

## A kick in the teeth?

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Dental injury is a distressing event, often causing psychological as well as physical problems, since it normally involves the highly visible front teeth. And it is particularly common among athletes, with sports-related dental injuries said to account for nearly 40% of all dental injuries (1).

However, even this statistic probably underestimates the true prevalence of sport-related dental injury, which is often not reported (2), tends to occur outside surgery hours (3) and often occurs with other, more serious injuries, such as concussion, cuts to the scalp and face and fracture of the jaw or other facial bones (4-9).

The risk of dental injury is particularly high with collision and contact sports. Sports involving high speeds and high impact (*alpine skiing, boxing and martial arts*) tend to result in more facial bone fractures, while those with low speeds and low impact (*basketball, rugby and soccer*) are more likely to be associated with dental injuries (10).

As the number of contact sport participants increase, traumatic accidents resulting in dental injuries also rise (11). And the bad news is that dental injury can still happen to athletes who are behaving responsibly by wearing the recommended mouthguards (12, 13).

Equally worrying is the fact that, although dental injury has been recognised as an occupational hazard for sportsmen and women for many years, its management 'on the field' remains poor (14), due to the lack of appropriate training offered to teachers, first-aid providers and other sport management personnel, and the inadequacy of existing first-aid kits.

## Managing dental injury

As dental injury is usually part of a multi-injury presentation it is often not noticed or ignored at the time of presentation. But this type of injury is not minor and requires prompt treatment if it is not to lead to further problems.

It is important that anyone with injured teeth should be seen by a dentist as soon as possible. While locating dental assistance much can be done at the scene of the accident to provide immediate care reducing the risk of long-term complications.

Athletes with any injury to the head, face or mouth should not return to the field until the full extent of the damage has been determined. The head, face and mouth have a plentiful blood supply resulting in copious bleeding after injury. - Concerns about exposure to blood-borne infections now prohibit athletes from remaining on the sports field with an uncontrolled bleeding wound or blood-stained clothing.

Although injuries to lips and cheeks tend to bleed profusely, they also heal quickly due to the excellent blood supply to the face. Such injuries however, are often linked with chipped, fractured or loosened teeth, which also need treatment as suggested below:

### *Chipped and fractured teeth*

- Cover the exposed area of tooth, which may be very sensitive to temperature change or the movement of air across the tooth surface;
- Take care to find and collect any chipped off tooth fragments otherwise a chest X-ray may be needed to exclude the possibility of fragments being lodged in the lungs or windpipe;
- Fragments can be reattached temporarily but securely, using the splinting material provided in *Dentist in a Box*, to cover the exposed area of tooth. If this is not possible, be sure to keep them to pass on to the dentist;
- Chipped back teeth can be managed using the no-mix temporary filling material provided in *Dentist in a Box*.

### *Dislodged / avulsed teeth.*

A permanent tooth which has been completely knocked out of the mouth requires prompt and effective management - and should ideally be reinserted into its socket in the mouth - Detailed advice is shown below (15, 16).

Table 1: how to manage dislodged teeth

<p><b>Don't:</b></p> <ol style="list-style-type: none"> <li>1. Panic</li> <li>2. Disturb the yellow part (root) of the tooth</li> </ol> <p><b>And never rinse the tooth in Water!</b></p>	<p><b>Do:</b></p> <ol style="list-style-type: none"> <li>1. Remain calm</li> <li>2. Wear gloves to protect yourself from blood-borne infection</li> <li>3. Find the tooth as quickly as possible and collect and save all the fragments to show the dentist</li> <li>4. Handle the tooth only by the white part (crown) at all times</li> <li>5. Immediately replace tooth in its socket using the other teeth as guides</li> <li>6. Immobilise any loosened teeth using splinting material from <i>Dentist in a Box</i></li> <li>7. Seek dental help as soon as possible</li> </ol>
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If you cannot re-insert the tooth immediately into its socket transport the patient at once to a dentist with the tooth completely submerged in isotonic saline (from *Dentist in a Box*).

For best results, care should be provided within 20 minutes of injury.  
*(The dislodged permanent tooth should be re-inserted into the socket from where it came within 20 minutes of injury, this can be done by anyone provided gloves are worn to prevent blood-borne infection).*

Research has shown that immediate care after injury offers best chance (up to 97%) of tooth survival. The chances of success are reduced to 84% five minutes after injury, 8-66% 5-20 minutes post-injury and 3-21% after more than 20 minutes. Clearly minimal delay between injury and the provision of primary care is essential for the best long-term results .

Immediate care after dental injury doesn't just improve the chances of tooth survival reducing post-injury complications and thus the overall costs of dental treatment.

#### *Loosened teeth*

These are teeth that move excessively but are still in their correct position in the mouth. Appropriate action is to:

- Hold the affected tooth in place;
- Splint the mobile tooth to a sound neighbouring tooth. Stiff aluminium foil is available but difficult to use. The splinting material supplied in *Dentist in a Box* is easier to use. *(See table 2 below, for details about this and other dental emergency kits);*
- Seek dental assistance.

