips or oral mucosa

Clinical notes

*** For patients selected for prophylaxis, perform as much dental treatment as possible during each coverage period.**

***A second antibiotic dose may be indicated if the appointment lasts longer than 6 hours or if multiple appointments occur on the same day.(If a procedure lasts longer than 6 hours, it may be wise to administer an additional 2-g dose**

For multiple appointments (on different days), allow at least 10 days between treatment sessions so that penicillin-resistant organisms can "clear" from the oral flora. If treatment becomes necessary before 10 days have passed, select one of the alternative antibiotics for prophylaxis.

.

Patients Already Taking Antibiotics. In patients who are already taking penicillin or amoxicillin for eradication of an infection (e.g., sinus infection) or for long-term secondary prevention of rheumatic fever, presence of viridans group streptococci that are relatively resistant to penicillin or amoxicillin is likely. Therefore, clindamycin, azithromycin, or clarithromycin should be selected for prophylaxis if treatment is immediately necessary. Because of cross-resistance with cephalosporins, this class of antibiotics should be avoided.

An alternative approach is to wait for at least 10 days after completion of antibiotic therapy before administration of prophylactic antibiotics. In this instance, the usual regimen can be used.

For patients with prosthetic heart valves who are taking anticoagulants, the dosage may have to be reduced on the basis of international normalized ratio (INR???) level and the degree of invasiveness of the planned procedure.

3-Detection of patients with hypertension and referral to a physician if poorly controlled or uncontrolled. Defer elective dental treatment if blood pressure (BP) is ≥180/110 mm Hg.

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT

Neurological Disorders

Dr.Abdulhameed Aldabagh
B.D.S,Ms.c,Phd-OS
Maxfax

NEUROLOGICAL DISORDERS

Neurological disorders are medically defined as disorders that affect the brain as well as the nerves found throughout the human body and the spinal cord.

Structural, biochemical, or electrical abnormalities in the brain, spinal cord or other nerves can result in a range of symptoms

Examples of symptoms include

Paralysis, muscle weakness
Poor coordination
Loss of sensation
Seizures
Confusion
Pain
Altered levels of consciousness.

There are **more than 600** neurologic diseases.

Example

Epilepsy

Stroke

Parkinson disease

Alzheimer disease

Multiplesclerosis (MS)

CRITICAL COMPLICATIONS: Patients with neurologic diseases are at high risk during dental treatment for complications such as stroke ,adverse bleeding, altered consciousness, and infection.

These events could prove serious or fatal. The dentist must be able to detect these patients, based on history and clinical findings, refer them for medical diagnosis and management, and work closely with their physicians to develop dental management plans that will be effective and safe for these patients.

Epilepsy

Epilepsy is a term that refers to a group of disorders characterized by chronic recurrent paroxysmal changes in the neurologic function (seizures) altered consciousness or involuntary movements caused by abnormal and spontaneous electrical activity in the brain.

Seizures (fits) may be convulsive (i.e. accompanied by motor manifestations) or may occur with other changes in neurologic function (i.e. sensory, and emotional).

Although seizures are required for the diagnosis of epilepsy, not all seizures imply epilepsy.

Seizures may occur during many medical or neurologic illnesses, including:

- Stress
- Sleep deprivation
- Fever
- Alcohol or drug withdrawal
- Syncope.

The cause of epilepsy is idiopathic in ***more than half*** of all patients.

Other causes of fits include:

- Vascular abnormalities (cerebrovascular disease).
- Developmental abnormalities (cavernous malformation).
- Intracranial neoplasms
- Head trauma.
- Hypoglycemia
- Drug withdrawal.
- Infection and febrile illness (meningitis, encephalitis).
- Genetic conditions such as Down syndrome.
- Syncope and diminished oxygen supply to the brain also are known to trigger seizures.

Classification of Epilepsy

1. Partial seizures (focal, local)
a. Simple partial seizures ***(consciousness is preserved)***
b. Complex partial seizures ***(consciousness is impaired)***

2. Generalized seizures (convulsive or nonconvulsive)
a. Absence seizures (petit mal)
b. Tonic-clonic seizures (grand mal)

Generalized seizures (convulsive or nonconvulsive)

Petit mal seizures: Most often come during childhood and are characterized by minimal or no movements (except for eye blinking) and brief sudden loss of awareness or of conscious activity; which may only last seconds.

Grand mal (tonic-clonic) epilepsy: Usually begin in childhood, or sometimes at about puberty. There is a warning **(aura),** followed by loss of consciousness, tonic and clonic convulsions and finally a variably prolonged recovery.

