



"Seven Deadly Sins" in Facial Trauma - Number Two, The Teeth. Some Common Causes of Concerns, Complaint and Catastrophe and How to (Hopefully) Avoid Them.

Mike Perry, FRCS, FDS, BSc

Consultant Oral and Maxillofacial Surgeon and clinical lead in Maxillofacial trauma, London

***Disclaimer** - This review is not an extensive evidenced based review of the literature. It is based on the past 20 years experience I have gained in assessing and managing facial injuries. Its principles have served me well (so far). Hopefully it will help those readers who see these injuries on an infrequent basis.*

The Teeth, Mouth and Lips.

Most dental injuries are managed by the patient's own dentist. So when patients attend with these injuries they should be advised to see them as soon as possible. Nevertheless non specialists may be called upon to make an initial assessment, particularly if other injuries are thought to be present. Whilst broken teeth need to be seen by a dentist, the broken bones they may be sitting in, also need to be seen by a maxillofacial surgeon. This can sometimes be overlooked if its not obvious.

It is therefore important that clinicians have a systematic technique to ensure that all the relevant bones, teeth and associated 'soft tissues' are examined. These include not just the teeth, but the facial bones, and jaw joints - temporomandibular joints (TMJs).

From an emergency department perspective examination is usually relatively straightforward and for most patients a mirror, light, and tongue depressor will be all that is required for an initial look.

For the non specialist its helpful to have a system. Starting at one place (eg inside the lips) and slowly move around the oral cavity, clockwise or anticlockwise, gently stretching the lining mucosa to look at its surface will hopefully visualise any injuries. Hand held dental mirrors, one in each hand, make excellent retractors. Even when there are injuries present, patients tolerate them well. Mirrors can also be used to reflect light into any dark recesses. As the clinician works their way slowly to the back of the mouth, they must be careful not to induce gagging. The lips, tongue, cheeks, floor of mouth, gums, teeth, palate and tonsils should all be looked at. Although this seems a lot, with practice a thorough examination is possible within a very short period of time. A useful trick is to ask the patient to 'lick your teeth' and note any loose, broken or chipped teeth / crowns. This seems to be quite a sensitive technique to pick up injuries. We all know our own mouths quite well, it seems.

1. The teeth

Bleeding around the necks of the teeth following an injury suggests a problem. These can be checked for tenderness by lightly tapping each tooth in turn. 'Tenderness to percussion' usually indicates a problem with the tooth, such as a fracture or dental abscess. A wobbly tooth is clearly abnormal, but this may be longstanding. These assessments need to be done carefully. Loose fillings and crowns may become dislodged and, although they would probably have fallen off soon anyway, some patients may consider this a reason to seek legal advice. If a crown, filling or tooth is loose it should be immediately pointed out to the patient (and documented).

Teeth in which the pulp chamber (which carries the tooth's nerve and blood supply) is dead or inflamed usually require complex treatment by the patient's dentist. To determine whether a tooth is alive, dead or 'pulpitic' (inflamed) a number of special test can be done. These tend not to be done by non specialist, although Cold Testing is easy to do - a freezing cold stimulus is applied to the tooth in question. A healthy tooth should react quickly, with the cold sensation disappearing soon after. A non vital ('dead') tooth will not react at all, whereas a tooth with an inflamed pulp (pulpitis) will often be extremely sensitive, with the pain lingering for several minutes before subsiding into a dull throbbing ache. Non vital teeth do not necessarily need to be removed. However, if left untreated the pigments in the dead pulp chamber can slowly leak out and stain the crown over the following weeks or months. That is why some teeth go dark. This can be very difficult to treat. Injured teeth therefore need close follow up by the dentist, in order to detect or prevent this happening. Once established it can be time consuming and costly to treat for the patient, who may then seek compensation.

Teeth that have been knocked out (avulsed) or are very loose require immediate attention. Time is of the essence. Generally speaking, a tooth that has been knocked out, should ideally be

replaced within 60 mins. Simply sending the patient off to their nearest maxillofacial unit or their own dentist (which may add considerable delays), dramatically reduces the prognosis. However, if transfers are unavoidable the tooth / teeth need to be carefully stored in an appropriate medium. Failure to use a suitable storage medium (such as Hartmann's solution, milk, or the patient's own cheek pouch), also results in a less successful outcome. A handkerchief is not an appropriate storage medium. The tooth should never be handled by the root, and should not be heavily scrubbed, brushed, or allowed to dry out.