Table 2: Dental emergency kits compared

	<b>Dentist In A Box</b>	<b>Dentanurse</b>	<b>Save A Tooth</b>
Website	dentistinabox.com.au	<a href="http://dentanurse.com">dentanurse.com</a>	save-a-tooth.com
Instructions provided	Yes	Yes	Yes
Replace lost filling(s)	Yes	Yes	No
Material requires mixing before use	No	Yes	N/A
Storage for knocked out teeth	Yes	No	Yes
Can be used to splint loosened teeth	Yes	No	No
Country of origin	Australia	UK	USA.

#### *Concussion*

This is often associated with dental injury, and a recent study suggests that when dental injury occurs concussion should be suspected, and *vice versa* (9).

## Long-term problems

The lifetime maintenance cost for dental injury was estimated by a National US Youth Task Force in 1992 at US\$10,000-15,000 per injured tooth, including initial treatment, further treatment of complications, provision or replacement of crowns and review visits until the tooth was lost.

Often the full extent of damage to the teeth and surrounding area after injury is not immediately apparent. Restorative care for dental traumatic injury may be lengthy, complicated, costly and extensive(17), and often undertaken in several stages. Treatment is not always successful. The affected teeth may be lost despite treatment due to persistent infection associated with the injured tooth/teeth caused by any of the reasons below.

Signs and symptoms suggesting a need for further investigation and possible treatment include any of the following:

- swollen face;
- swollen gum around the teeth;
- extreme sensitivity of the teeth to temperature;
- a pimple on the gum, giving rise to occasional discharge. (The pimple may disappear then re-appear again after a time);
- change (dulling/darkening) of tooth colour;.
- pain on chewing and/or biting;
- Painful or restricted movement of the jaw.

Such symptoms may be caused by:

- cracked/split **tooth crown**;
- cracked/split **tooth root**;
- damage to the nerve of the tooth;
- **temporomandibular joint** injury;
- fractured jaw or cheek.

If the cause of the infection cannot be eliminated the bony support around the tooth root in the jaw is eroded, loosening the affected tooth, and possibly surrounding teeth. When this occurs tooth loss is inevitable. If the tooth root has split the tooth may not be retained. These problems may not be apparent initially but could be detected by subsequent radiographs as part of regular periodic review for up to five years as recommended by International Association of Dental Traumatology.

## Reducing the risks

Missing front teeth are a highly visible deformity, which may in some cases be the only legacy of a sporting career. Schools and sporting organisations acknowledge the devastating impact of dental injury and make efforts to reduce the risk by encouraging the use of mouthguards.

However, for these to be effective, they must be worn regularly. And the problem is that there are a number different types of devices to choose from claiming to provide adequate protection to teeth, with variable degrees of comfort and quality of fit, which has led to widespread confusion among players (12,18-23).

Since younger players tend to take their lead on such matters from elite and other more experienced athletes, the fact that some of these don't wear mouthguards has a predictably discouraging effect (2).

So what makes for an acceptable mouthguard? The following factors are key:

- It should be comfortable, well-fitting and not prone to dislodging on impact;
- It should provide adequate thickness of material (4mm) over vulnerable areas to reduce impact forces(24);
- When biting lightly the on the guard, large areas of its biting surface should be in contact with the teeth in the opposing jaw, so minimising the risk of jaw fracture;
- Only a *custom-fitted mouthguard* can accommodate each individual's unique arrangement and number of teeth while ensuring adequate thickness of material to protect vulnerable areas.

## Mouthguard use and care

- Don't share your mouthguard. This is a close-fitting appliance designed to be worn only by its owner;

- Don't store the mouthguard in places where it may be subject to excessive heat build-up (eg your car) which may lead to distortion;
- During use, remove the mouthguard after each quarter/half of play, and rinse it and your mouth with water before re-inserting. At the end of play, rinse your mouth with water, wash the mouthguard with soap and cold or warm (never hot) water, then rinse with cold water;
- Store the mouthguard in its container when not in use. This should have ventilation holes that allow the guard to dry and encourage air circulation, preventing unpleasant odours;
- Before use, check the dry mouthguard in good light for any visible tears, particularly where the material is thin or worn. Identify any rough areas that may indicate splits or cracks by running your finger along the non-fitting surface of the guard that comes into contact with the opposing teeth. This surface must also be checked for damage following any heavy blow to the mouth or jaw.

Remember that no mouthguard will last forever. With use, the biting surface of any mouthguard may flatten, wear or become dangerously thin over the biting edges of the front teeth, allowing the player to bite through the mouthguard during use.

Damaged or worn mouthguards provide no protection other than a (false) sense of security, so be sure to get yours checked by a dentist before each season of play and at any other time if you have cause for concern.

*It's easier and cheaper to replace a mouthguard than to replace a lost tooth.*

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