

Lip-biting in Patients with Profound Neuro-disability

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Abstract: Profound neuro-disability due to severe brain damage affects approximately 1200 people per year in the UK. Approximately half of these patients exhibit exaggerated or abnormal oral reflexes. Biting, bruxism and ruminating movements may result in dental or soft tissue trauma, with severe lip or tongue lacerations. This paper describes 10 patients referred to the dental department at the Royal Hospital for Neuro-disability with lip bites and/or severe bruxism, during a 12-month period. Management options include: monitoring the lesion; smoothing teeth; providing a bite raising appliance; or extracting teeth. This paper discusses the difficulty in management of lip trauma in this group of patients and emphasizes the importance of an interdisciplinary approach.

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Clinical Relevance: Aspects of the management of lip trauma in patients with neuro-disability are relevant to children and adults with other medical conditions. This includes people with autism, learning disability, severe epilepsy or other conditions where there may be self injurious behaviour, most of whom will be cared for at home or within the wider community.

Lip-biting has been reported in different groups of patients; including those with developmental disability, cerebral palsy,^{1,2} epilepsy, autism and Lesch-Nyhan syndrome (a defect in purine metabolism, usually associated with severe learning disability, spastic cerebral palsy and aggressive self mutilating behaviour).^{1,3,4} The cause of the lip and tongue trauma, as with other self injurious behaviour, may include organic or behavioural factors.⁵ In coma patients, or those lacking cerebral function, lip injury has been described as involuntary behaviour.^{2,6,7,8} In these cases, management of the acute phase requires treatment for only a few hours or days.

However, in patients with profound neuro-disability a much longer-term management is required.

PROFILE OF PATIENTS AND INJURIES

This profile describes 10 patients referred to the dental department at the Royal Hospital for Neuro-disability with severe lip trauma or bruxism. There were seven men, with ages ranging from 21–58 years, and three women, with ages ranging from 43–63 years. The brain injuries included six traumatic injuries (four road traffic accidents, an industrial accident and a severe fall). There were two vascular injuries (one cerebral and one subarachnoid haemorrhage) and two anoxic injuries (one secondary to hypoglycaemia and one due to illicit drug overdose). The patients were either in a persistent vegetative or minimally conscious state and were admitted to the hospital for diagnosis and rehabilitation.

Six cases involved newly occurring traumatic lesions and four were chronic injuries with recurrent bites.

The clinical presentation of these traumatic lesions showed marked inflammation with bleeding or sloughing. In recurrent bites the scar tissue was split, with the surrounding tissue crushed and in two cases infected with *Candida*. Seven cases had more than one lesion present. In 'one-off' bites the lesions were discrete, although often deep, and had usually occurred during a specific event such as tracheostomy-suctioning or an epileptic seizure (Figure 1).

The six patients with marked bite reflexes all had lower lips which were tightly and constantly held in the bitten position. In three cases bruxism was also observed. Nine patients showed facial hypersensitivity, with reactions ranging from withdrawing or lowering the head to profound distress on any attempt to touch their face.

These patients were referred to the dental department because the ward staff experienced specific difficulties in providing daily oral care. For example, the patients would bite the lip as the mouth and face were touched. In two cases, the reason for referral was the noise created by bruxism which caused the families and ward staff distress.

Examination and assessment can be extremely difficult owing to oral clenching and bite reflexes. Amongst the cases reported, three patients required Diazepam or Midazolam sedation (administered rectally or intramuscularly) to facilitate examination. The timing of oral examinations was important and needed to be tailored to the individual. Some patients were more easily examined in bed before being roused for

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Figure 1. Trauma caused by lip biting.

the day, whereas others were more easily examined when they were seated in a chair with good head support.

MANAGEMENT OPTIONS

Various methods of management of lip trauma have been suggested, depending on the severity, frequency and cause of the injury. They include medication, behavioural techniques, use of oral appliances or dental extractions.⁵ Medical management may be appropriate where there is a causal link between the injuries and a psychiatric factor. Behavioural management techniques for rewarding and, thus, reinforcing non injurious behaviour and discouraging injurious behaviour may modify some habits.^{5,7} Medication and behavioural therapy may be combined in some cases,^{1,5} but this technique is of little value in patients with organic injuries.

