Emergency Dental, Handbook for Medical Practitioners

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The NSW Rural Doctors Network (RDN) is proud to be associated with the production of the Emergency Dental Trauma Kit. The purpose of the Kit is to support rural doctors in their treatment of dental emergencies, particularly when they occur after hours. Dr Tony Skapetis originally developed the Kit in 2006 through funding provided by RDN to Sydney West Area Health Service. Since that time, hundreds of rural GPs and emergency physicians have been trained in the treatment of dental trauma and Kits have been supplied to hospitals throughout regional, rural and remote Australia. This second edition of the Emergency Dental, Handbook for Medical Practitioners includes updated information and illustrations based on training developed and delivered by Dr Skapetis.

Dr Ian Cameron, CEO
NSW Rural Doctors Network
Tooth Nomenclature

All teeth can be described using two numbers. The first number describes the quadrant the tooth is in and the second number describes the tooth itself. The upper right quadrant is named quadrant one, upper left quadrant two, lower left quadrant three and the lower right is quadrant four.

After the quadrant has been numbered, the teeth themselves are numbered beginning from the centre line and moving posteriorly. For example the second upper right tooth distal to the midline would be described as tooth 12 (quadrant number one and tooth number two back of centre). Where the tooth is missing an allowance is made by skipping a number as though the tooth were there. With deciduous (primary or baby) teeth, the numbering system follows the same pattern as seen in the picture below.

Children less than 6 years of age normally have only deciduous teeth, 6-12 yrs a mix of deciduous and permanent, whilst after 12 yrs permanent teeth predominate.
Dental Anaesthesia

Maxillary teeth

A 5mL syringe with a 25G, 16mm needle is ideal for oral infiltrations.

Maxillary molar

Maxillary infiltrations are used to anaesthetise any maxillary teeth. After the lip is retracted, 2mLs of Lignocaine with Adrenaline (adult dose) or equivalent is injected at the deepest part of the sulcus, directly above the tooth involved with the needle penetrating 2 mm deep into the tissues.

Maxillary incisor
Mandibular infiltrations are suitable only for anaesthetising anterior mandibular teeth between the two lower canines (33 to 43). 2 mLs of Lignocaine with Adrenaline (adult dose) is injected into the deepest part of the sulcus adjacent to the tooth involved with a needle penetration of 2 mm into the tissues.
Dental Anaesthesia

Mandibular premolar and molars:
*The Inferior Alveolar Nerve block*

Mandibular molars and premolars are anaesthetised by penetrating the apex of the buccal pad of fat with the mouth wide open. The penetration depth is 20 to 25 mm and bone must be reached (medial surface of the body of the mandible). Upon hitting bone the needle should be withdrawn 1-2 mm and following a negative aspiration, 2 mLs of Lignocaine (adult dose) should be injected. The Inferior Alveolar Nerve block results in anaesthesia to all lower teeth in that quadrant up to the midline including 1/2 of the lower lip, chin and anterior 2/3 of the tongue of that side of the face.
Dental Anaestheisa

Infra-orbital Nerve block

Firstly palpate the Infra-orbital notch along the infra-orbital margin then slide index finger down below infra-orbital rim just below the notch. The injection site is located below the centre of the finger nail. Penetration is down to bone then withdrawal of 1-2mm followed by aspiration and the injection of 2mLs anaesthetic (adult dose).

The Infra-orbital N block provides dental anaesthesia from the maxillary midline to the premolar region (teeth No 1 to 5) and all the upper lip of that side of the face.
Crown Fractures

Uncomplicated Crown Fracture Treatment

Above shows an uncomplicated (no pulp exposed) crown fracture on the left incisor (21) which may be covered with GIC (Glass Ionomer Cement) to reduce sensitivity or even left alone to be managed by a Dentist in a few days where practical.

Complicated Crown Fracture Treatment

A complicated crown fracture with bleeding pulp exposed.
Crown Fractures

Crown Fracture Treatment

Exposed pulp is covered with a small amount of Ca(OH)$_2$ (Dycal) to try and preserve pulp vitality.

Fractured tooth surface (11) with Dycal pulp coating is completely covered with GIC, making sure the GIC does not interfere with the patient's opposing teeth. Note that the patient should be able to freely close their teeth together properly without the GIC interfering with the occlusion (bite).
Crown Fractures

Splinting of teeth using GIC

The mobile tooth no. 11, is splinted using GIC with adjacent teeth until the patient can seek further treatment by their own Dentist.
Avulsion Injury

Treatment of an Avulsion Injury

A typical avulsed tooth. Note the root portion is coated by the periodontal ligament. The integrity of this ligament is paramount in successful re-implantation.

The avulsed tooth should be transported in milk and handled from the crown portion to minimise damage to the root surface periodontal ligament cells. Once the socket is flushed with saline to remove residual clot, the avulsed tooth root should also be flushed with saline followed by re-implantation as soon as possible.
Avulsion Injury

Treatment of an Avulsion Injury

Cricket ball injury to the face on a 19 year old.

Injury sustained:
- 11 lateral & extrusive luxation
- 21 completely avulsed
- 22 extrusive luxation

Both 11 and 22 were repositioned using finger pressure after local anaesthetic and adjacent teeth were used as a guide to the repositioning.

