

22 EXPEDITION DENTISTRY

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PREPARING FOR A TRIP

High on Everest during 1994 a UK doctor, thoroughly prepared in all other respects for his summit bid, decided enough was enough – his continual toothache was overwhelming his chance of a lifetime. He descended through base camp, ran 26 miles to Namche Bazaar where he was able to be treated by one of the Sherpa dental therapists in the only effective remote dental facility in Nepal. Subsequently he was fortunate to progress through all the camps and stand on the summit of Everest. Pre-monsoon in 1999, Russian, Slovenian, American, Korean and Nepalese climbers with summit chances on Lhotse Shar, Everest, Nuptse and Pumori all presented for difficult emergency dental treatment at Namche Bazaar. All these climbers had dental conditions that could have been prevented had they considered treatment before leaving their home country.

*Prevention is better than cure, and much better than a ruined trip
A dental exam, if possible including panoramic X-rays, should be carried out 3 months
prior to departure. Treatment waiting lists and complex therapies may take a
surprisingly long time to achieve*

RISK AWARENESS

The remote traveller will find dentists few and far between and dental problems surprisingly frequent. If in desperation you feel compelled to seek treatment, you should be aware that where standards of cross-infection control are not assured, the risk of transfer of HIV and hepatitis or enteroviruses may be unacceptably high. The dental exam prior to departure is of the utmost importance. Almost all dental problems are predictable, especially when supported by comprehensive X-rays. It would be wise to accept professional advice that even mildly suspicious observations should be electively treated. A root treatment may occasionally take some months to settle.

Third molar (wisdom teeth) problems are relatively common in young adults. Waiting lists for surgical extraction under general anaesthetic can be excessively long in the UK (9–18 months). In remote areas, when personal hygiene has slipped for a week or two, bacterial infections of the gum structure around the part-erupted lower third molars can be debilitating. Treatment involves much more detailed oral hygiene after all meals, hot concentrated salt-water mouthwashing and broad-spectrum antibiotics capable of dealing with anaerobic bacteria.

As *dental pain* often results from a pressurised swelling in a constricted space normally full of nervous tissue, it can be controlled for weeks with a combination of antibiotics and suitable painkillers (non-steroidal anti-inflammatories, e.g. ibuprofen). This will preserve the option of seeking further treatment later.

The expedition medical officer will need to decide during the planning phase, pre-expedition, just what dental treatment is to be offered. There is a choice between using drugs only (prescription dentistry) and being prepared to attempt emergency extractions. The black arts of successful extraction technique and local anaesthetic placement take some decades to learn!

The expedition medical officer may be called upon to treat the following:

- Minor tooth and filling fractures
- Major tooth fractures from trauma
- Soft-tissue infections associated with wisdom teeth (third molars)
- Acute and transient dental pulpal pain in response to stimulation by hot, cold and sugary stimuli
- Chronic dental pulp pain which is often spontaneous and very protracted
- Mandibular and maxillary bone fractures
- Avulsed teeth.

Prior to leaving home, a decision should be made by the medical officer to offer treatment based on:

- Drugs only – be prepared for cross-border import of drugs
- Instrumentation – requires equipment, materials, training and costs
- Evacuation and referral – depends on local treatment availability, insurance and cost

In preparation the expedition medical officer should consider whether it would be possible to carry out some of the following skills to any advantage over the option of palliative treatment using pharmaceuticals.

- Do I have sufficient expertise to cope?

- Can I guarantee successful clinical outcomes?
- Does my knowledge allow a realistic differential diagnosis?
- Equipment – have I practised the manipulative surgical skills including working in a mirror image?
- Materials – have I practised their critical mixing and setting times?
- Will cross-infection control be adequate?
- Do I have the resources to treat postoperative problems?

