Treatment of Self-Inflicted Oral Trauma in a Comatose Patient: A Case Report

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SOMMAIRE

Les lésions des tissus mous que s'infligent les comateux au niveau de la bouche sont peut-être plus répandues qu'on le signale, étant donné qu'aucune étude approfondie du problème n'a été effectuée jusqu'à maintenant. Divers appareils pour la prévention des lésions auto-infligées aux tissus buccaux, en particulier chez les enfants et chez les personnes physiquement et mentalement déficientes, ont fait l'objet d'articles dans la littérature médicale, mais on dispose de peu d'information sur leur emploi chez les adultes comateux. Comme les comateux manquent de maîtrise cérébrale du cycle masticatoire, ils peuvent facilement s'infliger des blessures. Même s'il est assez fréquent qu'on restreigne les patients atteints d'une certaine perte de conscience et nécessitant des soins intensifs pour qu'ils ne se blessent pas lors de mouvements involontaires des membres, la restriction de la tête et du cou est souvent difficile à opérer, voire dangereuse. Le présent rapport de cas propose une solution simple au problème des lésions auto-infligées aux tissus buccaux.

Mots clés MeSH : coma; lip/injuries; mouth protectors; self mutilation/prevention & control

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A team effort is needed in the management of the comatose patient with self-inflicted oral trauma. On occasion, the private dental practitioner may be asked to provide clinical assistance to the team. Prevalence of trauma to oral tissues in the comatose patient is not well documented, but when it occurs it is quite destructive and distressful for both patient and family members. Most reported cases have been in the pediatric or special care journals,[1–22] with few reported for the adult decerebrate patient.

The cause of self-injurious behaviour and clinical symptoms varies and the literature is full of examples, especially in children with cerebral palsy,[1,16,18] severe neuro-disability,[23] Tourette's syndrome,[3,19] Lesch-Nyhan syndrome,[4,5,9] Chiari Type II malformations,[7] congenital insensitivity to pain,[6,8,12] various psychiatric disorders and encephalitis in infancy.[11]

Lack of control over the masticatory cycle in the comatose adult patient may sometimes result in neuropathologic chewing,[21,24] which in turn may be the result of severe brain damage due to a closed head injury, hypoxia and septic shock.[13] Management of these cases will vary according to the individual's medical history, frequency and severity of the injury and whether treatment is for the long or short term.

Numerous appliances and techniques have been advocated: occlusal bite planes, ratchet mouth props, padded tongue blades and intermaxillary fixation, and mandibular-cast silver caps with acrylic bite-blocks.[13] There are no standards, but it is universally accepted that a removable device is desirable for long-term use in comatose patients. Difficulties that may be encountered with respect to the design of an appliance include lack of cooperation from the patient, inability to gain access to the oral cavity for a proper examination and to take impressions, and the education of caregivers and family members in maintenance of the appliance and proper oral hygiene procedures for the patient.

An appropriate appliance must be simple to make and be well retained and easily serviced. It must also satisfy the following criteria[25]:

- deflect the tissues most likely to be damaged by involuntary movements of the mandible from the occlusal table
- permit a full range of mandibular movement
- allow for daily oral care
- withstand breakage and displacement forces over an indefinite period
- allow healing of traumatized tissues
- be easily fabricated and placed without risk to the patient.

The following case report describes the use of a simple device in an adult comatose patient. The material used is easily layered or repaired using heat alone without the need for organic solvents.

Figure 1: Patient with gauze wrapped around spatula between teeth.

Figure 2: Laceration on lower lip.

Figure 3: Polyolefin mouthguard.

Figure 4: Mouthguard with handle.

Case Report

The dental service of the Nihon University School of Dentistry at Matsudo was asked to examine and recommend treatment for a 56-year-old male patient who was intubated in hospital after suffering a subarachnoid hemorrhage caused by the rupture of a cerebral aneurysm. He had sustained self-induced lacerations to his lower lip. The patient underwent a ventriculoperitoneal shunt insertion and nutrition was provided by means of a nasogastric tube following tracheotomy. According to the Japan coma scale, his level of consciousness was III-200 (**Box 1**). At this level of consciousness, the patient could involuntarily move his arms and legs and frown on painful stimulus, but could not respond to requests, for example, to open his mouth. His medical condition was stable. Hospital staff attempted to control his involuntary masticatory movements by inserting gauze and tongue spatulas between his teeth but this failed (**Fig. 1**). The patient had been examined previously by another dentist, who had suggested extraction of all lower mandibular incisors to prevent injury. This recommendation is a possible solution, but only as a last resort when all other options have failed.