A potential problem is the uncooperative patient (often a child, or special needs patient) who requires a general anaesthetic to replace a tooth. Current guidelines and / or a lack of fasting may result in the refusal of the provision of a general anaesthetic late at night - essentially for a non 'life or limb threatening' condition. This will inevitably lead to a significant delay in treatment. It is therefore important that clinicians warn the patient that there may be delays in replacing the tooth. Referring clinicians should never tell patients (or their parents) they will be treated on arrival - the patient (plus relative / carer) may then attend with expectations of immediate care and this may not always be possible.

Only permanent (adult) teeth are suitable for reimplantation. Avulsed deciduous (baby) teeth are not reimplanted due to the risk of damage to the unerupted succeeding adult tooth bud.

2. Tooth Damage from General Anaesthetic

Tooth damage can occur during a general anaesthetic. It is more likely if the patient has crowns, decay, or periodontal (gum) disease. Patients should be warned of this risk during their anaesthetic consultation. If a tooth has been fractured during intubation, the broken segment should be retained. The patient will then usually require a dental assessment to see whether the broken part can be reattached. However it is not always possible to save the tooth, especially if it was grossly decayed, or already loose from pre-existing disease.

3. Lip and tongue lacerations

Lip lacerations are a common following facial trauma and typically present following an assault, or lip-biting following a fall, seizure or after a dental local anaesthetic. The lips have an abundant blood supply and therefore may present with seemingly dramatic bleeding and swelling. This often looks more severe than it really is. It is important to ascertain whether there is a likelihood of a foreign body embedded in the wound, such as tooth fragments, gravel, or glass.

Both the internal and external surfaces of the lips should be inspected as injuries may be 'through and through'. Simply stitching the skin can result in unsightly scarring and an unhappy patient. If there are missing fragments of the teeth, which cannot be accounted for, an X-ray of the lip should be requested. If negative then the clinician needs to consider imaging of the chest and neck. Important findings to document include;

1. Does the laceration cross the vermilion border (red / white junction of the lip)? This may require specialist referral for suturing. Poor alignment here can result in an obvious step along the border.
2. Is the laceration through and through? This requires a layered closure.
3. Wound depth. Lacerations into muscle have a tendency to gape, and should be closed with layered sutures. Glue and steri-strips are not appropriate for deep wounds.
4. Is the wound clean or dirty? This will dictate whether extensive cleaning is required and whether antibiotics and tetanus prophylaxis should be given.
5. Is there any tissue loss? If so, a referral may be prudent.

Most lip lacerations can be sutured closed under local anaesthetic. However if the patient is uncooperative, sedation or a short general anaesthetic may be necessary, with the same risks of delay as previously mentioned. Whilst adhesive tapes ('steri- strips') and glue are commonly used in some lacerations, they have only a limited application in lip lacerations, and will not adequately close a gaping wound. Glue is not suitable for wounds within the mouth. Sutures are therefore required in most cases.

Tongue lacerations are common in children and adults following a seizure. Generally speaking they often appear worse than they are. This is in part because the patient has to 'stick out' their tongue in order to see the injury. That in itself causes the wound to gape. When placed back in the mouth the edges of the wound then often sit together quite nicely. The mouth has quite an amazing ability to heal. This is in part due to its rich blood supply and the production of 'growth factors' which encourage healing - this is said to be the reason why animals lick their wounds. Nevertheless some wounds need suturing, often under a general anaesthetic, depending on where it is and the level of patient cooperation.

Medico-legal issues that can arise

- Dental treatment can be expensive and understandably some patients may be annoyed that they are faced with a sizeable fee (and the inconvenience of multiple visits to their dentist) to repair or replace a damaged filling / crown / tooth. This may be compounded if (in the patient's opinion) the loss was through no fault of their own, such as an assault or accident. Consequently they may seek retribution or compensation.
- Delays in diagnosis and treatment may reduce the success of some treatments aimed at salvaging the tooth (such as replantation, or root therapy) or maintaining its cosmetic appearance. If the tooth is ultimately lost the patient may feel the practitioner(s) involved in their care have failed in their duty by not diagnosing the problem sooner.
- Such arguments need to be balanced against the likelihood that the tooth in question had a good prognosis before the injury occurred. Pre-existing dental disease will predispose teeth to injury and loss. Patients may be unaware of this and possibly see this as an 'excuse' for the loss of their tooth.
- Delays in general anaesthetic administration will delay treatment, which in turn may

reduce prognosis. Patients (or their parents) may attend with very high expectations, which circumstances may not allow to be met. These expectations can sometimes be inadvertently fuelled by referring practitioners.

- Clinicians must be careful with penetrating soft palate injuries in children. The typical history is a fall while running with a pencil or pen in the mouth. Although the palatal wound itself is usually small, carotid injury and delayed onset of stroke have been reported.