The aura may consist of a mood change, irritability, brief hallucination or headache. After the aura warning, the patient emits a sudden "epileptic cry" (caused by spasm of the diaphragmatic muscles) and immediately loses consciousness.

The seizure usually does not last longer than 90 seconds; then movement ceases, muscles relax and a gradual return to consciousness occurs, which is accompanied by headache, confusion and mental dulling.

But if it lasts more than 5 minutes (by the clock) or starts again after apparently ceasing, the patient must be regarded as being in **status epilepticus, which** is particularly dangerous (the mortality can be up to 20%). Brain damage may result from cerebral hypoxia

Laboratory findings

The diagnosis of epilepsy generally is based on a history of seizures and an abnormal electroencephalogram (EEG).

Other diagnostic procedures that are useful for ruling out other causes of seizures include:

CT
MRI
SERUM CHEMISTRY PROFILES,
TOXICOLOGY SCREENING

Medical management

The medical management of epilepsy is usually based on long-term drug therapy. Phenytoin (Dilantin), carbamazepine (Tegretol), and valproic acid (Depakene) are considered first —line treatments.

Phenytoin and carbamazepine are efficient at blocking sodium or calcium channels of motor neurons.

Phenytoin, carbamazepine and valproic acid can cause

- bone marrow suppression
- Leucopenia
- Thrombocytopenia, resulting in an increased incidence of microbial infection, delayed healing, and gingival and postoperative bleeding.

- Valproic acid can decrease platelet aggregation, leading to spontaneous hemorrhage and petechiae.

Adverse effects of phenytoin:

- Gingival hyperplasia
- Increased incidence of infection
- Delayed healing
- Gingival bleeding (leucopenia)
- Osteoporosis and
- Stevens-johnson syndrome. {Metronidazole can interfere with phenytoin}.

Adverse effects of carbamazepine (Tegretol):

- Xerostomia
- infection
- delayed healing
- ataxia
- gingival bleeding (leucopenia and thrombocytopenia),
- osteoporosis,
- Stevens-Johnson syndrome.

Dental management

1. Identification of patient by history

a. Type of seizure
b. Age at time of onset
c. Cause of seizures (if known)
d. Medications
e. Frequency of physician visits (name and phone number)
f. Degree of seizure control
g. Frequency of seizures
h. Date of last seizure
i. Known precipitating factors
j. History of seizure-related injuries

2. Provision of normal care: Well-controlled seizures pose no management problems

3. If questionable history or poorly controlled seizures, consultation with physician before dental treatment—may require modification of medications.

4. Attention to adverse effects of anticonvulsants; these include:
a. Drowsiness
b. Slow mentation
c. Dizziness
d. Ataxia
e. Gastrointestinal upset
f. Allergic signs (rash, erythema multiforme)

5. Possibility of **bleeding** tendency in patients taking valproic acid (Depakene) or carbamazepine (Tegretol) as the result of platelet interference—Pretreatment platelet function analyzer (PFA)-100; if grossly abnormal, consultation with physician.

Preventive measures include:

- Knowing the patient's history.
- Scheduling the patient at a time within a few hours of taking the anticonvulsant medication.
- Using a mouth prop.
- Removing dentures.
- Discussing with the patient the urgency of mentioning the aura as soon as it is sensed.
- If sufficient time occurs, 0.5 to 2 mg of lorazepam can be given sublingually, or 2 to 10 mg of diazepam can be given intravenously.

If the patient has a seizure while in the dental chair

- The primary task is to protect the patient and try to prevent injury.
- No attempt should be made to move the patient to the floor.
- The instruments and the instrument tray should be cleared from the area, and the chair should be placed in a supported supine position.
- The patient's airway should be maintained patent (Turn the patient to the side to avoid aspiration).

Notes:

Erythromycin should not be administered to patients who are taking carbamazepine because of interference with metabolism of carbamazepine, which could lead to toxic levels of anticonvulsant drug.

Aspirin and NSAIDs should not be administered to patients who are taking valproic acid because they can further decrease platelet aggregation, leading to hemorrhagic episodes.

No contraindication has been identified for the use of local anesthetics in proper amounts for these patients.

After the seizure

✓ Oxygen 100% (if available).

✓ Maintenance of a patent airway.

✓ Mouth suction should be provided (to minimize aspiration of secretions).

✓ Discontinue dental treatment.

✓ Examine for traumatic injuries (lacerations, fractures).

In the event of avulsed or fractured teeth or fractured appliance, an attempt should be made to locate the tooth or fragments to rule out aspiration.