Various oral appliances have been described as a means of preventing further trauma and allowing healing of the lesion.^{1,2,6,7,8,9} Appliances which have been employed to prevent and treat lip-biting include cemented upper and lower splints, functional appliances with mandibular opening and protrusion,¹⁰



Figure 2. Soft vacuum moulded occlusal guard may prevent the bite reflex.

removable appliances with lip bumpers, lip plumpers cemented with orthodontic bands,³ occlusal guards,^{1,9,11} and lip shields.¹²

Dental extractions have been advocated in certain cases.¹³ In extreme cases the use of orthognathic surgery has been proposed suggesting the use of an osteotomy to create an anterior open bite to prevent lip-biting.⁵

Management regimes for the people referred to the dental department at the Royal Hospital for Neuro-disability generally include:

- Monitoring the lesion;
- Preventing infection (Corsodyl gel is commonly prescribed);
- Maintaining or improving oral hygiene;
- Smoothing teeth to reduce the possibility of trauma from sharp edges;
- Providing bite raising appliances – varying from soft vacuum moulded occlusal guards (Figure 2) to hard acrylic occlusal splints retained by stainless steel 'Adams' cribs or magnetic couplings (Figure 3). These can be used to retain lip bumpers (Figures 4 and 5);
- Extracting teeth.

In the 10 cases profiled, management included four hard acrylic bite raising appliances. An example of one case is illustrated by Figures 3 and 6–8. Impressions required to construct these appliances are extremely difficult to achieve owing to the patient's bite reflex, but the provision of a hard appliance with a lip bumper and at least 2 mm posterior occlusal coverage appears to prevent further trauma and allow resolution. In two cases, a vacuum moulded occlusal guard proved sufficient to break the bite reflex and prevent further trauma (Figure 2).

In one emergency situation a putty-filled impression tray was retained in the mouth for three days to prevent repeated trauma, to allow some resolution of swelling and bleeding and to permit sufficient healing to prevent repetition of the bite. In this case, treatment proved highly effective (Figure 9).

General anaesthesia (GA) was not considered as an option for examination



Figure 3. Case 1. Hard acrylic bite raiser with lip bumper, retained by Adams cribs.

or impression taking. Where impressions could only be achieved under GA, it was unrealistic to expect nursing staff to be able to insert/remove appliances and provide daily care.

In one case, the patient had already undergone the extraction of the lower incisors and was biting towards the angles of the lower lip. The treatment in this case consisted of extraction of the lower canines and premolars under general anaesthetic (Figure 10).

In the two remaining cases, gaining an impression for the construction of an appliance was impossible and the lesions were managed palliatively by the ward staff.



Figure 4. Magnet inserted into the buccal surface of a lower canine to retain a lip bumper.



Figure 5. Lip bumper used to protrude lower lip.



Figure 6. Case 1. Initial self inflicted injury.



Figure 7. Case 1. Appliance in situ.



Figure 8. Case 1. Resolution of the lesion and residual scarring.

OUTCOME OF TREATMENT

The outcomes of treatment were difficult to predict. In three cases it was necessary to try more than one option before the trauma could be treated or prevented. In two cases where the management was particularly difficult, the severe lip-biting stopped suddenly without any obvious reasons for the cessation of the trauma. The hard acrylic bite raising appliances seem most likely to prevent further trauma but, in many ways, they are the most difficult to achieve.

Additionally, the speech and language therapists applied programmes of desensitization to reduce abnormal oral reflexes. These programmes continued over a period of 2–12 weeks, depending on the response of the individual. Desensitization techniques were useful in the management and prevention of ‘one-

off’ bites and to facilitate impression taking in patients with facial hypersensitivity.

For impression taking the material of choice was a low viscosity putty. This was used in preference to alginate as it provides increased working time; tears less easily on placement or removal; is easier to control how and where it flows; and seems to be more easily tolerated by the patients.

