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An unusual lateral luxation of an upper incisor owing to long-term boxing without protection

CASE REPORT

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Abstract – This case report describes a lateral luxation of an upper incisor in a 19-year-old non-professional boxer. The tooth displacement gradually worsened over several months because the boxer received repeated blows to the head without using a mouthguard. Being a chronic dental trauma, rather than an acute lateral luxation, this case had several unique features: the labial plate of the alveolar bone was penetrated, the root apex was free in the vestibulum, the tooth was mobile (second degree) and radiographs revealed bone resorption. This case emphasized the need for a mouthguard to be used even with amateur boxing. The dental practitioner should educate his sportsmen–patients of the risk of sport-related dental trauma and the benefit of a mouthguard.

Boxing 'stands alone among other contact sports in having as its goal rendering opponents unconscious and helpless through successive blows to the head' (1). Thus, boxing-induced injuries are relatively common and are usually more serious than injuries in other sports because of the repeated direct blows to the head, which are illegal in other sports (2). These injuries include cuts, bruises, scrapes and the more severe injuries such as brain trauma, intracranial hemorrhage, cerebral edema and neurological injuries (3). Regarding the orofacial region, boxing-induced soft tissue lacerations and dental injuries were reported as well. The chance of one contact-sport participant, i.e., a wrestler or boxer, to sustain an orodental injury is 33–72% (4).

A variety of protective gears are used in order to prevent boxing injuries. First invented by Krause in the 1890s to prevent lip lacerations in boxers (5), the mouthguard currently is widely used for the prevention of dental as well as brain injuries. The mouthguard reduces the force of the impact in a direct blow to the jaw according to the time/area principles of elasticity. Moreover, by creating a gap between the condyle and the skull, the mouthguard reduces the impact to the brain (6). Dental and orofacial soft tissue injuries as well as jaw fractures have been dramatically reduced by the use of mouthguards (7).

We describe an unusual case of dental lateral luxation caused by 3 years of intensive boxing without using a mouthguard. In this case, apparently the luxation is the result of repeated blows rather than an acute single trauma.

Case report

A 19-year-old otherwise healthy male of African-American origin came to our dental clinic complaining about a rigid white lesion in the upper labial vestibulum. The patient first noticed the problem 8 months before his appearance at the clinic, reporting a gradual elongation of the lesion over time. The patient did not report any accompanying pain.

Clinical examination revealed that 6 mm of the apex of his left central upper incisor's root was exposed to the oral cavity penetrating the labial alveolar plate; in addition, the tooth's crown was inclined palatally (Fig. 1). Moreover, the tooth's mobility was in the second degree (1–2 mm horizontally). The results of cold- and electric-stimulation tests were negative, thus indicating that the tooth was non-vital; it was not sensitive to percussion. Alveolar bone resorption on the mesial and apical aspects of the root surface was observed in occlusal and periapical radiographs taken from a mesial angle (Fig. 2). No periodontal bone loss or tooth mobility was observed in the remaining dentition. Tooth wear was apparent in the anterior segment of the upper dental arch (Fig. 1).

The patient reported that he used to daily practice boxing as an amateur for 3 years, but he had never used a mouthguard. He did not recall a major traumatic event to the dental arch or the chin, but he stated that, during the 3 years of practice, he received constant blows to the face. The patient ruled out parafunctional habit with his dentition.

After the patient had provided the explanation, his tooth was removed. A provisional partial removable denture was fitted until the permanent restoration of the tooth would be fixed.

Discussion

Lateral luxation is one of the most prevalent dental injuries among the general population, resulting in up to

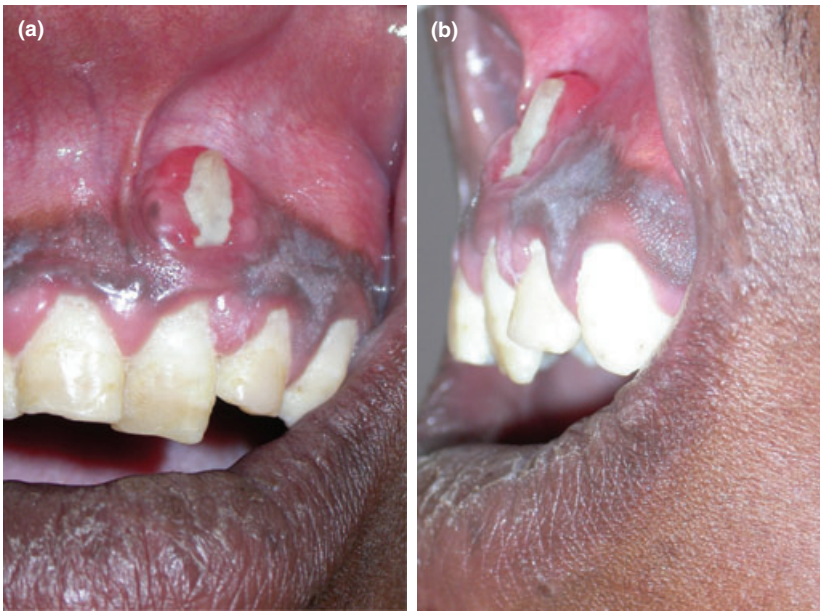

Fig. 1. (a) Frontal and (b) lateral views of the upper labial vestibulum, revealing the penetration of the apical portion of the root of tooth 21 via the labial alveolar plate. The tooth crown has a palatal inclination.

