Management of Traumatic Dental Injury after Periodontal Surgery in Patient with Hereditary Gingival Fibromatosis: Case Report

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Abstract
Traumatic Dental Injury (TDI) is often caused by a bruise from a sports-related incident or fall. In individuals with maxillary protrusion, the risk for TDI may be higher. We treated a patient with Hereditary Gingival Fibromatosis (HGF), a rare genetic disorder characterized by proliferative fibrous overgrowth of gingival tissue, who subsequently received a TDI after periodontal surgery. A 13-year-old Japanese boy was referred to the Division of Periodontics at Aichi Gakuin University Dental Hospital in March 2005 with the chief complaint of generalized severe gingival overgrowth involving the maxillary and mandibular arches covering nearly all teeth. Prior to orthodontic treatment, periodontal surgery was performed under general anesthesia in consideration of mastication, dental esthetics, and development. However, soon thereafter in August 2007, the protruded maxillary anterior teeth received an injury while he was playing basketball and the maxillary central incisors showed extrusive luxation. Two weeks after being reset, the maxillary anterior teeth were splinted with wire and adhesive resin cement, and then the splint was removed following evaluations of clinical and radiographic showing signs of normal periodontium. The marginal bone height corresponded to that seen in radiographic findings after the reset and orthodontic treatment was started 1 year later. At the 6-year follow-up examination, the teeth remained asymptomatic, pulpal response to sensitivity tests was normal, and healing was shown in radiographic images. In the present HGF case, we speculated that removal of thick gingiva around the teeth, which might have functioned as a mouth guard, increased the risk for TDI while playing sports. TDI is more likely to occur in patients with exposed protruded misaligned teeth after periodontal surgery. Therefore, it is important for HGF patients with such protruded maxillary anterior teeth to use a mouth guard when participating in sports following periodontal surgery to prevent TDI.

Key Words: Traumatic dental injury, Extrusive luxation, Hereditary gingival fibromatosis, Mouth guard

Introduction
Traumatic Dental Injury (TDI) is considered to be a public dental health problem because of its frequency and typical occurrence at young age, as well as cost and treatment that may continue throughout the life of the patient [1] and is often caused by an impact from a sports-related incident or fall. In individuals with maxillary protrusion, the risk for TDI may be higher [2,3]. TDI s occur with great frequency in preschool and school age children, and young adults, comprising 5% of all injuries for which individuals seek treatment [4]. A 12-year review of published reports showed that 25% of all school children experience dental trauma and 33% of adults have experienced trauma to permanent dentition, with the majority of those injuries occurring before 19 years of age [2]. Luxation injuries are the most common type of TDI in primary dentition, whereas crown fractures are more commonly reported in permanent dentition [2,3]. The teeth most affected by dental trauma are the maxillary central incisors, while children with an overjet size >3 mm are 1.78 times more likely to have TDIs [3]. TDIs present a challenge to clinician’s worldwide, thus proper diagnosis, treatment planning, and follow-up examinations are critical to assure a favorable outcome.

Gingival enlargement associated with Hereditary Gingival Fibromatosis (HGF) usually begins at the time of eruption of permanent dentition, though it can also develop with eruption of primary dentition, as a slowly progressive and sluggish localized or generalized hyperplastic gingiva. The common effects of gingival overgrowth are malposition of teeth such as maxillary protrusion and prolonged retention of primary dentition. Severe gingival overgrowth covers the dental crowns, which results in aesthetic and functional problems such as difficulties with mastication and speaking [5]. Here, we report a patient with HGF, a rare isolated genetic disorder, or part of a syndrome or chromosomal abnormality that occurs in approximately 1 in 750,000 people and characterized by proliferative fibrous overgrowth of gingival tissue [6]. The present patient suffered from extrusive luxation of the maxillary central incisors from a sports-related injury after undergoing periodontal surgery, and was successfully treated and followed for 6 years.

Case Report
The patient, a 13-year-old Japanese boy, was referred to the Division of Periodontics at Aichi Gakuin University Dental Hospital in Nagoya, Japan, on March 2005 with the chief complaint of severe generalized gingival overgrowth involving the maxillary and mandibular arches, and covering nearly all teeth (Figures 1 and 2). At the age of 4 years, his mother first noticed the condition, which gradually progressed. Family history and oral examination results showed that not only the patient, but also his father and sister were affected, revealing autosomal recessive inheritance (Figure 3). In consideration of mastication, dental esthetics, and development, surgery consisting of gingivectomy, gingivoplasty and flap procedures was performed under general anesthesia in July 2007 (Figure 4). A specimen of the gingival overgrowth was obtained.
Figure 1. Initial intraoral clinical appearance of the patient with severe generalized gingival overgrowth involving the maxillary and mandibular arches, which covered nearly all teeth. Adequate lip closure could not be attained.

Figure 2. Initial panoramic radiograph showing impacted permanent teeth.

Figure 3. Inheritance pattern of family. The age of each family member is shown in parentheses. Family history and oral examination results showed that not only the patient, but also his father and sister were affected, revealing autosomal recessive inheritance. We considered that the paternal grandfather influenced our patient, as well as his father and sister. 1: father, 2: sister, 3: patient.
Figure 4. Clinical appearance after surgical procedures consisting of gingivectomy and flap surgery under general anesthesia performed on July 2007. Right image shows excised maxillary gingiva with buccal overgrowth.

