

CRASH COURSE IN DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENT



DENTISCOPE

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Medical emergencies

Q: where do most medical emergencies occur ? bathrooms, parkings, staircases

- Pt collapses in the clinic → can be due to medical problem or anxiety
- Pt collapses in the parking lot → mostly due to medical condition [heart attacks]

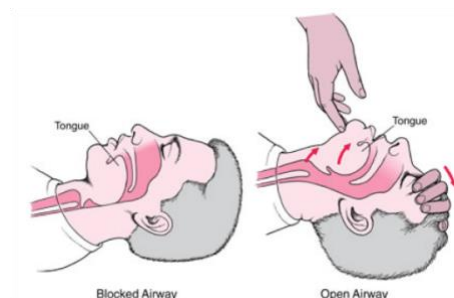
EMERGENCY	SINGS AND SYMPTOMS	MANAGEMENT
VASOVAGAL SYNCOPE	Sweating Cold skin Dizziness Pule is weak and thready Loss of conciousness	1- Put the pt in supine/ trenaedenberg position [head below the body so the blood goes to the brain] 2- Communicate with the pt [no response → pt is unconciouss] 3- Clear the airway 4- Look for chest rises and listen for breathing 5- Check for radial pulse [at the wrist] or carotid pulse [at the side of the neck]

Q: what causes vasovagal syncope? The pt feels stressed from the dental procedure or the sight of needles and the body activates the sympathetic nervous system “ fear or flight response “ which directs the blood to the muscles , but the pt is laying down so there is not enough venous return to the heart → poor cardiac output → less blood reaches the brain → syncope

Q: what happens if you keep the pt at upright position after syncope? The pt might die or get brain damage because the heart cannot pump enough blood to the brain

When the pt becomes unconciouss all of the muscles become flaccid [including the tongue] → the tongue drops back into the pharynx → airway obstruction and further hypoxia

To open the airway in an unconscious pt you do : head tilt + chin lift to push the mandible forward with the tongue



Q: why shouldn't you give any pt that just recovered from syncope anything by mouth ? during unconsciousness, the muscles are still flaccid and they need time to regain their muscle tone therefore giving anything by mouth can kill the pt by suffocation

Q: what should you do it an unconscious pt vomits ? tilt their head to the side to allow the vomit to accumulate in the buccal sulcus and suction the vomitus to prevent it from going into the esophagus or the trachea



EMERGENCY	SINGS AND SYMPTOMS	MANAGEMENT
ORTHOSTATIC HYPOTENSION	Dizziness Cold sweat <u>Thready pulse</u> and loss of consciousness [usually pt's on Beta blockers , elderly or pregnant women] specially after long procedures or long time sitting in the waiting room	1- Put the pt in supine/ trendelenberg position [head below the body so the blood goes to the brain] 2- Communicate with the pt [no response → pt is unconscious] 3- Clear the airway 4- Look for chest rises and listen for breathing 5- Check for radial pulse [at the wrist] or carotid pulse [at the side of the neck]

Q: what causes orthostatic hypotension ? long sitting or laying down , blood pools in the lower extremities → poor venous return to the heart [because of poor muscle contraction]

Q: why do pts on beta blockers get orthostatic hypotension ? because B blockers will dilate the blood vessels to reduce the blood pressure → decreased VR to the heart

Both vasovagal syncope and orthostatic hypotension will have quick recovery

So your management to any pt that loses consciousness is first to adjust their position to supine or Trendelenburg → if they recover quickly [vasovagal attack or orthostatic hypotension] but if they don't recover quickly → check blood glucose [might be hypoglycemia]

EMERGENCY	SINGS AND SYMPTOMS	MANAGEMENT
HYPOGLYCEMIA	Sweating Dizziness Increased HR <u>Pulse is pounding and fast</u>	Check blood glucose level If the pt is conscious → give any source of oral glucose If the pt is unconscious → Do not give anything by mouth ! Intravenous glucose – dextrose 50% IV OR Glucagon 1mg IM You cannot give epinephrine in the clinic [only hospital setting]

NOTE : PULSE IS POUNDING AND FAST IN HYOGLYCEMIA BUT WEAK AND THREADY IN SYNCOPE

EMERGENCY	SINGS AND SYMPTOMS	MANAGEMENT
HYPERGLYCEMIA	Confusion and fruit breath	Provide only emergency tx and refer to the hospital



Best area for venipuncture = the dorsum of the hand and wrist – because it is mostly veins and no arteries [choose straight , soft , elastic veins] do not choose large veins they might be sclerotic

Q: pt is unconscious with normal blood glucose and did not recover after position adjustment , what might be the cause? Adrenal crisis

Ginseng Chinese herb acts the same as aspirin causing platelet disaggregation and blood thinning → if you need to extract ask the pt to stop the ginseng for a few days

EMERGENCY	SINGS AND SYMPTOMS	MANAGEMENT
ADRENAL CRISIS	Pale + sweating <u>Nausea and vomiting and abdominal pain **</u> Thread pulse ** Pt collapses on the dental chair	Monitor vital signs + administer O2 IV line to give corticosteroids [hydrocortisone succinate 100 mg] Provide advanced resuscitation and transfer to the hospital

Q: what causes an adrenal crisis ? if the pt is taking exogenous source of corticosteroids [like in medications or some types of herbs] the adrenal cortex will stop producing steroids and will undergo atrophy. In cases of stress [like in dental procedures] the adrenal cortex cannot produce enough cortisol → pt goes into adrenal crisis

