

INITIAL MANAGEMENT OF DENTAL TRAUMA

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This article has been prepared on the basis that it may provide a useful aid for Dentists in the education of parents, teachers, health-care workers, dental assistants and anyone else who could be required to render first aid following dental trauma.

The clinical management of dental trauma can be complex and involve the use of numerous diagnostic aids and treatment modalities. A thorough discussion is beyond the scope of this article and readers are referred to an appropriate text such as The Text Book and Colour Atlas of Traumatic Injuries To The Teeth – Andreasen and Andreasen.

ETIOLOGY AND EPIDEMIOLOGY

Unfortunately as the caries rate in children has declined significantly over the past twenty years, the same fall has not been observed in the rate of dental traumatic injuries. The causes of these injuries not only varies considerably, but has been changing in nature as well. While contact sports such as, Australian Rules Football and Rugby continue to be responsible for a steady stream of dental trauma, leisure activities are also becoming increasingly associated with traumatic injuries. Activities such as roller-blading, skate-boarding, mountain bike riding, trampolining and horse riding are now associated with a significant amount of dental trauma. It has been suggested that women may be more susceptible than men to dental injuries as it has not been traditional for women to wear mouthguards. This trend has been observed in American basketball players.

A near perfect smile is a facial feature taken for granted by many young Australians. The benefits of increased awareness of good oral hygiene, better diet, fluoridation and orthodontic treatment means the majority of teenagers in this country can expect to have beautiful teeth. Unfortunately an accident involving the teeth can result in injuries that can in the least be expensive to repair and in the most serious cases, permanently disfiguring. The initial management of dental injuries is something that should be second nature to all dentists and para-dental staff. It could be said that people at the scene of these accidents such as teachers, school nurses and coaches at sporting clubs should be also well versed in the initial management of dental trauma. Certainly the first aid that is applied soon after the injury often has a profound affect on the long term prognosis for the tissues affected.

The precise prevalence and incidence of dental injuries is difficult to determine. Most studies probably grossly underestimate incidences because many minor injuries go unreported. General trends indicate that boys suffer traumatic injuries twice as often as girls.

There appear to be two peaks relating age to trauma which are 2 – 4 years and 8 – 10 years. By the age of 14 years up to 20% of children have sustained an oral injury. In Australia it has been found that the majority of injuries occur outside school hours. Dental injuries are twice as common in children with an increased overjet and inadequate lip coverage.

The exact nature of the dental injury, whether it be a luxation or fracture is related to the mechanism of the injury. If a tooth is struck with a hard object such as a cricket bat or hockey ball, then fracture type injuries are more likely to occur. If the impacting object is cushioned by the lip or is itself softer, then luxation injuries are more likely to occur. The direction of an impacting force will also determine whether subsequent fracture injuries are horizontal or oblique.

Studies have shown that initial treatment of dental trauma is often not well managed. These studies have recommended that increased public information be provided regarding first aid and secondly that appropriate emergency care centres be developed and utilised.

EXAMINATION AND DIAGNOSIS

As all dental trauma involves the head and neck, consideration must initially be given to the fact that other more serious injuries may have occurred. Any loss of consciousness, acute bleeding, respiratory problems or neurological signs or symptoms may indicate life threatening conditions have developed and emergency medical care is paramount.

Even at the point of first aid a history should be taken. This should at least include;

- The patient's name, age, sex, address and phone number. This may also provide information regarding the patient's cerebral state.
- General health of the patient.
- When did the injury occur?
- Where did the injury occur?
- How did the injury occur?

To enable examination of the injuries, it will be necessary to calm and reassure distressed patients. This can be done while blood is cleaned away and pressure applied to any still bleeding areas. This will allow a visual examination of any extra oral injuries. Examination of the nose is important particularly for the presence of fractures. Clear fluid draining from the nose or ears may be cerebrospinal fluid which indicates severe cranial damage.

Dental injuries often involve lip lacerations and these may require suturing or the expertise of a plastic surgeon.

Before any attempt is made to examine the mouth it should be noted that injuries to the jaws and temporomandibular joints may have occurred. Inability to open the mouth may indicate these areas have been damaged. If this is suspected the patient will need to see an Oral and Maxillofacial Surgeon and immediate transfer to the Emergency Department of a major hospital is indicated.

Examination of the teeth should include –

- ✓ Assessment of the crowns of the teeth for fractures and pulp exposures.
- ✓ Displaced (luxated) teeth and missing teeth should be noted.
- ✓ Disturbances in the occlusion should be checked.
- ✓ Abnormal mobility of individual or groups of teeth noted.
- ✓ The labial gingival tissues need to be assessed for mucoperiosteal avulsion “(degloving)”.