Figure 5. Light micrograph findings of gingival overgrowth. Low magnification view of gingival overgrowth showing epithelial hyperplasia with prominent papillae and connective tissue along with an increased amount of collagenous fibers is shown. (Hematoxylin-eosin, original magnification x50)
**Figure 6.** a, b: Extrusive luxation of the maxillary central incisors occurred while participating in basketball on August 2007. c: Radiograph on August 2007. d: The maxillary anterior teeth were splinted with wire and adhesive resin cement for a period of 2 weeks. e: Radiograph 2 week later. Pretreatment periapical radiograph findings showed a radiolucent area around the apex of the roots.

**Figure 7.** Post-splinting views of maxillary central incisors. a: after 2 weeks. b: after 2 months. c: after 3 years. d: after 6 years.
that seen in radiographic findings after the reset. Orthodontic treatment was started 1 year later. At the 6-year follow-up examination, the teeth remained asymptomatic, pulpal response to sensitivity tests was normal, and radiographic evidence of healing was demonstrated (Figures 7d and 8).

Discussion
HGF is a rare autosomal dominant form of gingival overgrowth. Affected individuals show a benign, slowly progressive, non-hemorrhagic, and fibrous enlargement of the oral masticatory mucosa [7,8]. In our search of reported cases, none that included long-term follow-up results were found. The present patient was followed for 6 years after periodontal surgery and treatment for extrusive luxation of the maxillary central incisors. It is not easy to visualize excessive overjet after periodontal surgery in HGF cases. Furthermore, no known past reports have noted this condition as increasing the risk of TDI. Therefore, we report the present case of HGF in a patient who underwent periodontal surgery following TDI, and was successfully treated and followed for a long period.

TDIs often occur as the result of an accident or sports-related injury, with the present case typical of the latter. Francisco et al. [3] reported that the prevalence of dental trauma among Brazilian schoolchildren was 16.5%. Teeth most affected by dental trauma are the maxillary central incisors, while boys run a 2.03-times higher risk of crown fracture than girls and children with an overjet >3 mm are 1.78 times more likely to have TDIs. In addition, children with inadequate lip coverage are 2.18 times more likely to present TDIs than children with adequate lip coverage [3]. The findings in our case confirmed all of these factors. In the present patient with HGF, the teeth affected by dental trauma were the maxillary central incisors, indicating that excessive overjet with inadequate lip coverage developed after periodontal surgery for the overgrowth.

Based on the 2011 dental trauma guidelines presented by the International Association of Dental Traumatology [9,10], we gently repositioned the teeth into their sockets and used a flexible splint for stabilization and patient comfort. Such a procedure can be used for up to 2 weeks, with asymptomatic, positive response to pulp testing reported. However, false negative results are possible for up to 3 months. On the other hand, continuing root development in immature teeth and intact lamina dura has been reported as favorable outcomes in similar cases. The present findings support the usefulness of a short-term non-rigid splint for luxated, avulsed, and root-fractured teeth. Although neither the specific type of splinting nor duration of splinting are significantly related to healing outcome, this therapy is considered best practice in order to maintain repositioned teeth in the correct position, as well as to provide patient comfort and improve function. On the other hand, evidence for an association between short-term splinting and increased likelihood of functional periodontal healing, acceptable healing, or decreased development of replacement resorption is inconclusive [11,12].

In our case, the maxillary anterior teeth were splinted with wire and adhesive resin cement following a reset. At a 6-year follow-up examination, the teeth remained asymptomatic, pulpal response to sensitivity tests was normal, and healing was demonstrated in radiographic images. In our search of reported cases, none that included long-term follow-up results of periodontal surgery for HGF were found. The present patient was followed for 6 years after undergoing a gingivectomy under general anesthesia and treatment of extrusive luxation of the maxillary central incisors. To our knowledge, this is the first report of an HGF patient who underwent periodontal surgery following TDI, and was successfully treated and followed for a long period.

Despite efforts to reduce the number of dental traumas, most current studies indicate that the incidence is unchanged, and remains at a relatively high level in children and young adults [13,14]. When reviewing studies related to prevention, it is clear that the main focus has been on making and promoting use of mouth guards. The majority of studies that investigated mouth guards were performed in vitro and focused on the materials used, as well as how they perform and protect, and their presented findings support the use and protective value of mouth guards for reducing sports-related injuries to the teeth and soft tissues. Dentists are encouraged to educate patients regarding the risks of oral injury in those participating in sports, and also fabricate properly fitted mouth guards and provide appropriate guidance regarding the various types and their protective properties, costs, and benefits [15]. As shown in our case, following periodontal surgery, it is important for HGF patients with protruded teeth to protect against TDI occurrence by using a mouth guard when participating in sports activities.

Conclusion
In the present HGF case, we speculated that the loss of thick gingiva around the teeth, which might have functioned like a mouth guard, increased the risk for TDI when participating in sports activities.
in sports activities. TDI is more likely to occur in patients with exposed protruded misaligned teeth after periodontal surgery. Therefore, it is important for HGF patients with such protruded maxillary anterior teeth to use a mouth guard when participating in sports following periodontal surgery to prevent TDI.

References