



## TREATMENT OF DAMAGED TEETH

Trauma to the face very often results in damage to the teeth and the soft tissue of lips, the gums and the hard tissues supporting the teeth (the jaw bone).

Tooth damage may involve fracture of the visible part of the tooth known as the “crown” of the tooth, or fracture of the “root” of the tooth that lies beneath the gum margin.

The treatment of tooth injuries depends on the extent of the injury to the tooth including:

- whether the fracture involves only the enamel,
- or both the enamel and dentine,
- or all three tooth structures including enamel, dentine and the pulp,
- or if a root fracture is present below the gum line.

The dentist must check for damage to a tooth by both a visual examination and using X-rays as soon as possible after the injury has been sustained to ensure no unseen root fracture is left undiagnosed and untreated. Late treatment of such a fracture is likely to result in loss of the tooth.

Sometimes teeth are not damaged themselves, but due to the heavy impact of the injury the tooth is moved within the bone.

- Sometimes a tooth may simply be loosened in the bony socket known as a **subluxation injury**,
- alternatively the tooth may be pushed deeper into the socket or partially removed from the socket. We refer to these as **intrusion or extrusion injuries**.
- A tooth may be completely lost from the socket known as an **avulsion** of the tooth.
- If the tooth remains attached to the bone supporting it and there has been a heavy impact on the tooth, it may move with the bone fragment as a result of a fracture of the bone. These horizontal movement injuries of the tooth attached to supporting bone are referred to as **Lateral Avulsion injuries**.

All these different degrees of injury have specific treatment indicated for them and it is extremely important to go directly to see a dentist for immediate assessment of the injury to give the tooth the best chance of healing and being retained. This is especially true for young children.

### **SUBLUXATION - tooth loosened in the socket:**

All loading of the tooth must be relieved. A watch and wait policy should be adopted. The tooth may firm up and suffer no long-term effects but sometimes such teeth discolour. This is a sign the pulp tissue within the root canal system has died and the darkening is due to the absorption of blood pigment into the dentine. Such teeth must be carefully assessed and are likely to require root canal therapy. In such cases a patient may be best referred to an Endodontist, a dentist who specialises in root canal therapy.

### **INTRUSIVE LUXATION - tooth intruded into the socket causing a crush injury at the root tip:**

Immediate repositioning is indicated and a rigid splint should be provided for 6 weeks as such injuries are usually accompanied by an alveolar fracture hence bone healing must be allowed to take place without any movement of the tooth or the bone fragments. Antibiotics are indicated but tetanus is not usually an issue.



Mature permanent teeth need to be treated by root canal therapy in all cases. Immature teeth with an open root tip can be observed and followed up and if the tooth discolours or if signs of infection are noted, appropriate root canal treatment should be started.

If the tooth cannot be pulled out of the socket back into normal position immediately, orthodontic repositioning must follow later. However over 50% of such teeth suffer root resorption following healing (where the root is eaten away). This requires the tooth to be removed.

Death of the pulp tissue occurs in nearly all mature teeth with closed root tips.

**EXTRUSIVE LUXATION - tooth is partly extruded from the socket remaining in the correct longitudinal axis:**

Immediate tooth repositioning is indicated pushing the tooth back into the socket to its fullest extent. Flexible splinting is indicated for 2-3 weeks. Antibiotics may be required but usually tetanus is not an issue. Follow up is indicated clinically and radiographically for 5 years.

The pulp tissue within the root canal dies in 65-100% of cases (depending of which research you read) and root resorption occurs in just under 10% of cases.

**AVULSION - Tooth completely dislodged from it's socket:**

Gently wash the tooth in normal saline or milk removing gross contaminants alone while avoiding rubbing the root surface as vital periodontal ligament cells will remain. Hold the tooth by the crown and never handle the roots. Replace the tooth back in the socket the right way round before the blood clots as any delay will mean that complete seating back into the socket will not be achieved.

If the tooth cannot be replaced for whatever reason, store the tooth in the patient's mouth in their saliva but avoiding biting the tooth as this will damage the periodontal ligament cells. If the patient is unwilling to place the tooth in their mouth or if the patient is a child who may swallow or inhale the tooth, place it in milk. Do not delay attending a dentist for professional treatment.

Once the tooth is returned to the socket, check that the tooth is correctly placed by gently closing the teeth together to make sure the tooth is not preventing correct closure.

Avulsed teeth must be rigidly splinted in place for 10 days ONLY then the splint must be removed.