In the event that a seizure becomes prolonged or is repeated (status epilepticus):

✓ Intravenous lorazepam (4 to 8 mg, or 10 mg diazepam, is generally effective in controlling it.

✓ Oxygen and respiratory support should be provided because respiratory function may become depressed.

✓ If the seizure lasts longer than 15 minutes, the following should be provided:

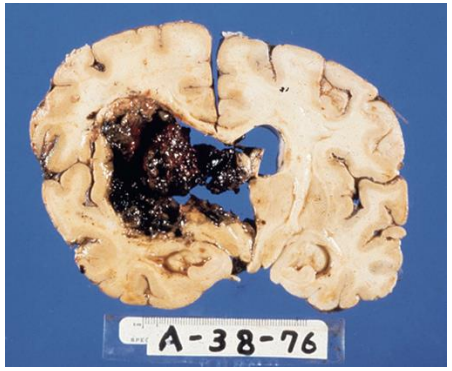
IV access, repeat lorazepam dosing.
phenytoin administration.
activation of the emergency medical system.

Stroke CVA is commonly referred to as a stroke, which is also sometimes called a brain attack.

Stroke is a generic term that is used to refer to a cerebrovascular accident—a serious and often fatal neurologic event caused by sudden interruption of oxygenated blood to the brain.

This in turn results in focal necrosis of brain tissue and possibly death.

Even if a stroke is not fatal, the survivor is often debilitated in motor function, speech .



Etiology

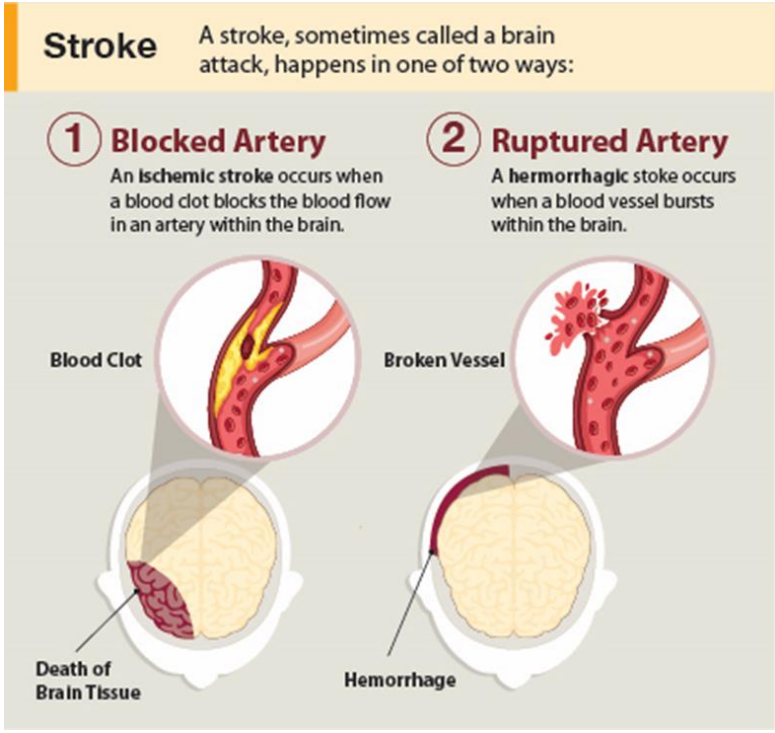
A stroke is caused by the interruption of blood supply and oxygen to the brain as a result of ischemia or hemorrhage.

1. **Ischemic stroke** (most common type): Induced by thrombosis or occlusion of a cerebral blood vessel by distant emboli.

Its risk is increased by atherosclerosis and cardiac pathosis (myocardial infarction, atrial fibrillation).

2. Hemorrhagic stroke: Hypertension is the most important risk factor for intracerebral hemorrhagic stroke.

.



Additional factors that increase the risk for stroke include:

1. The occurrence of transient ischemic attacks.
2. Previous stroke.
3. High dietary fat.
4. Obesity and elevated blood lipid levels.
5. Physical inactivity.
6. Uncontrolled hypertension.
7. Cardiac abnormalities.
8. Diabetes mellitus.
9. Heavy tobacco smoking.
10. Increasing age.
11. Periodontal disease

Four events associated with stroke are:

A. *Transient ischemic attack (TIA):* Is a "mini" stroke that is caused by a temporary disturbance in blood supply to a localized area of the brain. A TIA often causes numbness of the face, arm, or leg on one side of the body, weakness, tingling, and speech disturbances that usually last less than 10 minutes.