In concluding risk awareness, the importance of travel, illness and evacuation insurance should be considered. It would be unusual for predictable dental problems to be covered. Health insurance generally does not cover dental problems adequately as first-world dental risks and costs are high. The replacement of a tooth lost when on expedition, by a bridge or implant, will be very costly and will not be covered by insurance, or state-funded dental schemes. Private dental capitation schemes will cover most costs and for that reason are particularly worth considering. While advising fellow travellers to examine the small print of any travel insurance, the “expedition dentists” should consult their indemnity insurers who will be capable of offering advice on medico-legal responsibilities concerning appropriate “duty of care”.

Expedition doctors would be well advised to consider dental treatment by prescription only, unless involved in a long expedition in extremely remote circumstances, such as polar regions.

DENTAL PROBLEMS AND THEIR TREATMENT

Lost fillings and broken teeth

- *Symptoms* – vary. Nil to transient reaction to hot, cold and sweet stimuli, sometimes leading to mild short-lasting toothache. Tongue getting “cut to ribbons”.
- *Treatment* – press a small ball of temporary filling material into as dry a cavity as possible (to dry the cavity consider using cotton wool twisted on to the end of a match).
- *Requirements* – gloves, temporary filling material, mirror and flat-bladed plugger, cotton-wool rolls for saliva control.
- *Problems* – mixing filling material, working in mirror, saliva control, having to repeat the procedure.
- *Tip 1* – if it causes no symptoms leave alone.
- *Tip 2* – divers should beware hyperbaric pressure changes under damaged fillings. These should be thoroughly sealed with temporary filling material.

Chronic toothache

- *Symptoms* – continual tormenting toothache, soft-tissue swelling – which is often large – sleepless, distracted and irritable.
- *Treatment* – lance and drain any large swellings
 - antibiotics and non-steroidal anti-inflammatory drugs (NSAIDs), with initial high dosage
 - extraction if no adequate resolution of symptoms.
- *Requirements* – drugs, local anaesthetic, syringe, forceps, knowledge and practice of both local anaesthetic application and extraction technique.
- *Tip* – avoid extraction if possible.

Loose crowns and bridges

- *Symptoms* – obviously loose or avulsed crown or bridge.
- *Treatment* – clean and thoroughly dry both prosthesis and anchoring teeth. Practise reseating crown then re-cement using proprietary cement.
- *Requirements* – cotton wool for moisture control, cement.
- *Tip* – Supaglu is a cyano-acrylic. Do not use in the mouth in any circumstances.

Lower third molar and associated gum problems

- *Symptoms* – swelling at angle of mandible, trismus, earache.
- *Treatment 1* – antibiotics for anaerobic infection, NSAIDs, hot salt-water mouthwashes, rigorously improved oral hygiene and/or extraction.
- *Treatment 2* – The same treatment rationale applies to general gum problems, even if uncomfortable to apply and sustain.
- *Requirements* – drugs, knowledge of placement of inferior dental block, local anaesthetic, aspirating syringe, forceps and elevators, and how to use them.
- *Tip* – lower third molars are often impacted and among the most difficult of extractions without a surgical approach. Avoid extraction.

Traumatically damaged teeth

- *Examination* – approach is decided by the severity of the enamel and dentine fracture and whether pulpal blood is visible in the fracture area.
- *Symptoms* – acute reaction to hot, cold and sweet stimuli through fractured dentine tubules. Hypersensitive to touch, sometimes local anaesthetic not effective.
- *Treatment* – if no blood, attempt to seal and cover exposed dentine with

temporary filling (glass ionomer material). If pulpal blood present, attempt to seal with calcium hydroxide paste and glass ionomer temporary filling. Give broad-spectrum antibiotics and NSAIDs; extract if acute pulpal pain becomes uncontrollable.

- *Requirements* – drugs, calcium hydroxide lining, glass ionomer temporary filling, local anaesthetic, syringe, forceps.
- *Tip 1* – hot and cold hyper-reaction fades considerably in a few days.
- *Tip 2* – pulpal blood in a remote situation means almost inevitable nerve necrosis and eventual root treatment. Counsel patient of cost of tooth replacement before extraction. Implants and/or bridge work is very expensive and not covered by most insurance.

