Crown-root Fracture Restoration on a Patient with Autism Spectrum Disorder

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ABSTRACT

Introduction: Children with intellectual and physical disabilities including autism are susceptible to dental trauma as a sequela from falls due to poor muscular coordination. In addition, their altered muscle tonus often results in an open bite with labial flaring of the maxillary incisors and lip incompetence, predisposing these teeth to fractures. This case report describes an alternative approach of restoring a fractured maxillary permanent central incisor with a composite strip crown during surgical repositioning of the periodontium on an autistic patient. The prognosis of the incisor is guarded due to the probability of re-injury. However, the decision to maintain the tooth clinically was esthetically preferable in comparison to an extraction or decoronation.

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INTRODUCTION

Disabled children, including those who are mentally, socially, or physically challenged, typically tend to have more obvious oral health problems, owing to their actual disability or related medical conditions. Studies have shown that children with disability have worse oral health and require more frequent and complex treatment than healthy children. The majority of children with special health care needs have poor oral hygiene with high caries prevalence and moderate gingivitis. The incidence of malocclusion among physically and/or intellectually disabled (ID) children is reported to be higher than in healthy children.

Dinesh et al reported that handicapping malocclusion increases with the severity of intellectual disability (13.5–15.3%). Studies have also shown that the prevalence of an anterior open bite increased slightly with a corresponding increase in severity of ID. Vellapally et al observed a similar trend in the prevalence of an anterior open bite; 15.6% among children with mild ID, 19% among those with moderate ID, and 22% among children with severe ID. The vertical anterior open bite was generally greater than 1 mm. Vigild reported 23% anterior open bites and 29% anterior crossbites among a sample of 181 ID adolescents aged 13 to 19 years. Among the sample of children with ID alone, 35.2% had full cusp deviation in the anteroposterior molar relationship.

Because patients with ID tend to have malocclusion, including an anterior open bite, they are more prone to traumatic dental injuries. “Falls” has been found to be the most common cause of injury among patients with ID. Studies evaluating the prevalence of dental trauma in children with different kinds of disabilities such as cerebral palsy have also been presented. Holan et al assessed the prevalence of dental trauma among 68 cerebral palsy subjects ranging in age between 7 and 21 years and reported that 57% of these patients had signs of trauma to their permanent teeth.

Current evidence indicates that individuals on the autistic spectrum tend to have significant motor difficulties present early in life and at an early age. Because of poor muscular coordination, the propensity to suffer falls,
and the predisposition to have flaring from the maxillary incisors, children with ID including autism are susceptible to dental fractures. Traumatic injuries, which affect the dental tissues and supporting periodontal structures, may cause functional, emotional, and esthetic impairments that require immediate and case-specific management by the dentist.23

The present case report describes an alternative approach of restoring a fractured maxillary permanent central incisor with a composite strip crown during surgical repositioning of the periodontium on an autistic patient. Treatment was provided under general anesthesia due to the patient’s medical condition and his inability to cooperate with invasive dental procedures in the clinical setting. Although the long-term prognosis of a fractured maxillary incisor on this type of patients is guarded, the clinical decision to maintain the tooth was a better esthetic option than an extraction or decoronation.

CASE REPORT

A 16-year-old Caucasian male of low socioeconomic status who currently resides in a group home for developmentally disabled has been a patient of record at the University of Florida, Pediatric Dental Clinic for 12 years. He has autism spectrum disorder with the comorbid conditions of irritability, aggressive behavior, attention-deficit hyperactivity disorder (ADHD), seizures, and gait abnormality (toe walking). In addition, the patient has esotropia/amblyopia of the left eye and allergies (seasonal and to nuts or seafood). The patient currently takes Valproic acid (for seizures), Risperidone (for mood disorder), Benztropine (to counterattack involuntary eye movement, a side effect of Risperidone), Guanfacine (for ADHD), Montelukast (for allergies), and Loratadine (for allergies).

The patient was brought to the pediatric dental clinic for an emergency examination on April 2014 by his caregiver. The chief complaint was: “A broken filling on the upper anterior tooth.” Prior to this visit, the patient presented with a traumatic crown fracture with pulp exposure of tooth #8 in 2007 (Fig. 1). An excessive overjet with flaring on the maxillary incisors and an open bite was noted during the clinical examination. At that time, the patient received a Cvek pulpotomy with calcium hydroxide under protective stabilization. The patient returned to the clinic 1 month later due to symptoms of spontaneous pain and because the mother noticed discoloration of the tooth. During this clinic visit a radiographic periapical radiolucency (Fig. 2) was detected and a root canal therapy was completed under oral sedation with Diazepam (Fig. 3). Following treatment, the patient experienced repeated traumatic injuries to the same permanent central incisor, including fractures of composite restorations that were completed twice. Subsequently, a coronal fracture (all surfaces involved) occurred which was restored under conscious sedation. This last composite restoration and part of the tooth crown

Fig. 1: Radiograph from complicated crown fracture of tooth 8

Fig. 2: Radiographic periapical pathology on tooth 8

Fig. 3: Radiograph from root canal therapy of tooth 8
broke slightly subgingival about 1 month after treatment. The fragment was still attached and a glass ionomer was used as bonding material.