Once the teeth are repositioned, surrounding alveolar bone is compressed above the roots of teeth involved.
Avulsion Injury

Treatment of an Avulsion Injury

Note that occlusion should be checked to make sure the repositioned 11 and 22 are not interfering with the lower teeth and the patient can close their back teeth together properly.

Avulsed tooth socket 21 was first irrigated with saline to remove any blood clot and then the socket was checked for any loose alveolar bone fragments which would restrict the tooth being reimplanted.

The tooth should be handled carefully from the crown portion and the root portion should be handled least, to minimise damage to the periodontal ligament cells.
Avulsion Injury

Treatment of an Avulsion Injury

Tooth 21 has now been reimplanted and again its position should be checked relative to the adjacent teeth as well as the opposing occlusion.

Emergency short-term splint
*Blu-Tac* (completely non-toxic) or equivalent is rolled up into a sausage shape and is placed over the now repositioned teeth.
Avulsion Injury

Treatment of an Avulsion Injury

Several layers of aluminium foil or the foil backing of a vaseline gauze (nasal) pack is moulded over the Blu-Tac to stabilise and splint the teeth.

Longer term splinting
Teeth splinted using fishing line and GIC (Glass Ionomer Cement). Alternately GIC alone could have been used. Note that the lip lacerations were sutured using absorbable Vicryl sutures.

Avulsed tooth 11 is splinted after reimplantation using GIC with adjacent teeth until the patient can seek further treatment from their own Dentist, ideally within 2 weeks.
Intrusive Injury

Treatment of an Intrusive Injury

Teeth 21 and 22 have been extensively intruded.
Treatment of an Intrusive Injury

After local anaesthetic, teeth are forcibly repositioned using forceps, needle holders or similar.

The position of adjacent teeth is used to guide the final repositioning with soft tissue being compressed around the roots of the teeth. The teeth are now ready for splinting.
Extrusive & Lateral Injury

Treatment of Extrusive & Lateral Luxation

After local anaesthesia, extruded 21 and laterally luxated 22 were repositioned back to their original positions using finger pressure whilst noting adjacent and opposing teeth as a guide.

After repositioning, the patient must be able to bring their back teeth together properly without interference. The teeth should then be splinted using GIC and referred for follow-up by a Dentist within 2 weeks.
Suturing inside the Mouth

Sutures placed to control intra-oral haemorrhage

1

3

4

Gingival tissue is delicate compared to skin and tears easily.
Sutures placed in the mouth being used to control intra-oral haemorrhage. Suture material used is 3/0 or 4/0 absorbable material such as plain catgut, chromic or vicryl sutures.
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Appendix A

EMERGENCY DENTAL

With tooth displacement

Permanent tooth

Lateral luxation  Extrusive luxation

Avulsion

Reposition if tooth is mobile &/or is interfering with bite under L.A.

Store tooth in milk and refer to dentist ASAP for immediate management

Rinse tooth under running water holding tooth from crown

Re-implant tooth into socket ASAP

If intrusion <3mm

If intrusion >3mm

If patient >18 years old

If patient <18 years old

Intrusive luxation

If intrusion less than 6mm

Intrusion more than 6mm

Leave alone

Reposition under L.A.

Splint with GIC to adjacent teeth

Refer to Dentist within 2 weeks
Dental Trauma

Without tooth displacement

Crown # (fracture line above gum) or Crown root # (fracture line extends below gum)

If complicated (pulp exposed)
  Dry & cover pulp with Dycal
  Refer to Dentist when practical

If uncomplicated, (no pulp exposed)
  Dry & cover all of # surface (including Dycal) with GIC
  Refer to Dentist within 2 weeks

Root #
  Splint if crown segment is mobile

Deciduous tooth

If tooth is an inhalation risk or interfering with bite
  Extract

If no inhalation risk, no interfering with bite
  Leave tooth alone

Dental Trauma Management Flowchart
Dental Infection Management Flowchart

Facial swelling presentation:
1. Assess ABC (as per EMST)
2. Remember to check for:
   - trismus (less than 2 fingers of mouth opening - adults)
   - tongue swelling/hardness
   - floor of mouth elevation

If unstable:
1. Airway intubation?
2. Appropriate ICU/Maxillofacial
   Surgeon management.

If stable:
1. Confirm dental origin via x-rays if available:
   - OPG or
   - CT if orbital or submandibular swelling present.

Dental origin

Features

- Slow Onset
- Afebrile
- Not Septic
- Patient Mobile

- Acute onset
- Febrile
- Systemic Symptoms present

Flowchart continues on next page...
Flowchart continues from previous page...

Appendix B

EMERGENCY DENTAL
Materials for repairing dental fractures and splinting teeth

Dycal, a brand of Ca(OH)$_2$ used to cover exposed pulps in complicated crown fractures, comes in the form of 2 tubes, one the base and the other a catalyst. Equal proportions are dispensed ready for mixing together using a spatula or similar device.

Left picture shows the GC Fuji IX GIC (Glass Ionomer Cement) which consists of a bottle of liquid and one of powder, the latter of which is dispensed using the green scoop onto a paper mixing pad.
Materials for repairing dental fractures and splinting teeth

One drop of GIG liquid to one scoop of powder ready for mixing.

GIG being mixed to a consistency where the material will not freely run off the mixing spatula (or similar). The GIC has a working time of about 2 minutes but will set faster once inside the mouth due to body heat.