Cortisone is produced from → adrenal cortex - Daily production of steroids is 20 mg

Adrenal gland insufficiency is either :

- Primary → addisons's disease [the adrenal cortex produces enough cortisol for daily need only = 20 mg]
- Secondary → pt is taking an exogenous source of corticosteroids in the form of medications or herbs

Adrenal crisis and syncope → weak and thready pulse

Hypoglycemia → strong pounding pulse with increased HR

CUATION: if the pt has skin problems or arthritis or severe asthma → they are most probably on corticosteroids and are at risk of adrenal crisis

EMERGENCY	SINGS AND SYMPTOMS	MANAGEMENT
MYOCARDIAL INFARCTION	Pale + sweating Chest pain <u>Irregular pulse</u> <u>BP might be normal or high or low</u>	<u>Place pt in upright position</u> Check BP → if the BP is high or normal give Nitroglycerin [NTG] or aspirin + O2 Transfer to the hospital

Q: what happens if you place a pt having MI in a supine position? More blood will go to the heart and eventually to the lungs through the right side → pulmonary edema and hypoventilation [because the alveoli are engorged with blood]

Q: why do you need to check the BP before giving NTG? Because NTG is a very potent vasodilator if the BP is already low it will drop it even more



Q: why is aspirin a life saving drug in case of MI ? most cases of MI happen due to lack of blood supply to the coronary arteries because of a blood clot, aspirin given in the first few minutes will prevent the clot from further progression

EMERGENCY	SINGS AND SYMPTOMS	MANAGEMENT
HYPERVENTILATION	Stressed patient <u>Rapid breathing</u> Palpitations + dizziness <u>Stiff fingers ** + hypo calcemic tetany</u> <i>In hyperventilation the pt blows off CO2 resulting in respiratory alkalosis and the calcium enters into the cells → hypocalcemic tetany</i>	<u>Calm the pt down</u> Ask the pt to breathe into a paper bag [this will correct the <u>respiratory alkalosis</u>]

EMERGENCY	SINGS AND SYMPTOMS	MANAGEMENT
ASTHMA	coughing wheezing ** dyspnea	Position the patient upright Give bronchodilator [O2 + <u>Aminophylline 250mg slow IV / Hydrocortisone sodium succinate 100mg IV</u>]

EMERGENCY	SINGS AND SYMPTOMS	MANAGEMENT
FORGEIN BODY DISLOGED IN THE THROAT	Pt will sense it's location and catch their neck or point to an area in the neck Pt cannot speak	If the pt is in supine → DO NOT PUT THE PT UPRIGHT [try to remove with tweezers or magill's forceps – max of 2 times] If the pt is well → transfer the pt to the hospital [you must accompany the pt] If the pt is upright or standing → try back thrust or abdominal thrust [you can only try abdominal thrust once because it uses all of the air in the lungs]

In vasovagal attack and orthostatic hypotension → position the pt in supine position / Trendelenburg position

In MI and Asthma → up right position



Bleeding disorders

Bleeding can either be local cause or systemic cause [bleeding in most healthy patients is due to a local cause]

Local causes of hemorrhage originate in either **soft tissue** or **bone**.

Soft tissue bleeding:

- Arterial bleeding is **bright red** and **spurting** – most commonly injured arteries in Oral surgery = greater palatine artery + buccal artery
- Venous blood is **dark red** in color and **flows steadily**.
- Capillary bleeding is **bright red** in color and is more of a **minimal ooze**.

Bone bleeding: from nutrient canals, central vessels [inferior alveolar artery] or from central vascular lesions (Hemangioma or Vascular malformation).

Hemorrhage classes:

Class 1	Loss of up to 15% of blood volume No change in vital signs fluid resuscitation is not usually necessary
Class 2	Loss of 15-30% of total blood volume. Tachycardia – pale cool skin Volume resuscitation with crystalloids (Saline solution or Lactated Ringer's solution) is all that is typically required. Blood transfusion is not typically required.
Class 3	Loss of 30-40% of blood volume. Blood pressure drops , tachycardia, peripheral hypoperfusion (shock), capillary refill worsens, and the mental status worsens . Fluid resuscitation with crystalloid and blood transfusion are usually necessary
Class 4	loss of >40% of circulating blood volume. Aggressive resuscitation is required to prevent death.

WHO classification of blood loss:

- Grade 0 no bleeding
 - Grade 1 petechial bleeding
 - Grade 2 mild blood loss (clinically significant)
 - Grade 3 gross blood loss, requires transfusion
 - Grade 4 debilitating blood loss, retinal or cerebral associated with fatality
-
- **Petechiae** : a small (1-2mm) red or purple spot on the body, caused by a **minor hemorrhage**



- **Purpura** : 1 cm red or purple discolorations on the skin caused by bleeding under the skin that do not blanch on applying pressure.
- **Ecchymosis** : subcutaneous purpura larger than 1 centimeter or a hematoma
- **Hemarthrosis** : bleeding in the joints

Blood test	Normal count
Platelet count	140,000 to 400,000/mm³ ➤ Thrombocytopenia : < 140,000/mm³ ➤ Clinical bleeding problem : <50,000/mm³ ➤ Spontaneous bleeding with life threatening : <20,000/mm³
Bleeding time	1 to 6 minutes
Prothrombin time	11-15sec Warfarin therapy increases PT
INR	1 [you can do surgery up to INR 3] INR = 3-3.5 [take consultation]
aPTT	25-35 sec Heparin increases aptt
Thrombin time	9 to 13 seconds

