

Sheet no: 23.

Refer to slide no: 23 hardcopy only. (Management of traumatic dental injury).

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HAPPINESS IS



**...telling your mom
you love her.**

Case: 9 years old boy was playing football in his school, he fall and one of his central incisors was fall down .

What should you do??

Most of student was their answer is to splinting the teeth (replant of the teeth at the same time).

The day after, family told you that the boy died!

This is happen, because the bay had intracranial hemorrhage! You have to ask the ptn about any lake of conciseness or vomiting.

Treating human being is the priority

One type of trauma is avulsion, (the tooth completely displaced out of its socket.) As we manage this case early as the prognosis was better. (The first ½ hour is the best for prognosis), recently the change it and said the first 20 min it give the best prognosis.

Etiology:

1. Falls - most common reason for facial trauma in general
2. Traffic injuries
3. Acts of violence
4. Sports accidents

Prevalence:

We have two peaks:

- a) Primary teeth: age 2-3 y when they still learn how to walk (fall a lot) and motor coordination is still developing
- b) Permanent teeth: age 9-10 y when vigorous/violent playing and sports become more frequent

Incidence:

Around 1.3 – 4% of schoolchildren are subjected to some sort of facial trauma and 0.4% among the population

Classification:


There is a lot of classification.

If we talked about the part where the trauma happens, we classified trauma:

- 1- Crown fracture
- 2- Crown root fracture
- 3- Root fracture
- 4- Luxation injuries.

If we talked about the tissue affected by trauma, it classified into:

- A- Hard tissues: Teeth and bone (e.g. root fracture and displacement)
- B- The periodontium (PDL and cementum).
- C- The pulp (loss of blood supply).
- D- Soft tissues – visible laceration (gingiva, oral mucosa, tongue, lips, cheeks)



Usually any injury affects the combination of these tissues!

A- hard tissue:

- Enamel fracture: incomplete fracture. (not complicated)
- Enamel – Dentine fracture: (not complicated)
- Enamel – Dentine – Pulp fracture: (complicated)
- Crown root fractures without pulp exposure (uncomplicated)
- Crown root fractures with pulp exposure (complicated)
- Root fracture.
- alveolar fracture
- Fracture of maxilla and mandible.

B- periodontium: histological cement that cover root is similar to bone. In addition, bone undergoes continuous remodeling (deposition, resorption). However, cementum does not undergo such thing, so what does prevent resorption? Root is covered with insulating layer of organic tissue, which called precement or cementoblast. Osteoclast is active against inorganic tissue (which is bone or cement) . So if this layer removed then there will be access of osteoclast to cementum! Then resorption will happen. In addition, the same scenario happens to prevent osteoclast to get inside dentine and resorpe it.

The PDL can suffer one of two injury types which have different consequences on the management and its outcome:

1- Separation injury:

Cleavage of intercellular structures (collagen and intercellular substance) with limited damage to the cells in the area of trauma. Wound healing can arise from existing cellular systems with minimal delay. (cleavage of periodontal fiber , here some cell still attached)

2- Crushing injury: worse

There is extensive damage to both cellular and intercellular systems. The damaged tissue must be removed by macrophages and/or osteoclasts before the traumatized tissue can be repaired. Several weeks are added to healing process and this is reflected in the recommended splinting period.

**** In avulsion as we will talk later it needs 2 week to be healed. (Physiological splint). No necrotic tissue! (إذا رجع بالوقت الصح)**

Wound healing:

Dr explain it briefly, you should read slides.

- 1- Platelets, Macrophages, neutrophile.
- 2- Revascularization

This whole process is known as the healing module which has been estimated to progress at a rate of 0.5 mm per day. E.g. if the tooth length is 20 mm we need 4 days to get repaired.

Luxation injury:

- 1- Concussion: trauma that lead to some sort of tenderness or pain. There is no mobility & no displacement, it is purely injury to pdl.
- 2- Subluxation: mobility without displacement.
- 3- Extrusion: mobility and displacemt .(out side of socket)
- 4- Intrusion : mobility and displacement (inward of socket)
- 5- Lateral Luxation : mobility and displacement (to side)
- 6- Avulsion : mobility and completely loss of the teeth.