B. Reversible ischemic neurologic deficit (RIND): Neurologic deficit recovers within 24 hours.

C. Stroke-in-evolution: In which the deficit has been present for several hours and continues to worsen during a period of observation.

D. Completed stroke: Signs of a stroke include hemiplegia, temporary loss of speech or trouble in speaking or understanding speech, temporary dimness or loss of vision, particularly in one eye (may be confused with migraine), unexplained dizziness, or sudden fall.

Laboratory Findings

laboratory and diagnostic imaging tests to rule out conditions that can produce neurologic alterations, such as diabetes mellitus, uremia, abscess, tumor, acute alcoholism, drug poisoning, and extradural hemorrhage.

Laboratory tests often include urinalysis, blood sugar level, complete blood count, erythrocyte sedimentation rate, blood cholesterol and lipid levels, chest radiographs, and electrocardiogram.

Doppler blood flow, EEG, cerebral angiography, CT, and MRI, are important for determining the extent and location of arterial injury.

Medical management

- Prevention: This is accomplished by identifying risk factors in individuals (e.g., hypertension, diabetes, atherosclerosis, cigarette smoking) and attempting to reduce or eliminate as many of these as possible.

- Blood pressure control
- Antiplatelet therapy
- Statin therapy are primary stroke prevention methods.

Stroke Treatment:

1. The immediate task is to sustain life during the period immediately after the stroke. This is done by means of life support measures and transport to a hospital.

2. The second task involves emergency efforts to prevent further thrombosis or hemorrhage and to attempt to lyses the clot in cases of thrombosis or embolism.

Thrombolysis and improved neurologic outcomes have been achieved with intravenous recombinant tissue-type plasminogen activator (rt-PA).

3. After the initial period, efforts to stabilize the patient continue with anticoagulant medications such as heparin, coumarin, aspirin.

Heparin is administered intravenously during acute episodes.

coumarin, aspirin, or platelet receptor antagonists (ticlopidine) are employed for prolonged periods to reduce the risk of thrombosis.

4. Corticosteroids may be used acutely after a stroke to reduce the cerebral edema that accompanies cerebral infarction.

5. Surgical intervention may be indicated for removal of a superficial hematoma or management of a vascular obstruction.

6. Valium, Dilantin, and other anticonvulsants are prescribed in the management of seizures that may accompany the postoperative course of stroke.

7. If the patient survives, the final task consists of the institution of preventive therapy, administration of medications that reduce the risk of another stroke (statins and antihypertensive drugs), and initiation of rehabilitation (physical and speech therapy).

Dental Management of the Patient with Stroke

1. Identify risk factors.

1. Hypertension*
2. Congestive heart failure*
3. Diabetes mellitus*
4. TIA or previous stroke*transient ischemic attack
5. Increasing age ≥75 years*
6. Elevated blood cholesterol or lipid levels
7. Coronary atherosclerosis
8. Cigarette smoking

Note: Risk of stroke increases by a factor of 1.5 for each condition above indicated by*. Thus, having multiple risk factors listed above greatly increases the risk of a stroke.

2. Encourage control of risk factors (referral to a physician, if appropriate).

3. Obtain a thorough history of stroke.

i. Note the date of the event, current status, medical therapy, and any residual disabilities.

ii. Provide only urgent dental care during the first 6 months after a stroke, TIA, or RIND.

iii. Avoid elective care in patients who have had recent TIAs or RINDs.

iv. Determine risk for bleeding problems in patients taking anticoagulant drugs, and minimize perioperative bleeding.

a) Aspirin + dipyridamole (**Persantine**), ticlopidine (Ticlid); obtain pre-treatment PFA 100.

b) Coumarin-Pretreatment INR 3.5. Higher levels require consultation with physician to reduce dose.

c) Heparin (IV)—Use palliative emergency dental care only, or discontinue 6 to 12 hours before surgery or start another anticoagulant (e .g., coumadin) with physician's approval. Then, restart heparin after the clot forms (6 h later).

d) Use measures that minimize hemorrhage (atraumatic surgery, pressure, gelfoam, suturing), as needed.

e.Have available hemostatic agents and devices (stents, electrocautery).

4. Schedule short, stress-free, mid-morning appointments. Provide N20-02 inhalation as needed.

5. Monitor blood pressure and oxygen saturation.

6. Use a minimum amount of anesthetic containing a vasoconstrictor. (A local anesthetic with 1:100,000 or 1:200,000 epinephrine may be used in judicious amounts

7. Avoid epinephrine in the gingival retraction cord.

8. Recognize signs and symptoms of a stroke, provide emergency care, and activate an emergency medical support system.