- Warfarin affects PT
- Heparin affects aPTT

PT = Tests extrinsic (factor VII) and common (I,II,V,X) pathways

aPTT= Tests intrinsic and common pathway

Management of patients with bleeding disorders :

Pre-operative blood investigations and preoperative correction of the underlying deficiency (Replacement of Clotting factors / platelets)

What blood tests to order in cases of bleeding disorders	
Condition	What tests to order
Aspirin therapy	BT + aPTT
Coumarin / warfarin therapy	PT
Renal dialysis pts [heparin]	aPTT
Liver disease	BT + PT
Pt is on long term ABX therapy	PT

Bleeding type	Management
Primary bleeding [during surgery]	Pressure, suturing , ligation, electrocautery , local hemostatic agents [collagen and oxidized cellulose, Tranexamic acid 5%]
Reactionary bleeding [few hours after surgery]	examination of the surgical wound to identify the site of bleeding • If bleeding is from bone then the hemostatic agents like bone wax or gelfoam is usually used. • If bleeding is from soft tissues then, ligation / cauterization of blood vessels along with the use of hemostatic agents like surgicel and suturing of the wound is carried out
Secondary bleeding [few days after surgery]	Removal of any debris from the wound surface that promotes infection of the wound. Identify the source of bleeding Surgical stents can be placed over extraction sockets for stabilization of clot and prevention of wound contamination.



Cardiovascular diseases

ASA Class	Description
I	Healthy Pt
II	Pt has mild systemic disease that does not limit their activities (e.g., controlled hypertension or controlled diabetes without systemic sequelae)
III	Pt has moderate or severe systemic disease, which does limit their activities (e.g., stable angina or diabetes with systemic sequelae)
IV	The pt has severe systemic disease that is a constant potential threat to life (e.g., severe congestive heart failure, end-stage renal failure)
V	The pt is morbid and is at substantial risk of death within 24 hours
VI	A declared brain-dead person whose organs are being removed for donor purposes
E	Emergency status: In addition to indicating underlying ASA status (1-5), any pt undergoing an emergency procedure is indicated by the suffix "E"

Hypertension [HTN] : Defined as having systolic blood pressure (SBP) $\geq$ 140mm of Hg or diastolic blood pressure (DBP) $\geq$ 90mm of Hg

Normal	DBP = 80 mmHg SBP = 120 mmHg
Pre hypertension	DBP = 80 -89 SBP= 120-139
Stage 1 HTN	DBP = 90 -99 SBP = 140 -159
Stage 2 HTN	DBP = 100 SBP = 160

Dental management for patients with controlled hypertension: [Asymptomatic BP < 140/80 mm Hg]

- 1- Measure BP at every visit + review the medical history to know if there are any changes in medications or new medical problems
- 2- **Short morning appointments ****
- 3- **Minimize stress ****

Dental management of patients with uncontrolled hypertension [Asymptomatic BP 160-179/100-109 mm Hg]

- 1- periodic intraoperative BP monitoring
- 2- Emergency care may be accomplished as long as SBP is < 180 mmHg & DBP is < 110 mmHg
- 3- **Terminate appointment if BP rises above 179/109**

Dental management of patients with poorly controlled diabetes mellitus [SBP > 180mmHg and / or DBP > 110 mmHg]



Abort all dental procedures – Refer the Pt for immediate medical evaluation

Oral manifestations:

There are no recognized manifestations of hypertension but anti-hypertensive drugs can often cause side effects, such as:

- 1- Xerostomia
- 2- Gingival overgrowth
- 3- Lichenoid drug reactions & Erythema multiforme
- 4- Taste sense alteration

CAUTION: Most antihypertensive drugs have drug interactions with LA and analgesics:

- A. Interaction of **LA with nonselective beta-blockers** may increase LA toxicity
- B. LA with Epinephrine can cause HTN when a patient is taking nonselective b-blockers (propranolol and nadolol)
- C. **Long-term use of NSAIDs** may antagonize the antihypertensive effect of medications like diuretics, beta blockers and ACE inhibitors

Local anesthesia:

- Epinephrine can be used ONLY in controlled HTN patients
- **Options in uncontrolled HTN: – Mepivacaine (Scandonest) 3% (with NO vasoconstrictor)**
- Mepivacaine has a very short effect and can't be used for long appointments like endo or surgery because the pt will be in pain + discomfort which will raise their BP. **You can give 1 carpule of LA with epinephrine to establish long anesthesia and then continue with mepivacaine**
- Retraction cord containing epinephrine should be avoided.

Infective endocarditis

Causative organisms: Staph Aureus, Viridans Streptococci

Q: why do you need to give ABX prophylaxis for IE pts? Invasive dental procedures can introduce bacteria into the blood which can colonize and grow on the valves

ABX prophylaxis is equal to a DAY DOSE of the ABX , given once - 1 hour before the procedure.

Indications [patient]	Indications [procedure]
1- prosthetic cardiac valves [transcatheter-implanted prostheses and homografts] 2- prosthetic material used for cardiac valve repair [annuloplasty rings and chords] 3- history of infective endocarditis 4- Cardiac transplant <u>with valve regurgitation</u> 5- Unrepaired cyanotic congenital heart disease, including palliative shunts and conduits	Prophylaxis is recommended for all dental procedures that involve <u>manipulation of gingival tissue</u> or the <u>periapical region</u> of the teeth, or <u>perforation of the oral mucosa</u> Prophylaxis is NOT needed for: 1- Injections in non infected sites 2- Ortho or removable appliance placement 3- Bleeding from trauma to the lip or inside the mouth



6- Repaired congenital heart defect with residual shunts or valvular regurgitation

4- Shedding of primary teeth

Q: what is the difference between ABX prophylaxis and ABX coverage?

