Management of Dental Trauma in Children

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Classification of trauma

- Injuries to the hard dental tissues & pulp:
  - Enamel infraction
  - Enamel fracture
  - Enamel-dentine fracture
  - Complicated crown fracture

Classification of trauma

- Injuries to the hard dental tissues, pulp & alveolar process:
  - Crown root fractures
  - Root fracture
  - # alveolar socket wall
  - # of alveolar process

Classification of trauma

- Injuries to Periodontal tissues:
  - Concussion
  - Subluxation
  - Luxation (extrusion, lateral, intrusion)
  - Avulsion

Classification of trauma

- Injuries to gingiva or oral mucosa:
  - Laceration
    - Tear
  - Abrasion
    - superficial wound
    - rubbing or scraping
    - raw, bleeding surface
  - Contusion

Classification of trauma

- Almost always, there is a combination of injuries … eg crown fracture and subluxation injury and gingival laceration

General approach to trauma

- Triage
  - Assess level consciousness
  - Other injuries
  - Oro-facial injuries
- Clean
- Records and Documentation
- Stabilise
- Treat
- Remain calm

History
Examination
Diagnosis

History

- Where, When, How?
- Medical
- Dental – including previous trauma
- History of signs and symptoms of trauma

Examination

- Emergency – DRABC, cervical, cerebral, haemorrhage
- General
- Extra-oral
- Intra-oral soft
- Intra-oral hard
  - might include visual, pulp sensibility, TTP, mobility, colour, probe, sound
- Periodontium
- Radiographic
  - might include OPG, PA, Mx/Md occ, soft tissue (25% exposure), lateral Mx
- Other

Diagnosis

- Must be made prior to treatment
- Xxxx due to Yyyy; consistent with Zzzz
- For example: Luxation injury (palatal displacement) of 61 and contusion of upper lip due to trauma; consistent with fall onto hard object

Enamel Fracture

- Primary and permanent dentition
  - Smooth sharp edges
  - Restorative - strip crown

Enamel and Dentine Fracture

- Primary dentition
  - Restorative – strip crown
- Permanent dentition
  - Restorative
- Seal dentine tubules

Complicated Crown Fracture

- Primary dentition
  - Pulp capping – only if very small exposure and treatment is immediately after injury, then strip crown
  - Pulpotomy, then strip crown
  - Pulpectomy, root fill, then strip crown
  - Extraction

Complicated Crown Fracture

- Permanent dentition
  - Pulp capping
  - Pulpotomy, then restorative
  - Pulpectomy, ? apexification, root fill, then restorative
  - Extraction – very rarely

Crown-Root Fracture

- Primary dentition
  - Uncomplicated:
    - Restorative – strip crown; or
    - Extraction
  - Complicated:
    - Pulpotomy or pulpectomy, then restorative – strip crown; or
    - Extraction

Crown-Root Fracture

- Permanent dentition
  - Treatment options to consider:
    - RCT
    - Extrusion
    - Perio surgery
    - Restorative
    - Extraction and management of the space
  - Very complicated and time consuming

Root Fracture

- Primary dentition
  - If no significant mobility of coronal fragment
    - No immediate treatment indicated … review
    - Splinting not necessarily indicated / achievable
  - If displaced or very mobile coronal fragment
    - Extract the entire tooth; leave small apical fragment if risk of damage to successor

Root Fracture

- Permanent dentition
  - If mobile coronal fragment
    - Traditional regimen: rigid fixation for up to 2 months
    - More recent regimen: flexible fixation for 2-3 weeks
    - If fracture is at CEJ, exo of coronal fragment may be indicated … need to then consider root burial, ortho extrusion, exo of root

Root Fracture

If coronal fragment relatively firm …
no splint may be necessary

Review for type of healing:

- Fracture
  - healing with calicified tissue
  - healing with connective tissue
  - bone and connective tissue
  - granulation tissue

- Pulp
  - revascularisation
  - necrosis
  - pulp canal obliteration.