SPECIFIC PROBLEMS FOR PATIENTS WITH NEURO-DISABILITY

For many patients with brain injury the use of an oral appliance is inappropriate. Abnormal oral reflexes may prevent the insertion and removal of appliances and impressions may be impossible to take without the use of general anaesthesia. Some patients have involuntary jaw movements and spasms that could result in the displacement of the appliance, consequently creating a potential choking hazard.¹⁴ Intermaxillary fixation has been suggested for use in post coma patients. It is obviously inappropriate for long-term use as it prevents daily oral hygiene procedures being carried out adequately and, in some patients, the force of masticatory movements would loosen or break wires causing additional trauma.

Pressure from nursing staff and/or the patient’s family to manage the lip trauma can lead to the extraction of teeth. Willette (1992) pointed out that this has inherent problems.⁸ It has been observed that, with the extraction of permanent incisors, trauma continues to occur in a new site. The canines and then the premolars subsequently become involved. Following numerous extractions, cheek-biting by the remaining molars may become a problem.³ La Banc and Epker (1981) advocated the removal of mandibular incisors.⁴ The problem then is that the lower lip, having no support, intrudes and is often actively sucked causing severe trauma to the skin beyond the lip as well as lip injury at the premolar region (Figure 10).

Training of nursing and auxiliary staff in the general provision of oral care and



Figure 9. A putty-filled impression tray in situ.

wound cleansing has significantly improved staff confidence and their management of these patients’ lesions. Specific training is essential to prevent injuries during insertion and removal of appliances (to patients and carers) and to reduce the risk of inducing gag reflexes or vomiting.⁸

If general anaesthesia were used to facilitate impressions, it would not be possible for staff to insert and remove the appliances. Appliances cannot be worn continuously without significant detriment to the rest of the dentition and oral health. Piercell *et al.* (1974) suggested the use of general anaesthesia for the insertion of appliances for short-term, palliative care of terminally ill coma patients.¹⁴ However, this practise is not appropriate for long-term care and is not advocated.

CONCLUSION

Lip-biting is a significant problem in patients with brain damage. The prevention and management is difficult and unpredictable. It requires an interdisciplinary team approach



Figure 10. Lip at rest following extraction of lower incisors, showing lack of lip support.

involving nurses or carers and speech and language therapists, as well as the dental team to achieve the best outcome.

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An elusive success!

The all-ceramic crown has undergone enormous development over the past 40 years, with its development being traced from the aluminous porcelain crown in 1965¹ to the Procera-AllCeram crown, with its dense alumina coping, recently developed by Andersson and Oden² in conjunction with Nobel Biocare AB, Goteburg and Sandvik Hard Materials AB, Stockholm. Aluminous porcelain crowns were a much-used treatment modality 30 years ago, before improvements in the aesthetics which



Figure 1. Four unit all-ceramic bridge, which has survived for 38 years.



Figure 2. Acrylic labial facing in position.

could be obtained by metal-ceramic restorations made these more popular. However, the development of all-ceramic bridgework has been altogether more elusive and, although recent work has reported short-term success with Empress 2 (Ivoclar-Vivadent, Schaan, Leichtenstein) bridges³, all-ceramic bridges are still far from common.

It was therefore with some surprise that I recently examined a new patient who had had a 38 year-old all-ceramic bridge in place (Figures 1 and 2), the reason for attendance being a recent porcelain fracture. The patient had also worn an acrylic gingival facing for the same period of time (Figure 3). The treatment had been carried out by a local Glasgow dentist, long since retired, with the laboratory work having been carried out on the same premises. John McLean has reported that the first alumina-reinforced bridges were made by McLean and Kempton in the 1960s using high-alumina rods and tubes, and that many of these experimental bridges are still in place.⁴ (Perhaps this is one of them.) He states that the reason for their lack of common acceptance was the dramatic improvements in the aesthetics of metal-ceramic restorations around that time, which then reduced demand for the alumina-reinforced bridges with their inherent risks. When everything is positive – no negative patient factors, avoidance of trauma, excellence in



Figure 3. Palatal view.

laboratory work and a clinician in top form, then it seems that even a treatment which might often be considered speculative can produce an excellent and longlasting result – as I have reported previously.⁵ Unfortunately, in everyday practice, these factors are not all positive all of the time!

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