- ABX prophylaxis is a day dose of the ABX given once , 1 hour before the procedure . given for pts at risk of developing infective endocarditis
- ABX coverage is ABX given for 1 full course or for a week . given for immunocompromised pts or pts with poor healing.

➤ No association between dental procedures and prosthetic joint infections

Patients with a history of complications associated with joint replacement surgery who are undergoing dental procedures, prophylactic antibiotics should only be considered **after Orthopedic consultation** [the orthopedic will prescribe the ABX not you]

Situation	Agent	Dose [30- 60 mins before the procedure]	
		Adult	Child
Pt can take oral medication [general prophylaxis]	Amoxicillin	2 grams	50 mg / kg [max 2 gram]
Unable to take oral medication	Ampicillin	2 grams IV/ IM	50 mg / kg IV or IM
	Cefazoline Ceftriaxone	1 gram IV / IM	
Allergic to penicillin	Cephalexin	2 grams	50 mg /kg
	Clindamycin	600 mg	20 mg / kg
	Azithromycin Clarithromycin	500 mg	15 mg / kg
Allergic + can't take oral medication	Clindamycin	600 mg IV / IM	20 mg / kg IV or IM
	Cefazolin Ceftriaxone	1 grams	50 mg/kg

Coronary artery disease / Myocardial infarction:

- Most important management is to minimize stress [explain procedures, distraction techniques , No2 sedation etc..]
 - Prophylactic dose of sublingual nitroglycerin
 - If the pt had a recent MI you need to wait **6 months** before any dental appointment
 - Recent Angina attack → wait 30 days
- If it is an emergency [consult physician + give prophylactic nitroglycerin + limit treatment to treating acute infection, pain relief or bleeding control]

Angina is the symptom

Myocardial infarction is the disease.



- If the pt has worsening symptoms → delay elective dental therapy until PROPERLY treated

Myocardial infarction (MI) – heart attack

- **Intense and unremitting chest pain for 30-60 mins**
- Substernal, and often radiates up to **neck, shoulder, jaw and down left arm**
- Described as a substernal pressure sensation that also may be characterized as squeezing, aching, burning, or even sharp pain
- Sometimes, symptom is epigastric discomfort, with a feeling of indigestion or of fullness/gas

MI management in the dental clinic:

- 1- Terminate all dental treatment
- 2- Position pt in upright position
- 3- Give nitroglycerin (NTG) tablet or spray + Administer oxygen + Check pulse & B.P.
- 4- If pain is relieved → taper O2 over 5 mins
- 5- If discomfort continues for 3 mins → give 2nd tablet of NTG + monitor
- 6- If discomfort continues for 3 mins → give 3rd tablet of NTG + monitor
- 7- If discomfort continues for 3 mins after the 3rd tablet → MI is in progress → transport to the hospital [if pain is severe give 2 mg morphine SC or IV]

Bleeding :

Normal INR = 1

3 different protocols used to treat patient with High INR (Taking Oral Anticoagulant)

- 1- Warfarin not discontinued (minimizes thromboembolic events & increases risk of bleeding after surgery).
- 2- Warfarin discontinued (drug should be discontinued 5 days prior to surgery, during this period pt is at risk of developing thromboembolic event but not bleeding).
- 3- Warfarin discontinued & patient placed on alternative anticoagulant therapy [low molecular weight heparin] (thromboembolic event minimized).

tranexamic acid (Exacyl) –
antifibrinolytic agent [local
hemostatic agent]

If the pt has hemophilia → they need to take the factor at the day of the surgery + 3 days after [3 days after extraction the factor levels will be low that's why pts need to take it at the day of surgery + 3 days after surgery]

If the pt's INR is above 3 you can only give Mepivacaine , using LA with epi will give a false image of hemostasis → pt will have bleeding after a few hours

NOTE: pts on warfarin will eventually stop bleeding and develop a clot , it just takes longer to achieve hemostasis .





G6PD & thalassemia

G6PD is common in the UAE and most cases carry the Mediterranean variant, which results in more severe symptoms than other G6PD variants, due to an unstable enzyme and less than 1% of enzymatic activity.

G6PD deficiency : a disease that causes premature RBC hemolysis when exposed to oxidative stressors [stressors can be Fava beans, antibiotics, bacterial or viral infections, etc.] - The condition presents **1-3 days** following the oxidative stress and the resultant hemolysis usually resolves, without any problems .

Signs and symptoms:

- 1- Tachycardia + shortness of breath
- 2- Dizziness & fatigue
- 3- Fever
- 4- Paleness and jaundice

Oral changes :

- 1- Pale discoloration of the oral mucosa.
- 2- **Increased susceptibility to infections.**
- 3- **Bleeding spontaneously or on slightest provocation.**
- 4- Excessive plaque accumulation.
- 5- **Retarded wound healing**

Dental management : In patients with G6PD deficiency, local anaesthesia may induce methaemoglobinaemia in high doses. most likely caused by **prilocaine** and **benzocaine**.