Avulsed teeth

- *Symptoms* – patient presents with whole tooth and root knocked out.
- *Treatment* – if kept in warm isotonic solution (saliva is best) the tooth can be replanted into the socket after the evacuation of any solid blood clot.
- *Requirements* – ability to splint into place. This will be almost impossible in remote locations. Splint using filaments of copper electrical wire.
- *Tip 1* – counsel on cost of prosthetic replacement but advise that success of replantation is beyond reasonable expectation, and unsplinted teeth have no hope.
- *Tip 2* – Supaglu is a cyano-acrylic. Do not use in the mouth in any circumstances.

Fractures to mandible and maxilla

- *Symptoms* of fractured mandible – inability to eat, independent movement of different groups of lower teeth, typically history of trauma to chin, not excessively painful.
- *Symptoms* of fractured maxilla – difficulty in eating, depressed or spongy zygomatic arch, not excessively painful.
- *Treatment* – prioritise and treat all wounds
 - consider extent of head injuries
 - protect airway
 - immobilise fracture by well-padded external vertical bandaging, if possible with upper and lower teeth in occlusion
 - pain relief, high-calorie soft-food diet
 - immediate accompanied evacuation to specialist care.

DENTAL EQUIPMENT AND DRUGS FOR REMOTE DENTISTRY

Aim to keep the weight of your dental first aid kit to less than 1.5kg

Contact: The Dental Directory, 6 Perry Way, Witham, Essex CM8 3SX

Tel. +44 800 585586

Online purchasing: www.dental-directory.co.uk

TABLE 22.1 MINIMAL DENTAL EQUIPMENT

Sterile surgical gloves
Cotton-wool rolls
Sealed alcohol swabs
Sachets of instrument sterilisation solution
2 dental mirrors
1 sickle probe
1 pair locking tweezers
1 flat-bladed filling plugger
1 spatula to mix filling material/glazed paper pad
1 pair Spencer Wells fine suturing forceps
Black suture silk on fine semi-lunar needle
1 pair fine-curved surgical scissors
Disposable scalpels
Extraction forceps of your choice – 4 forceps would be the minimum
Aspirating local anaesthetic (LA) syringe, gauge 30 needles (3cm), LA cartridges

SUMMARY

1. Almost all routine dental problems can be prevented by a timely comprehensive dental inspection and elective treatment.
2. Dental pain will compromise and may ruin an expedition.
3. Expedition dental symptoms can be palliatively treated by antibiotics and non-steriodal anti-inflammatory drugs such as ibuprofen.
4. Hyperbaric pressure changes under damaged fillings will cause severe dental pain, whereas hypobaric changes at altitude will not (although prolonged exposure to extreme cold can cause pain).
5. A decision by the medical officer pre-expedition needs to be made as to whether to include extraction as a treatment option, bearing in mind the likelihood of oral trauma (rockfall, avalanche, bar-room brawls, etc!).
6. Most proprietary “emergency” dental kits are not worth having.
7. General travel/health insurance covers few dental situations.

8. Duty of care and responsibilities need to be discussed with your indemnity insurers.

TABLE 22.2 DENTAL PHARMACEUTICALS AND MATERIALS

Antibiotics

Metronidazole 200mg for anaerobic gum infections: one four times a day for 4 days

Augmentin 500mg for all dental swellings and pain: one three times a day for 5–7

days

Pain relief

Ibuprofen 400mg for all dental pain of routine origin (up to three times a day)

Mouthwashing

Sachets of hydrogen peroxide mouthwash, table salt

Temporary filling materials

Dycal – a two-liquid opaque calcium hydroxide lining to place under deep temporary fillings or over traumatically exposed live pulpal tissue

Cavit – a soft, easy-to-use, calming, temporary filling material

Glass ionomer filling material – a permanent filling material made up by mixing powder and water in a careful ratio. Normally contains fluoride. Can also be used in a thin preparation to re-cement crown