Box 1 Japan coma scale; 3-3-9 system

1. Wakes even without stimulus	
1	Almost lucid, but consciousness is not as clear as it ought to be
2	Disoriented
3	Unable to recall name or birthday
2. Wakes with stimulus, but falls asleep when stimulus ceases	
10	Opens eyes readily when called
20	Opens eyes in response to loud calling or shaking
30	Opens eyes narrowly with repeated calling or painful stimulus
3. Does not wake even with stimulus	
100	Performs motions such as brushing off painful stimulus
200	Moves arms and legs or frowns with painful stimulus
300	No response to painful stimulus

A thorough examination of the patient was difficult due to the restricted opening of his jaws, but he appeared to have a significant overjet and overbite, suggesting a Class II, Division 1 occlusion. In addition, there was a severe self-inflicted traumatic lesion on his lower lip mainly on the left side (**Fig. 2**) and a transient ruminatory chewing cycle was observed. This suggested that the lower lip was trapped between the maxillary and mandibular anterior teeth and was acting as a bolus, thus initiating a pathologic chewing cycle. The ulcer created by this action was sizeable; the tissue was edematous and bleeding. All maxillary and mandibular teeth were present except for teeth 36 and 46, which had been replaced with two 3-unit fixed partial dentures. Observed laceration of the lower lip was due to adduction of the lip as a result of sucking and bruxism.

Figure 5: Mouthguard in patient's mouth.

Figure 6: Initial resolution of wound 3 days after placement of mouthguard.

Figure 7: Two weeks after insertion, fibrotic scar is visible.

Figure 8: Complete resolution of wound.

Because of the difficulty encountered in trying to open the jaw due to trismus, we decided to make a simple, easily serviceable appliance that would satisfy the criteria outlined by Hanson.[25] With great difficulty, a gag was used to open the mouth and the opening was secured on the right side with a medium-sized McKesson rubber bite-block (McKesson Mouth Props, Hu-Friedy, Chicago, Ill.).

A unilateral impression was made using a "rim lock" stock tray and irreversible hydrocolloid impression material. A conventional mouthguard was fabricated using a polyolefin sheet (MG21, Molten Medical Inc., Tokyo, Japan) with adequate coverage of teeth 33–47 to ensure good retention (**Fig. 3**), but not overly extended to avoid impingement on soft tissue and muscle attachment. A long flexible plastic handle made of the same material was attached to the anterior portion of the mouthguard (**Fig. 4**); this could be secured to the patient's hospital gown with a safety pin to prevent accidental loss or possible inhalation of the appliance should it become dislodged. The labial portion of the appliance was slightly thickened (8 mm) by layering to prevent the lips from becoming trapped between the anterior teeth (**Fig. 5**). The nursing staff were asked to keep the appliance in the mouth at all times except when it was removed for daily oral hygiene procedures.

Results

Within 3 to 4 days after insertion of the appliance, the nursing staff noted that serious clenching of the jaw had ceased and that it was possible to manipulate the jaw with a tapping motion. Sucking and adduction of the lips had ceased and initial resolution of the wound was observed (**Fig. 6**). By 14 days after insertion, healing of the wound was noted, with the appearance of a fibrotic scar (**Fig. 7**). At4 weeks postinsertion, the lesion had completely resolved, leaving a fibrotic scar

Although the appliance was removed after healing (**Fig. 8**), the family asked that it be replaced as a preventive measure in the long term, because they noted that periodically the patient adducted the lips between the anterior teeth. It was decided to comply with the wishes of the family with the proviso that oral hygiene and maintenance would be carried out; a full coverage mandibular mouthguard would be constructed at a later date to avoid any occlusal problems that might arise from wearing a unilateral mouthguard for an extended period; and the patient would be seen by a dentist every 3 months.

Discussion

Trauma to oral soft tissue in adult comatose patients may be more widespread than documented and, although no extensive study has been conducted on the subject, many authors have suggested the fabrication of appliances to prevent self-inflicted trauma, particularly in children.

Mastication and masticatory movements have been described as the result of a complex set of actions that are both voluntary and automatic; these movements involve the coordination of the muscles of mastication operating in a learned pattern to prepare and break down a bolus of food for swallowing. Learning and control of these movements is under the influence of the central cortex, reticular formation and the extra-pyramidal system.[21] One characteristic of lack of cerebral control is lack of coordination of the masticatory movement, which in turn may lead to self-inflicted trauma to oral tissues. Bruxism seems to appear at different levels of unconsciousness and disappears only after a significant improvement in the level of consciousness.[22] Myostatic masticatory reflex may be initiated in a comatose patient if the lips or tongue are trapped between the teeth, mimicking the placement of a bolus of food on the occlusal surfaces of the teeth.[26]

Management of these patients should be immediate, using an easily fabricated removable appliance in the short term, and a long-term solution should be sought as level of consciousness improves. Ngan and Nelson[21] state that the design of any appliance depends on the prognosis of the patient, neurologic status and the severity of chewing or bruxing. The practice has been to construct either a full-coverage mouthguard or one covering the anterior sextant using traditional materials; however, these materials lack proper adaptation to the dentition, hence are not adequately retained. Dislodgement of such an appliance may cause even more serious complications if it is inhaled. In this case, a simple cross-arch appliance made of polyolefin was introduced. This mouthguard material is odorless, has good visco-elastic properties and high impact resistance and is easy to laminate and repair by layering using heat rather than adhesives. Because the material is also lightweight and highly resistant to tearing, we were able to fabricate a long handle that could be secured to the patient's garment making it easy for caregivers to remove and replace the device during oral hygiene procedures. The cross-arch design, which covered two-thirds of the mandibular occlusal surface, was successful in resolving the problem in the short term. In the long term, a full arch stent would be more appropriate to prevent an imbalance to the occlusion and inadvertent overeruption of teeth not covered by a partial appliance.

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