Thalassemia : RBCs have abnormal hemoglobin – treated by blood transfusions every 4-6 weeks

Oral changes :

- 1- Anemia
- 2- Low bone mass → malocclusion
- 3- Hypertelorism [increased distance between the eyes]
- 4- High caries index
- 5- Mucosal pallor
- 6- **CHIPMUNK FACE**

Things to consider in thalassemia pts :

- 1- Degree of iron overload in the body (consider liver dysfunction, NSAIDS)
- 2- Chelators administered to the patient (given to chelate iron in pts w frequent transfusions to minimize iron effect on organs)>> they **can cause immunity problems: agranulocytosis & neutropenia.**



Pregnancy

Time for dental treatment:

- **First trimester** = week 1-12 [fetal organ formation – most susceptible to teratogens]
Only provide emergency care
- **Second trimester** = week 13 -24 [**safest time to deliver dental care**]
- **Third trimester** = week 25-40 [**only emergency care**]

Q: what is the safest time to do any dental treatment in a pregnant woman ? second trimester

Position of the patient :

- Semi supine or sit up position + Elevate the **right hip** 10- 12cm

Supine hypotensive syndrome: happens when a pregnant woman lies flat [supine position]

- Compression of **inferior vena cava & aorta**
- Decrease **venous return to heart**
- Decrease **uteroplacental perfusion and fetal distress**



Symptoms of supine hypotensive syndrome:

- 1- Sweating, nausea, weakness
- 2- **Sense of air lack ****
- 3- Bradycardia
- 4- Decrease blood pressure
- 5- Loss of consciousness

Tx: roll the pt onto their **left side**

Q: can you take xrays for a pregnant pt ? yes , but with precautions.

Xray precautions in pregnant women:

- 1- take only xrays that are essential for diagnosis + limit the radiograph to the affected tooth only
- 2- use lead shield + long cone + collimation
- 3- be careful while taking essential films to eliminate the need for repeated exposure



q: **which medications are safe to be used in pregnant women ?**

- **ABX** = amoxicillin , penicillin, clindamycin , cephalexin [FDA group B] – safe to be used in all trimesters
- **Analgesics** = Paracetamol (short term usage) is the analgesic of choice in all trimesters, ibuprofen [both FDA group B]



Strong analgesics = Codeine is safe for short term usage, but should be avoided in last trimester due to **fetal respiratory depression** and withdrawal symptoms

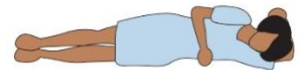
- **Safe LA** = Lidocaine, Etidocaine, Prilocaine [Local anesthesia is not teratogenic, and may be administered to pregnancy patient in usual clinical doses] – most common LA in pregnancy is [lidocaine + vasoconstrictor]
- **Vasoconstrictors** = **no specific contraindication**

CAUTION:

- **Aspirin** is nonteratogenic but may cause **maternal and fetal haemorrhage and oral clefts, large doses during last trimester may cause fetal hypertension, anemia and low birth weight.**
- **NSAID** should be avoided in last trimester due to **possible circulatory effects and persistent pulmonary hypertension.**
- **Diazepam anticonvulsant [FDA group D]** can cause **clefts with prolonged exposure**
- **Nitrous oxide should not be used in first trimester**, and if used in second or third trimesters, **do not use less than 50 % Oxygen**
- Large dose of **prilocaine** are known to cause **methemoglobinemia which could cause maternal & fetal hypoxia**

Emergencies in pregnant women

- 1- **Syncope:** due to Supine hypotensive syndrome, dehydration, anemia, hypoglycemia and neurogenic disorder
- 2- **Morning sickness [enhanced gag reflex] :** pt might aspirate vomit → place the pt in recumbent position + suction [if needed do chest compressions]
- 3- **Seizure:** pt might aspirate gastric content → hypoxia
 - A. Control of airway
 - B. Place pt on her left side
 - C. Oxygen & suction
 - D. Transfer to the hospital
- 4- **Bleeding + cramping :** PROCEEDS MISCARRIAGE
Place the pt on left side and oxygen, transfer to hospital



Left Lateral Recumbent



Epilepsy

Seizure = sudden intense bursts of electrical impulses in the brain that affect consciousness, sensation and body movements

An Epileptic is any person who had 2 or more seizures of an idiopathic nature in their life

Seizures

Partial	Generalized
Simple (Consciousness is not impaired)	Tonic-clonic (grand mal)
Complex (Consciousness is impaired)	Myoclonic
	Atonic
	Absence seizures (petit mal)
	Febrile seizure [in high fever]: type of generalized tonic-clonic

Tonic - A sustained muscular contraction.

Clonic - Intermittent muscular contractions and relaxation.

Status epilepticus: A seizure lasting more than 5 minutes and is life threatening, most often a generalized tonic-clonic

Aura: Localized symptom that may be the first part of a seizure:

[Dizziness, head ache, upset stomach]

Common medications that epileptic patient take [**Phenytoin - one of the best tolerated anticonvulsants, Carbamazepine, Valproic acid**, Barbiturates, Succinimide, Benzodiazepines]

Newer anticonvulsants : lamoterigine, gabapentine

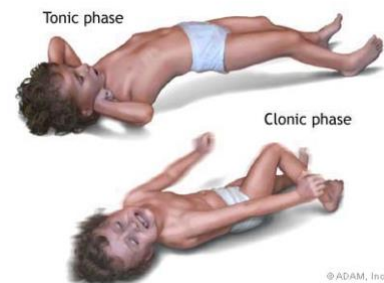
Predisposing factors for a seizure:

- 1- Fatigue & Decreased physical health
- 2- Alcohol ingestion
- 3- Emotional stress
- 4- **Flashing lights**
- 5- Menstrual cycle
- 6- Missed meals

Management: Based on preventing and minimizing occurrence of seizures

The first step in management of an epileptic dental patient is identification [by a thorough medical history , ask :

- What medications are you taking?
- What type of seizure do you have & How often do you have a seizure?
- What signals the onset of your seizure?
- How long do your seizures last?