You can go to <http://www.dentaltraumaguide.org/> . It is one of the best site that tell you about trauma

You should know the injury above in detail from this site (description, etiology, diagnosis).

For example:

Dental Trauma Guide x

www.dentaltraumaguide.org/Permanent_Lateral_luxation_Diagnosis.aspx

The Dental Trauma Guide

Your interactive tool to evidence based trauma treatment

created by

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Permanent Teeth		LATERAL LUXATION - DIAGNOSTIC SIGNS	
Concussion		Description	Displacement of the tooth other than axially. Displacement is accompanied by comminution or fracture of either the labial or the palatal/lingual alveolar bone.
Subluxation			
Extrusion			
Lateral luxation			
Description			
Etiology			
Diagnosis			
Treatment			
Prognosis			
References			
Intrusion		Visual signs	Displaced, usually in a palatal/lingual or labial direction.
Avulsion		Percussion test	Usually gives a high metallic (ankylosed) sound.
Infraction		Mobility test	Usually immobile.
Enamel fracture		Sensibility test	Sensibility tests will likely give a lack of response except for teeth with minor displacements.
Enamel-dentin fracture			
Enamel-dentin-pulp fracture			
Crown-root fracture without pulp involvement			
Crown-root fracture with pulp involvement		Radiographic findings	Widened periapical ligament space best seen on occlusal or eccentric exposures.
Root fracture		Radiographs recommended	As a routine: Occlusal, periapical exposure and lateral view from the mesial or distal aspect of the tooth in question.
Alveolar fracture			
Jaw fracture			

Because No pdl , get ankylosed

Bookmark this web site. It is so useful. And use it when you need in clinic.

C- **Pulp:** it is common after trauma to get 1- complete canal obliteration, canal calcification. There is yellowish discoloration, why? Dentine no translucent. 2- Pulp necrosis.

No need for RCT . After trauma, we need 2 weeks to reevaluate the vitality of the tooth. then we decide if we need rct or not.

d- **Soft tissue:**

- 1- Abrasion: superficial wound.
- 2- Contusion : bruise (alveolar fracture).
- 3- Laceration: cut, very common.
- 4- Avulsion: bite.

Consequence:

- **Root resorption:**

The most important. It divide into external and internal (look at the slide)

EXTERNAL RESORPTION:

1- Repair-related (surface) resorption: just part of healing, nothing to worry about.

Trauma can affect cement when it removes the precement layer. In cases of damage to the layer of cementum (minimal damage without exposure of dentinal tubules), the site will be resorbed by macrophages and osteoclasts. There will be expose root surface. Two types of cells raise to compensate root surface. A- Cementoblast/clast or Osteoblast/clast. Usually osteoclast is faster, but if the damaged part is small (not significant) then it will be temporary , it will reversed and surface will composite with cementoblast. If the pulp is vital nothing should done (no need for RCT).

2- Replacement resorption (ankylosis-related).

For the same reason (above) the root was exposed. If it was significant (some said: 20% of root surface, some said 4mm² then it will not reversible. Osteoblast and it will continue until the root surface replaced with bone. X-ray : no **Radiolucency**.

Question: does it good or bad thing?

It is long process. For Immature teeth takes > 5 years to be replaced with bone.

Mature teeth take 20 years. So it is not thing that I worry about and Nothing to do

3- external Infection-related (inflammatory) resorption:

As we said there was loss of insulating layer (precement) but here we have something to stimulate resorption.

Continuous stimulation for Resorption: **1- pressure (wisdom tooth) 2- infection (inside pulp).**

This results in a more extensive inflammatory reaction and continuation of the osteoclast cell to resorb the root. This process is known as "External Inflammatory root resorption" and is usually progressive until the root canal is exposed, we may lose the whole tooth in a matter of months.

The bad thing about it that it is Very quick procedure. The whole root within one 3 months . in mature teeth it prolonged but no more than one year (the whole root and bone) . the good thing if you detected it you can manage it completely by debridement (cleaning (caoh) and shaping) and may it reverse . If not reversed this area will fill with bone.