All missing teeth and fragments will need to be accounted for. Missing teeth should be found and may be present where the accident occurred. This area should be carefully searched. Intruded teeth can appear to be missing. Examination of the socket where the tooth appears to be missing may reveal intrusion has occurred.

FIRST AID

Practically all dental injuries will require some active treatment by a dentist. Arrangements should be made to have the patient transferred to a dental surgery as soon as possible. Some simple measures will increase the chances that injured teeth will be saved in the long term.

1. Excessively mobile teeth should be temporarily splinted with an aluminium foil splint. (figures 1 – 3).
2. Ideally teeth that have been avulsed should be replaced into the socket immediately. If this is not possible the tooth should be stored in - (order of preference)
 - (a) A commercial dental storage medium.
 - (b) Saline.
 - (c) Blood with or without plastic wrap such as “Glad Wrap”.
 - (d) Milk.

It is best to avoid normal water or saliva. Allowing the tooth to dry should be avoided under all circumstances.

If the tooth is to be replanted, it should be held only by the crown and any foreign matter on the root carefully removed. Delicate tissues remaining on the root surface are vital for the tooth's recovery, and can be easily damaged.

Studies have conclusively shown that the amount of time the tooth is out of the socket is directly related to the long term viability following re-plantation. Similarly storage in appropriate medium will enhance the success of subsequent treatment.

INITIAL DENTAL TREATMENT

A thorough radiographic examination following trauma is mandatory. Both periapical and occlusal films will reveal root fractures that may be missed if only one film is taken.

Radiographs of involved soft tissues, particularly the lips will often reveal missing tooth fragments or debris which will need surgical removal.

Initial dental management follows the general principles outlined above. Displaced teeth should be re-positioned and avulsed teeth replanted. Non rigid splints should be applied –

- ✓ When there is a danger of the injured tooth being displaced again
- ✓ To maintain the position of luxated teeth
- ✓ To stabilise alveolar fractures

A flexible core material such as thick fishing line, orthodontic arch wire or reinforced fibre can be enamel bonded to the injured and adjacent teeth to form a satisfactory splint.

In mature re-implanted teeth pulpectomy is indicated seven to ten days after the injury. In re-implanted immature teeth, pulpal revascularisation may occur. However, this is less likely with increased extra-oral periods. Revascularisation has been recorded in immature teeth, replanted up to three hours following injury. These teeth need to be monitored carefully (weekly) for the onset of root resorption or apical osteitis. These processes can proceed rapidly and so extirpation of the necrotic pulp and placement of a suitable medicament such as calcium hydroxide should be carried out immediately necrosis of the pulp is confirmed.

The tetanus immunisation status of accident patients should be established and if necessary a booster injection arranged. A course of antibiotics is recommended following re-implantation of avulsed teeth.

Luxated teeth should be repositioned and splinted. Teeth with root fractures should be repositioned where necessary and splinted. Endodontic treatment is not indicated at this early stage in the management of luxation injuries and root fractures. Conservative management only should be carried out and injured teeth monitored radiographically and with appropriate pulp tests for signs of pulpal necrosis. In the absence of signs or symptoms of pulp necrosis, no endodontic treatment should be initiated.

Teeth which have sustained crown fractures will need immediate treatment. Exposed dentine should be disinfected and sealed with composite resin or if available the tooth fragment can be rebonded.

Exposed pulps can be treated by pulp capping, partial (Cvek) pulpotomy, cervical pulpotomy or pulpectomy. Pulp vitality should be maintained wherever possible in teeth with incomplete root formation.

Where treatment is available soon after injury (less than twenty four hours) pulp capping can be carried out in both mature and immature teeth.

Partial pulpotomy (Cvek pulpotomy) is indicated in both immature and mature teeth where vital tissue is evident at the exposure site regardless of the size of the pulp exposure and the interval between the injury and treatment.

Where necrotic tissue is seen at the exposure site in an immature tooth, a deep or cervical pulpotomy is indicated.

Pulpectomy is necessary in mature teeth where necrotic tissue is evident at the fracture site or where extensive loss of tooth structure means restoration with a post will be necessary.

SUMMARY

The emergency treatment that is carried out following dental trauma can have a profound influence on the success of future treatment and the long term prognosis for injured dental tissues. Members of all levels of the dental and medical professions and members of the public who may be exposed to dental trauma should have a knowledge of appropriate dental first aid.