- Have you ever been hospitalized

The office staff must be sensitive to the embarrassment that many individuals feel after a seizure [because they might have partial loss of memory, deep sleep, loss of consciousness and musculoskeletal contraction and relaxation → loss of bladder control]

Q: while working patient develops a seizure what do you do?

- 1- Terminate the dental procedure.
- 2- Protect the patient from injury
- 3- Open the airway / administer oxygen.
- 4- Obtain vital signs.
- 5- Activate the EMS.
- 6- Anticonvulsant medications I.V.

Gingival hyperplasia is secondary to phenytoin (dylantin) therapy

DD of seizures:

- Epilepsy
- Local Anesthetic Overdose Reaction
- Hyperventilation
- Cerebrovascular Accident
- Hypoglycemic Reaction
- Syncope

If you recognize the aura [or pt informs you] → stop TX and activate EMS → CABD [consciousness , airway, breathing, definitive treatment]

Seizure persists more than 5 mins → CABD + administer anticonvulsant if available

Intranasal phenytoin [dylantin] can be given DURING tonic clonic seizure



Diabetes

Diabetes Type 1 = Beta cells of the pancreas is not producing enough insulin

Common complication = **ketoacidosis that leads to coma**

Diabetes type 2 = the cells of the body are not responding properly to the insulin produced

Common complication = hypoglycemia

Signs and symptoms:

- Polyuria, (especially nocturia)
- Polyphagia
- Polydipsia + Dry lips
- Rapid and unexplained body weight loss
- Blurred vision **

Controlled diabetic = did not change their medication dose or blood sugar reading for the past 3 months

Insulin is important because it will allow glucose to be absorbed into the cells of muscles and other tissues, when insulin is absent or very low [undiagnosed or uncontrolled diabetic] the body cannot absorb the glucose → starts breaking down fat for energy → build up of acids in the blood stream [ketones] → keto acidosis and fruity smell of the breath

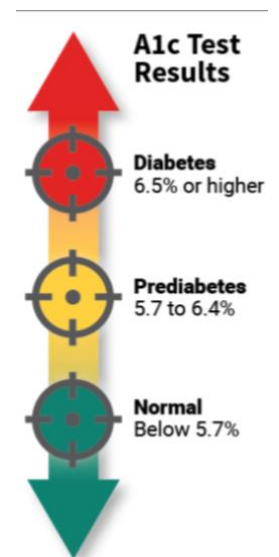
Signs for ketoacidosis develop within 24 hours:

1. Excessive thirst and Frequent urination
2. Nausea / vomiting and abdominal pain
3. Weakness or fatigue + Shortness of breath
4. Fruity-scented breath **
5. Confusion

Diagnosis of diabetes: At least one of the following

- 1- A fasting (> 8-hour) plasma glucose of > **126 mg/dL** on two separate occasions [ex; measured on a Sunday then measured on a Tuesday]
- 2- A random plasma glucose of > **200 mg/dL** plus symptoms
- 3- A two-hour postprandial glucose of > **200 mg/dL** after a glucose tolerance test on two separate occasions

NORMAL GLUCOSE RANGE = 80 -120 mg/dl





Diabetes treatment [type 1]:

- 1- Insulin [injected subcutaneously] + self-monitoring of blood glucose in the normal range (80–120 mg/dL).

Higher blood glucose levels (≥ 200 mg/dL) can be tolerated, particularly in the very young pts , if there is $\uparrow$ risk of hypoglycemia

- 2- Routine HbA1c testing (with a goal HbA1c < 8 in children)
- 3- frequent BP checks, foot checks
- 4- annual eye exams + microalbuminuria screening
- 5- lipid profile every 2–5 years

Types of insulin :

- 1- Regular insulin $\rightarrow$ lasts up to 8 hours
 - 2- Humalog [lispro] $\rightarrow$ lasts up to 8 hours
 - 3- Novolog [Aspart] $\rightarrow$ quick action within 10- 20 mins and lasts up to 5 hours
 - 4- Levemir [detemir] $\rightarrow$ lasts up to 20 hours
 - 5- Lantus [glargine] $\rightarrow$ lasts up to 14 hours
- Both Levemir and lantus do not have peak effect and last long [up to 20 hours]

Oral complications of poorly controlled DM :

- 1- Xerostomia [caused by the polyuria] + **increased incidence and severity of caries**
- 2- Bacterial, viral, and fungal infections (including candidiasis)
- 3- poor wound healing
- 4- gingivitis and periodontal disease
- 5- burning mouth symptoms

Q: what should you ask every diabetic pt ?