When a tooth falls out, it may become infected by bacteria and this may lead to infection when the tooth is replaced. For this reason antibiotics should be provided. There is also the risk of Tetanus infection if the tooth has been on the ground and for this reason the dentist or doctor must consider the patient's tetanus immunisation status and determine if a booster is indicated.

If the dislodged tooth is a mature permanent tooth, it is necessary to start root canal therapy before day 10 while the tooth remains splinted in place. The root canal is dressed with calcium hydroxide or a root canal dressing material called Ledermix three times for periods of 3 months. Each time the tooth must then be cleaned out, dried internally and redressed. Finally the tooth is again cleaned out, dried and a permanent root filling may be placed into the root canal of the tooth.

Follow up X-rays should be taken of the tooth every year for the next 5 years and then every 2-5 years to check for any changes that may indicate the root is failing.

The chance of the pulp tissue within the root canal dying if not treated in this way is almost 100%.



Even after correct treatment, the root of the tooth may be eaten away, a process we refer to as root resorption. This is common after such an injury and affects between 74-96% of avulsed teeth (many factors influence this outcome including the time out of mouth, storage medium used, root handling)

**LATERAL AVULSION - tooth moves in a horizontal direction - often the crown moves back while the root tip move forward damaging the bone over the front of the root):**

In this case the tooth may appear to have moved in the jaw. Usually a fall results in impact on the crown of the tooth that appears to move backwards but the roots of the tooth move forward as the tooth rotates about the centre of the root. This forward movement of the root breaks the bone over the front of the root and can result in several small sharp bony fragments existing over a forward placed root and the gum can either remain in tact or it may be lacerated and torn.

One can very gently feel with a finger over the root of the tooth and an abnormal shape will be felt. There may even be a feeling of small sharp fragments of bone present under the gum covering. If lacerations are seen in the gum, then these must be closed.

Usually these small bony fragments remain attached to the periosteum surrounding the bone. This is a thin tissue with a rich blood supply that nourishes the bone and keeps it alive. As a result the bone tends to survive such injuries and repairs like a normal bone fracture as long as the fragments are stabilised.

The aim of initial dental emergency treatment must be to gently replace the bone fragments into their former positions and at the same time the forward placed root should be guided back into its correct position but this always required an anaesthetic (either local or general). Some force is usually necessary by holding the crown of the tooth and manipulating the tooth by rotating it back into position. After repositioning, it is important to prevent any movement of the bone fragments or the tooth during healing. Immediate attendance at a dentist to receive local anaesthetic is therefore essential to allow this repositioning procedure.

A splint is then required, and in this case the bone takes 4-6 weeks to heal and for reparative bone to form around the fractures.

Antibiotics are best given to prevent any post-trauma infection. Unless the fracture is associated with lacerations and contamination of the wounds, it is unlikely that Tetanus will be an issue.

Root canal therapy is not indicated unless the tooth discolours or signs or symptoms of infection arise.

Regular radiographic and clinical review is indicated for 5 years.

The risk of the pulp tissue within the root canal dying is around 60% while root resorption has been reported in under 10% of such teeth.



## QUICK-GUIDE FOLLOWING TOOTH INJURY

*These guidelines have been proposed by the Australian Society of Endodontology.*

Traumatized teeth can often be saved by acting fast and doing the right thing. The tooth needs to be located, cleaned and replaced in the tooth socket if it has been knocked out. For the best chance of success the tooth must be replaced within 30 minutes. Attendance at any dentist surgery is also critically important and should take place immediately after the injury ideally.

### WHAT YOU SHOULD DO

Remain calm. Find the tooth. Handle the tooth only by the crown of the tooth and try not to touch the root of the tooth. **If the tooth is clean**, replace it in the tooth socket immediately and gently hold it in place and then immediately go and see a dentist, remember time is critical. **If the tooth is dirty**, clean it as soon as possible ideally with milk. Then have the patient gently suck the tooth free of milk and replace the tooth in the socket. If milk is not available, briefly rinse in cold water and then replace in socket. Time is critical.

If you are unable to replace the tooth in its socket, keep the tooth moist either submerged in milk or wrapped in Glad Wrap or ask the patient to keep the tooth in their cheek in saliva. DO NOT store the tooth in water or detergent. Seek immediate dental treatment. **If the tooth appears to be broken**, Replace tooth in its socket, or place in milk or Glad Wrap. Immediately seek dental treatment.

### WHAT YOU MUST NOT DO

Do not hold the tooth by the root surface, do not scrape the root surface to clean it, do not let the tooth dry out, do not rinse in water for more than a few seconds and do not delay seeking dental treatment. Delay will lead to failure of the tooth to heal back in its socket.