****** in case of trauma and the tooth is vital (لو شو ما كانت قوية) , the will be no external root resorption. There will be replacement resorption (it takes prolonged time so no worry about it). So replacement resorption can't be prevented but external inflammatory can.

****In case immature teeth, where we can preserve tooth vitality this should be my treatment approach.**

Therefore it is really important to consider this after trauma, if we know that the pulp will not regenerate and that we have lost the vitality of the pulp, we need to do root canal treatment within a week or two to prevent external inflammatory root resorption, because if bacteria are eliminated from the root canal and/or dentinal tubules by proper endodontic therapy, the resorptive process will be arrested and reversed.

The resorption happen when there is pressure or infection.

- 4- Internal resorption** : no sign of canal on radiograph. Etiology is unknown, maybe trauma and some sort of stimulation. Apical part of the tooth is vital. If the tooth is necrotic no osteoclast inside root! So the stimulating factor come from coronal pulp, so the tooth may or may not respond to vitality test. If the resorption is apically usually pulp will not respond. and coronally will respond. Treatment just removes the pulp.

Manifestation : pink spot.

- 5- Subepithelial external inflammatory** : we have deep pocket. Bacteria from oral cavity. Management is difficult, we need flab. Remember most cases the pulp is vital unless the resorption is significant. Read slide.

It is important to be able to differentiate between internal and external inflammatory root resorption:

	Internal Inflammatory Root Resorption	External Inflammatory Root Resorption
Clinically (Upon pulp test)	Vital pulp (still responds)	Necrotic pulp
Location On X-rays	Internal and <u>Coronal</u> (due to the coronal necrotic pulp and vital apical pulp)	External
Outline of Canal on X-rays	Outline is totally lost	Outline is preserved
Angled X-rays	Always centered	-

- Note:

Management is the same for both cases; which is RCT.

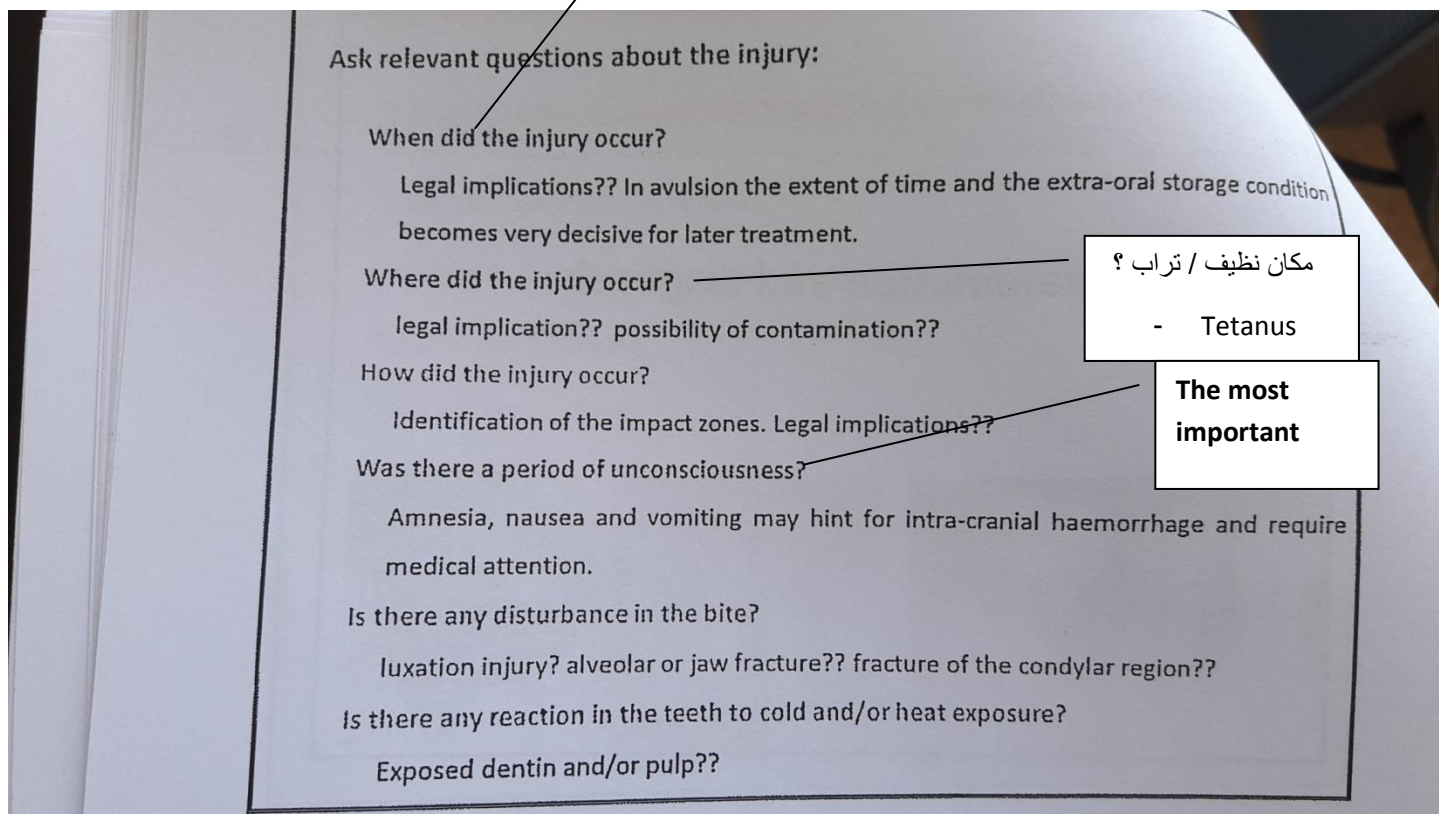
Examination :