Upon clinical evaluation at the April 2014 visit, a palatal crown-root fracture with subgingival extension was diagnosed (Fig. 4). The palatal fragment was loose and the patient was able to tolerate the manipulation of the fragment without the need for local anesthesia. As an emergency procedure, the broken tooth piece was reattached with flowable composite (Filtek Supreme) after a total-etch technique. Periodontic and prosthodontic consultations were obtained the day after trauma. The recommendation was to remove the palatal fragment and assess the restorability of tooth #8 during surgical repositioning of the periodontium. Subsequently, 2 weeks later, the patient came for an emergency examination. The chief complaint was: “The back piece of the front tooth broke off.” The aforementioned palatal fragment was no longer present. A second periodontal consultation was performed to determine alternative treatments for tooth #8. Again, surgical exposure of the root was recommended to evaluate the extent of the fracture and to determine whether a restorative procedure or decoronation was indicated. Given the patient’s medical condition and his inability to sustain complex procedures in the clinical setting, he was scheduled for dental treatment under general anesthesia. Surgical exposure of the crown-root fracture was performed by a periodontist. The extension of the fracture on the palatal surface was about 4 mm below the cementoenamel junction (Fig. 5). At that point, it was determined that a restoration of tooth #8 was warranted. Following an ostectomy procedure to create a sound margin, the tooth was prepared for a composite strip crown. The matrix was trimmed to cover the palatal root fracture. The tooth was etched with phosphoric acid, a bonding agent was applied, the composite crown was light cured, and adjustments were made with carbide finishing burs. The gingival flap was surgically repositioned and nonresorbable polytetrafluoroethylene (PTFE) monofilament sutures were placed (Figs 6A and B). Instructions were given to use chlorhexidine gluconate 0.12% to ensure that the surgical area was kept clean. The patient returned to the pediatric dental clinic for a follow-up 1 week after the procedure. The periodontal tissue was healing adequately, but the accumulation of plaque was noted (Fig. 7). Oral hygiene instructions were reinforced with the caregiver. Subsequently, the patient had a periodontal follow-up 2 weeks after the surgery. At that time

Fig. 4: Crown-root fracture of tooth 8

Fig. 5: Surgical exposure of crown-root fracture of tooth 8

Figs 6A and B: Composite strip-crown on tooth 8 and gingival flap repositioned
The sutures were removed. The caregiver was informed that the prognosis of tooth #8 was guarded because of the patient’s predisposition to traumatic injuries secondary to falls and his excessive overjet.

The patient was seen for follow-up at 9 months. On tooth #8, class I mobility was detected, the periodontal tissues appeared to be healthy, and the strip crown was intact with a slight discoloration (Figs 8A to C). A 3-month follow-up was performed afterwards and similar findings were detected. The radiographic examination of tooth #8 revealed adequate bone trabeculation and intact periodontal ligament (Fig. 9).

DISCUSSION

There are several alternatives to restoring a crown-root fracture: (1) Reattachment of the coronal fragment (which was performed on this patient without success), (2) a crown lengthening procedure or orthodontic extrusion followed by a post-and-core and a full coverage porcelain restoration, (3) extraction and an implant retained crown, (4) decoronation to maintain the alveolar bone with the goal of placing an implant in the future, or (5) replacing the tooth with a removable denture or a fixed dental bridge.

Treatment alternatives must take into consideration the patient’s compliance and tolerance toward invasive dental treatment in the clinical setting. A developmentally disabled patient with autism, seizure disorder, and a history of aggressive behavior may not be able to tolerate complicated surgical, orthodontic, and restorative treatment options involving multiple visits.

In this case, the patient was treated under general anesthesia and a definitive treatment was performed. The possible alternatives to treat the maxillary central incisor were decoronation or restoration of the tooth after a crown lengthening procedure. The other treatment modalities were not feasible. An implant was an unrealistic alternative due to the patient’s inability to
undergo this procedure, the need for multiple visits in an outpatient clinical setting with different specialists, and a lack of financial coverage. Since tooth #8 was treated previously with root canal therapy and because the root length/width was adequate, full coverage composite restoration was recommended. This option was esthetically favorable for this patient.

CONCLUSION

A patient with autism received a restoration of a crown-root fracture after the surgical repositioning of the periodontal tissues. The treatment demonstrates a successful outcome for a period of about 2 years. Although the prognosis of a fractured maxillary incisor on this patient is guarded, the decision to maintain the tooth clinically was a better option esthetically than an extraction or decoronation.

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REFERENCES