Management of dental traumatic injury

**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

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

1- Crown fracture

2- Crown root fracture

3- Root facture

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:**

o Enamel fracture: incomplete fracture. (not complicated)

o Enamel – Dentine fracture: (not complicated)

o Enamel – Dentine – Pulp fracture: (complicated)

o Crown root fractures without pulp exposure (uncomplicated)

o Crown root fractures with pulp exposure (complicated)

o Root fracture.

o alveolar fracture

o 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:

**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.

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.

**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 displacement. (Outside 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.

C- **Pulp: it** is common after trauma to get

1- Complete canal obliteration, canal calcification.

There is yellowish discoloration, why? Dentine not 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 divides into external and internal

**EXTERNAL RESOPRPTION:**

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

Trauma can affect cement when it removes the precment 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 rise to compensate root surface 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.**

**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 dominates here and it will continue its work 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 continuously:

**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.

The bad thing about it is 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, there 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**.

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.

**4- Internal resorption:** no sign of canal on radiograph.

Etiology is unknown, maybe trauma and some sort of stimulation.

the apical part of the root is always vital. If the resorption is more apically positioned then the tooth won’t respond to vitality testing "however the apical part is still vital" but if the resorption is more coronal, then the tooth will respond to vitality testing

**Manifestation: pink spot.**

**5- Subepithelial external inflammatory:**

We have deep pocket and bacteria from oral cavity.

Management is difficult, we need flab.

Remember most cases the pulp is vital unless the resorption is significant.

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| --- | --- | --- |
|  | Internal Inflammatory Root  Resorption | External Inflammatory Root  Resorption |
| Clinically  (Upon pulp test) | Vital pulp (still responds) | Necrotic pulp |
| Location On X-rays | Internal and Coronal  (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 | - |

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

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.**

Questions related to injury:

When did the injury occur?

Where did the injury occur? (Indication of contamination possibility)

How did the injury occur?

Was there a period of unconsciousness?

Amnesia, nausea and vomiting may hint for intra-cranial hemorrhage

Is there any disturbance in bite? (Indication of luxiation injury or alveolar, jaw, condylar fractures)

Is there any reaction in the teeth to cold/heat?

**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 |

Avulsed teeth:we concern about 2 things:

1- pdl ( the most important; only 20 min of the first 1 hour is the best prognosis. )

2- Pulp (if necrosis happens)

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.