- 1- How much insulin they use, what type & how often they inject themselves each day
- 2- Whether their diabetes is well-controlled (if so they are more likely to go hypo)
- 3- What their signs/symptoms of a hypo are (these should be updated regularly)
- 4- What their HbA1c is

Your goal as a dentist is to **prevent insulin shock during the dental appointment**

We depend on HBA1C to determine if the pt is well controlled or not. [you can treat a pt with HBA1c up to 8]

Brittle diabetes [mostly in type 1] = pt flips between hypo and hyper quickly. Pts being treated with large doses of insulin have periods of **extreme hyperglycemia & hypoglycemia**. – such pts are at higher risk for infection

You can only give emergency tx to a pt with brittle diabetes + Close consultation with the physician is required before any dental treatment



If diabetes is well-controlled → all dental procedures can be performed without special precautions.

If not well-controlled [can be hyper >200 mg/dl or hypo <70 mg/dl] → emergency only

Diabetic pts in general :

- 1- Give morning appointments
- 2- usual insulin dosage and normal meals on day of dental appointment
- 3- pt should inform dentist if symptoms of insulin reaction occur during dental visit
- 4- Glucose source (orange juice, soda, Glucola) should be available and given to pt if symptoms of insulin reaction occur

Acute dental or oral infection → leads to loss of glycemic control [so they should be managed aggressively by incision and drainage, extraction, warm rinses & AB]

Pts with brittle diabetes may require hospitalization during management of an infection.

Risk for infection in diabetic pts is directly related to **fasting blood glucose levels** [if fasting blood glucose level is **below 206 mg/100 mL**, no increased risk is present]

Epinephrine has an opposite effect to insulin, so **blood glucose could rise with the use of epinephrine**
→ In diabetic pts, Use Mepivacaine

Advantage of mepivacaine: no toxicity/ allergy , no BP elevation

Disadvantages of mepivacaine : short acting + risk of bleeding

In long procedures → give one lidocaine then continue with mepivacaine

Q: why should you test blood sugar before giving IAN block? Because tingling in lips is sign of 'hypo' and it could be mistaken as the normal sign of LA

Periodontal treatment could lead to a mean reduction of 0.4% in HbA1c level - by improving the diabetes control the periodontal condition may also be positively affected and vice versa

IV sedation : fasting before the appointment (i.e., nothing by mouth after midnight); using only half the usual insulin dose; and then supplementing with IV glucose during the procedure.



Kidney disease

Chronic kidney disease [CKD] = 3 months of reduced glomerular filtration rate (GFR) and / or kidney damage.

CKD COMPLICATIONS:

- 1- **Anemia** => due to lack Erythropoietin
- 2- **Hyperkalemia** (High Blood Potassium)
- 3- **Hyperphosphatemia** (high serum phosphate levels) / Hypocalcemia
- 4- **Acidemia** (the state of low blood pH)
- 5- Low Vit D / Secondary Hyperparathyroidism / renal osteodystrophy
- 6- Edema [in extremities]
- 7- **Uremia** (urine in the blood)

↑ Po₄
 ↑ K⁺
 ↓ PH
 ↓ Ca²⁺

CKD pts suffer from :

- 1- Increased bleeding tendency → screen for bleeding disorders
- 2- Increased susceptibility to infections → always consult with their physician + avoid dental tx if disease is unstable
- 3- Drugs intolerance → avoid drugs metabolized in the kidneys
- 4- Hypertension → monitor BP before , during and after procedure

Management of pts with CKD:

- 1- **Avoid nephrotoxic drugs (acetaminophen (Tylenol) in high doses, aspirin, non-steroidal anti-inflammatory drugs)**
- 2- Adjust dosage of drugs metabolized by the kidney according to their GFR or Creatinine Clearance (88–128 mL/min for healthy women and 97–137 mL/min for healthy men)
- 3- Aggressively manage orofacial infections with culture and sensitivity tests and antibiotics

Management of pts with end stage renal disease on renal dialysis :

Avoid dental treatment on the day of dialysis [specially in the first 6 hours] because the pt will be tired + those Pts are also on heparin [there is risk of bleeding]

Simple procedures can be **done one day after** dialysis , complicated procedures should be **done one day before** dialysis [so that LA and any toxins produced by the procedure can be eliminated by the dialysis]

Pts on renal dialysis might be carriers for HIV / Hep C and B

Oral complications of CKD and ESRD:

- 1- Pallor of oral mucosa (Related to anemia)
- 2- Pigmentation of oral mucosa [Red-orange discoloration of the cheeks and mucosa caused by deposition of carotene-like pigments occurs when renal filtration is decreased]
- 3- Xerostomia + saliva has ammonia like odor



- 4- Dysgeusia [metallic taste in the mouth]
- 5- Candidiasis
- 6- Petechiae and ecchymosis of oral mucosa [due to bleeding tendencies]
- 7- Enamel hypoplasia
- 8- Osteodystrophy (radiolucent jaw lesions)
- 9- **Uremic stomatitis - red, burning mucosa covered with gray exudates and later by frank ulceration**

Uremic frost : white patches caused by **urea crystal deposition** on the skin but may be seen on the oral mucosa associated with blood urea nitrogen (BUN) levels greater than **55 mg/dL**



NOTE : CARIES IS NOT A FEATURE BECAUSE THE HIGH UREA IN SALIVA WILL BUFFER THE ACIDITY PREVENTING PH DROP AND CARIES

Q: a pt on hemodialysis will undergo extraction , which blood test should you order and what is the normal range ? since the pt is on Heparin you order aPTT – normal range [25- 35 seconds]

Some pts with ESRD will have AVF [Atrio ventricular fistula – a port that is used as access for dialysis]

Managing a pt with AVF: [those pts have increased risk of bleeding due to physical destruction of platelets and the use of heparin] – to minimize bleeding :

- 1- Determine the status of hemostasis by ordering aPTT
- 2- Providing dental treatment one day after hemodialysis [on the same day of dialysis, patients are generally fatigued and may have a tendency to bleed due to the activity of heparin that **lasts for 6 hours**].
- 3- Primary closure of wounds using pressure or hemostatic agents such as **thrombin, oxidized cellulose, desmopressin, and tranexamic acid [antifibrinolytic agent]**
- 4- Perform major surgical procedures **on the day after the end of the week of hemodialysis** [to provide additional time for clot retention before dialysis is resumed]
For example if the pt has Monday/ Wednesday/Friday weekly hemodialysis regimen, surgery performed on **Saturday** allows an additional day for clot stabilization before hemodialysis is resumed on Monday of the following week.