27% of all dental wounds, according to one report (8). Fourteen percent of all dental luxation injuries occur during sports activities (9). Laterally luxated teeth usually have their crowns displaced palatally and are often associated with fractures or comminution of the labial plate of the alveolar bone (10). It seems that, in the unique present case, repeated rather than acute trauma caused the luxation of the tooth. Thus, there was a gradual worsening of the luxation over time rather than an immediate displacement of the tooth, as seen in acute trauma. Furthermore, the labial plate of the alveolar bone was gradually penetrated by the luxated tooth rather than being fractured, which usually occurs in acute dental trauma. In contrast to most acute lateral luxation injuries, in which the root apex is locked in the fractured apical alveolus and there is little mobility (10), in this case the root apex was free in the labial vestibulum and the tooth was highly mobile. Finally, occlusal and periapical radiographs, taken from a mesial angle (10), showed the tooth's displacement as well as bone resorption on the mesial and apical aspects of the root surface, whereas in acute lateral luxation a periapical radiograph taken from extreme mesial or distal angles shows the displacement, and an occlusal view shows an increased periodontal space apically to the root surface (10).

The typically recommended treatment in acute lateral luxation, which is forceful repositioning of the tooth followed by 2–3 weeks of splinting (10), was not appropriate in this case. The patient refused to agree that the tooth be aligned by orthodontic treatment because of the poor long-term prognosis of the tooth. Moreover, he refused to stop boxing, which was a preliminary condition for the orthodontic treatment. Instead, the tooth was extracted and provisional restoration was fitted. The permanent restoration will be designed in accordance with the healing of the alveolar bone.

For sports activities, such as boxing, that place participants at risk for oral injuries, the American Dental Association and the Academy for Sports Dentistry recommend the regular use of a properly fitted mouthguard (7). The mouthguard protects the lips and intra-oral soft tissues from bruises and lacerations, protects the teeth from crown fractures, root fractures, dislocations and avulsions and protects the jaws from fractures and dislocations (7). The mouthguard was first designed for boxers in the late 19th century, but early in the 20th century boxing officials declared mouthguards illegal. The officials later changed their ruling and mouthguards have become a part of regular boxing equipment (4). Currently, in the US five sports at the amateur level require the use of a mouthguard: boxing, football, ice hockey, men's lacrosse and women's field hockey, whereas the only professional sport organization that requires the use of a mouthguard is boxing (7).

In contrast, in Israel, non-professional boxers, as in the case of the present patient, are not required to use a mouthguard. Moreover, the patient in this report was not even aware of the existence of mouthguards. This non-familiarity and non-use of mouthguards are contrary to a report of a high level of awareness and usage among Turkish boxers (11), but is in agreement with the report of Levin et al. (12), about an extremely low level of awareness and mouthguard usage among young adult sportsmen, including contact-sportsmen, in Israel, and with Persson & Kiliaridis (13), who reported that none of a group of 26 young adult male wrestlers had worn mouth protectors regularly.

Although the behavior of not wearing a mouthguard is influenced by comfort, the ability to speak and breathe, aesthetics and the athlete's perception of how the mouthguard affects his or her image as a player, it seems that the key factor is inadequate information about the risk of injury and the long-term benefit of the use of a mouthguard (14). Gardiner & Ranalli (14) recommended that players as well as coaches be educated regarding this important issue.

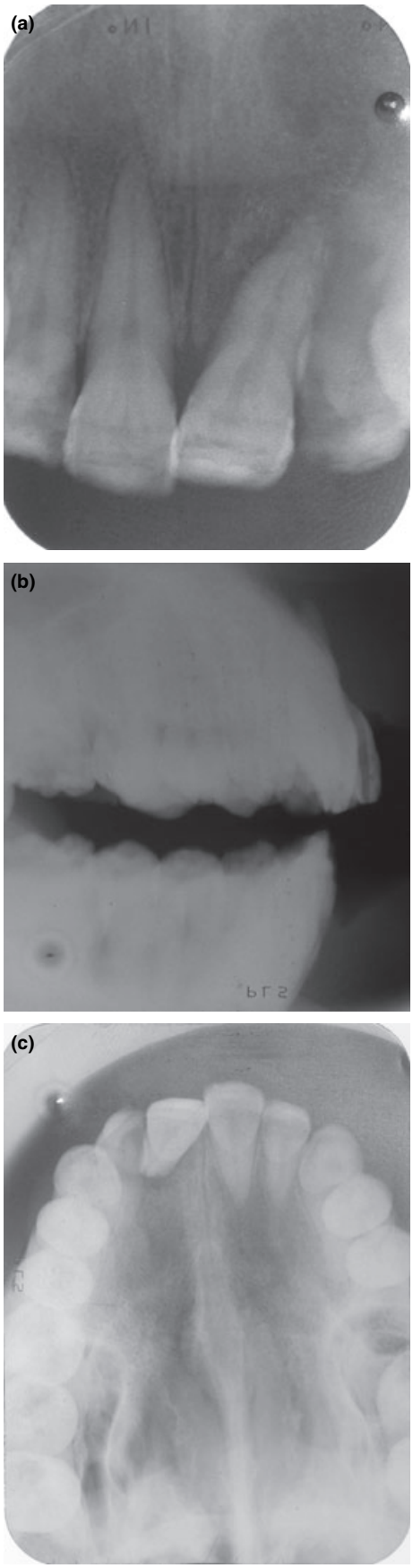

Fig. 2. (a) Frontal periapical radiograph, taken from an extreme mesial angle, showing the tooth's displacement and an alveolar bone resorption on the mesial aspect of the root surface. (b) Lateral radiograph showing the displacement of the tooth. (c) Occlusal radiograph, taken from the mesial angle, showing the displacement of the tooth as well as bone resorption on the mesial and apical aspects.

Conclusions

We describe a case of an incisor lateral luxation resulting from repeated boxing blows over a 3-year period without the use of a mouthguard. A dental practitioner who treats sportsmen should strongly recommend to them to regularly use a properly fitted mouthguard, and they should also be aware of slight tooth displacement.

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