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Concussion and Subluxation

- Primary and permanent dentition
  - Observation only
  - Splinting not indicated / achievable
  - Soft diet

Luxation

- Primary dentition
  - Extrusive luxation:
    - Extraction is indicated … do not reposition
  - Lateral luxation:
    - If not excessive mobility and if not in traumatic occlusion, leave to allow spontaneous repositioning (via forces from tongue and lip)
    - If excessive mobility or if in traumatic occlusion, extraction is indicated

Luxation

- Permanent dentition
  - Disimpaction of the luxated tooth
  - Management of the alveolar fracture
  - Reposition tooth
  - Non-rigid splinting 10-14 days
  - High probability of need for RCT in mature teeth

Intrusion

- Primary dentition
  - Do not extrude physically or orthodontically
  - Direction of displacement
    - If apex of primary tooth has been displaced palatally, into developing permanent tooth, extraction is indicated
    - If apex of primary tooth has been displaced labially, away from developing permanent tooth, defer to severity of displacement criteria
    - If apex has been displaced labially and has fractured the labial bone plate (as seen on lateral Mx film), extraction is indicated … virtually no chance of spontaneous eruption.
  - Severity of displacement
    - If less than half crown has been intruded, good chance of spontaneous eruption over the next three months … leave and monitor
    - If half crown has been intruded, possibility of spontaneous eruption is reduced … allow time for spontaneous eruption, but consider extraction
    - If more than 75% of crown has been intruded, possibility of spontaneous eruption is very low … extraction is indicated.

Intrusion

- Primary dentition
  - How do you determine the direction of displacement?
    - Mx Occ: Primary tooth will appear foreshortened if it has been displaced labially
    - Mx Occ: Primary tooth will appear elongated if it has been displaced palatally
    - Lateral Mx film: Identify the position of apex of primary tooth in relation to permanent crown
    - Mx Occ or PA: Appearance of developing permanent tooth should be normal and virtually the same as the contralateral tooth.

Intrusion

- Permanent dentition
  - Options include:
    - passive re-eruption,
    - surgical repositioning, or
    - orthodontic repositioning
  - Two schools of thought:
    - Treatment based on age/stage of root development
    - Treatment based on severity of intrusion

Intrusion

- Permanent dentition
  - Treatment based on age/stage of root development
    - Immature tooth: left to re-erupt over 6 months, for sake of pulp, PDL and marginal bone
    - Mature teeth up to 17 yoa: left to re-erupt over 6 months, for sake of pulp, PDL and marginal bone
    - Mature teeth older than 17 yoa: reposition surgically or orthodontically

Intrusion

- Permanent dentition
  - Treatment based on severity of intrusion
    - < 3 mm: leave to re-erupt spontaneously
    - 3-6 mm: either leave to re-erupt spontaneously or apply traction to reposition
    - > 6 mm: surgical or orthodontic repositioning is necessary; inevitable that there will be eventual loss of the tooth due to ankylosis and replacement resorption.

Intrusion

- Permanent dentition
  - Need for RCT, particularly in nearly mature or mature teeth is almost inevitable. Focus should be on achieving re-eruption to enable endodontic access.

Avulsion

- Primary dentition
  - Never reimplant

Avulsion

- Permanent dentition
  - Considerations:
    - Extra-alveolar time
    - Storage medium
    - Stage of development
  - Treatment:
    - Clean
    - Reimplant
    - Non-rigid splint 7-10 days
    - RCT is inevitable if mature and probable if immature

Injury to the developing permanent dentition secondary to injury to the primary dentition

- Approx half of all injuries to a primary tooth cause some form of injury to the developing permanent successor

- Types of injury to primary teeth to consider:
  - Intrusion of the primary tooth
  - Luxation of the primary tooth
  - Injury leading to primary tooth pulp death and ultimate necrosis, giving rise to apical periodontitis

- Types of injury that may be caused to the permanent successor
  - Enamel hypomineralisaiton – white, yellow or brown opacity
  - Enamel hypoplasia – physical defect
  - Crown or root dilaceration
  - Partial or complete arrest of root formation
  - Odontome formation

Additional treatment

- Cleaning
- Chlorhexidine
- Analgesics as indicated
- Antibiotics as indicated
- Tetanus prophylaxis as indicated
- Follow up

Loss of vitality in immature teeth - Revascularisation