Q: do you need to give ABX prophylaxis for a pt with AVF? Justify . NO, because infective endocarditis occurs in a very small percentage of such patients, guidelines do not recommend ABX prophylaxis

Q: what is your role as a dentist for a pt that will receive kidney transplant ? before transplant achieve optimal oral hygiene to prevent development of any dental problems after transplant [the pt cannot have any dental procedures 6 months after transplants] + incase of gingival enlargement due to cyclosporine just maintain oral hygiene and plaque control through scaling



Q: why can't you do gingivectomy immediately for cyclosporin induced enlargements ? because there is a chance it might recede later [because the pt will not take the drug forever] , all you can do is maintain OH and plaque control through scaling – unless overgrowth is severe and covering the crowns → then you can consider gingivectomy

Cyclosporine causes hypertension so most pts taking cyclosporine are also given nifedipine [antihypertensive drug] which causes a more severe enlargement [both have synergistic effect]



Liver diseases

Viral hepatitis and alcoholic liver disease = most common liver disorders

3 things to remember when dealing with liver disease pts :

- 1- impaired drug metabolism [avoid hepatotoxic drugs like NSAIDs, Acetaminophen, Metronidazole, Diazepam]
- 2- bleeding tendency [due to decreased production of vit K and other coagulation factors + thrombocytopenia due to portal hypertension]
- 3- Risk of infections

Sudden weight loss → can lead to fat accumulation in the liver [fatty liver disease]

Viral hepatitis

Viral hepatitis	Mode of transmission + notes
A	fecal contamination of food or water [usually by traveling in an endemic region] or by direct contact with an infected person .
B	Percutaneous and permucosal exposure [sexual activity]
C	Blood + blood products [Renal dialysis pts, drug users]
D	Co infection with Hep B [more in drug addicts and pt's with hemophilia – a more severe infection than Hep B] Same mode of transmission as B
E	Similar to hep A

- Most cases of viral hepatitis resolve with no complications
- All patients with a history of viral hepatitis must be managed as though they are potentially infectious [isolated room, high volume suction, face mask , double gloves]

Patients With Active Hepatitis:

- 1- urgent care only - in an **isolated operatory** with **strict standard precautions**
- 2- Minimize aerosols [high speed suction + manual scalers]
- 3- Avoid drugs metabolized by the liver
 - If surgery is necessary → **prothrombin time and bleeding time** should be obtained and abnormal results discussed with the physician

The most common hepatitis is Hep B – has a vaccine

Dentists are at risk of getting :

Hep B and to a lesser extent Hep C [due to exposure to infected blood/body fluid]

Dentists need periodic retesting of **HBsAg** [surface antigen] and **HCV RNA**

HBV, HCV, and HDV → can stay and become chronic

Chronic viral hepatitis increases the risk for hepatocellular carcinoma



Patients Who Are Hepatitis Carriers:

- 1- NO elective dental treatment + refer to a physician
- 2- Necessary emergency dental in an isolated operatory and minimal aerosol production with protective precautions

Drugs metabolized in the liver should be considered for diminished dosage when one or more of the following are present:

- 1- Aminotransferase levels [ALT] elevated to greater **than 4 times normal values**
- 2- Serum bilirubin > 35 µM/L or 2 mg/dL
- 3- Serum albumin < 35 mg/L
- 4- Signs of ascites and encephalopathy, and **prolonged bleeding time**

Warfarin antagonist = vitamin K

If you give Vitamin K you will not interfere with warfarin

Warfarin gets eliminated after 7-10 days while Vitamin K works immediately in case of bleeding in a pt on warfarin

Heparin antagonist = protamine sulfate

NOTE: drug modifications are not required for the patient who has completely recovered from hepatitis

Patients with alcoholic liver disease

Oral manifestations of alcoholism:

- 1- Traumatic or unexplained injuries
- 2- Jaundice
- 3- Peripheral edema (edematous puffy face)
- 4- Ecchymoses, petechiae, or prolonged bleeding
- 5- **Poor hygiene and neglect (caries) are prominent oral findings in patients with chronic alcoholism**
- 6- Nutritional deficiencies → angular or labial cheilitis
- 7- Vitamin K deficiency → bleeding tendency
- 8- A sweet, musty breath odor

Dental management of alcoholism pt : [you major concern is bleeding problem + risk of cancer]

- 1- Obtain P T,PTT,INR before surgery + have available local haemostatic measures.
- 2- avoid hepatotoxic drugs
- 3- **Local Anaesthesia of a maximum 2 carpules**
- 4- **Avoid Pt swallowing Blood (encephalopathy)**
- 5- monitor oral cancer

**** patients with alcoholism may require increased amounts of local anesthetic or the use of additional anxiolytic procedures**





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