We need good history.

Questions related to injury:

Europe : child had injury 2-3 days so there is some sort of neglect .

This is not in our country, our dentist concern about the days that the tooth is out of its socket.



Check every thing. Systemically.

- Radiographic examination: we need multiple radiographic procedures from different angle to exclude/detect any further root fracture or displacement of the tooth in its socket. The standard of care is an occlusal view OR 2 angles of Periapical radiographs OR 3 angles or Periapical radiographs is the best.
- CBCT : 3d image . in case of trauma dr not indicate it.

Management:

- a- Soft tissue wound : as slide
- b- Teeth and hard tissue : reposition the tooth in its position as soon as possible probably . As we talked, the pdl is the most important one.

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Splinting time :

Subluxation	2 weeks
Extrusive Luxation	2 weeks

Avulsion	2 weeks / some said 1 week
Lateral Luxation	4 weeks
Root fracture (apical and middle third)	4 weeks
Alveolar bone fracture	4 weeks
Root fracture (cervical third)	4 months

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Avulsed teeth :

we concern about 2 thing. 1- pdl (the most important; only 20 min of the first 1 hour is the best prognosis.)

1- pulp (if necrosis happen)

management :

rinse it with saline, milk , water and then replant it. To prevent dried out.

The best storage medium is HBSS which is phosphate buffered saline. It is not available.

Then milk is best then saline then saliva , finally water. Because pdl will absorb water.

Then in dental office :

- 1- less than 60 min ; then injury to pdl is favorable and the injury to pulp is not.
- 2- More than 60 min ; read the slide (😊لأنه خلصت المحاضرة وطلع الدكتور)

Read the slide.

يقول الحسن البصري - رحمه الله - :
 " قَرَأْتُ فِي تِسْعِينَ مَوْضِعًا مِنَ الْقُرْآنِ الْكَرِيمِ ،
 أَنَّ اللَّهَ قَدَرَ الْأَرْزَاقَ وَضَمَّنَهَا لِخَلْقِهِ ،
 وَقَرَأْتُ فِي مَوْضِعٍ وَاحِدٍ : الشَّيْطَانُ يَعِدُكُمُ الْفَقْرَ
 فَشَكَّكْنَا فِي قَوْلِ الصَّادِقِ فِي تِسْعِينَ مَوْضِعًا ،
 وَصَدَّقْنَا قَوْلَ الْكَاذِبِ فِي مَوْضِعٍ وَاحِدٍ "