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COMPOSITE RESIN RESTORATION OF ENAMEL-DENTIN FRACTURE OF PERMANENT CENTRAL INCISOR - CASE REPORT

КОМПОЗИТАНА РЕСТАВРАЦИЈА НА ЕМАЈЛОВО-ДЕНТИНСКА ФРАКТУРА КАЈ ТРАЕН МАКСИЛАРЕН ИНЦИЗИВ - ПРИКАЗ НА СЛУЧАЈ

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Abstract

Aim: The aim of this study is to present the application of piezosurgery in the extraction of an impacted mandibular third molar in a patient with Parkinson's disease. The goal is to preserve insufficient bone tissue and maintain the integrity of the mandibular canal contents in a limited surgical field. **Material and Method:** A 67-year-old male patient with total toothlessness and Parkinson's disease visited the University Clinic for Oral Surgery and Implantology with signs of acute odontogenic infection in the lower left quadrant. A CBCT scan revealed the presence of an impacted left mandibular third molar, with close proximity to the apex of the tooth and the roof of the mandibular canal, which were separated from each other by a 1 mm bone wall. **Results:** The use of piezosurgery in the treatment of an impacted third molar in a patient with Parkinson's disease proved to be the most effective and predictable method, minimizing trauma to soft tissue and bone structures. **Keywords:** impacted mandibular third molar, piezosurgery, Parkinson's disease, surgical extraction.

Апстракт

Композитната реставрацијата на забите софрактура на коронкатае конзервативно, навремено и економично решение при избор на третман. Современите адхезиви и композити им овозможуваат на стоматолозите да ги обноват фрактурираните дентални структури, враќајќи ја естетиката и функцијата на повредениот заб. Во оваа студија е прикажанаемајловодентинскатрауматска повреда на левиот максиларен централен инцизив. Пациентпт е на 7.5 годишна возраст чија повреда настанала при пад од стол во домашни услови. Опишана е целата процедура од приемот на пациентот во стоматолошка ординација до дефинитивно реконструктивно решение - реставрација со композитна смола. Реставрацијата со композитна смола на трајните заби со траума на коронката е едноставна процедура која треба да се планира и изведе запазувајќи ги анатомските и морфолошките карактеристики на фрактурираниотзаб, но исто така и повторно воспоставување на функцијата и естетиката на забот. **Клучни зборови:** фрактура на коронка, композитни реставрации, дентална траума.

Introduction

Dental trauma injuries are the most common injuries in childhood and among schoolchildren. Tooth fractures mostly involve front teeth in the upper jaw because of their position in the oral cavity. However, they can also occur in the lower jaw and posterior teeth.

Boys are affected almost twice as often as girls in the primary and permanent dentition. Most of these injuries in both dentitions involve the anterior teeth, especially the maxillary central incisors. The injuries of the primary dentition most often happen between the ages of 2 and 4 because at this age, the child is learning to walk by itself, the coordination and judgement are incompletely developed, and the majority of injuries are due to falls in and around the home[1]. The injuries of permanent dentition are most often between the ages of 7 and 10, and they are caused by falls while playing and running some contact sports. However, bicycling and scooters are the common accessories of this age[2,3].

According to one research article, on a global scale, aprevalence of 22 % and 15 % has been observed for traumatic dental injuries in the primary and permanent dentition, respectively, along with an incidence rate of 28.2 cases per 1000 per year. Accidental falls, road traffic accidents, and some sports activities are reported as

the most frequent causes of dental injuries in children worldwide[4].

Trauma to the frontal teeth is one of the most disturbing conditions for children and parents. Treatment strategies for immature young teeth should aim to preserve pulp vitality for continuing tooth maturation and root development, especially in young patients with incomplete apexogenesis[5].

Dental trauma may result in esthetic, psychological, and functional problems. Also,it can make changes in speech and chewing and interfere with the child's normal development. Because of that, it is important that the missing parts of the teeth are reconstructed[6].

Over the past two decades, there has been a significant rise in the occurrence of traumatic dental injuries. It is likely to increase the incidence rate of traumatic dental injuries compared to dental caries and periodontitis in the future[7].

Children with lip competence coverage and children with obviously protruding incisors or increased overjet have a higher risk of injuries to the front teeth.

Dental trauma can be direct or indirect[11].

Direct dental trauma refers to an injury to the teeth and surrounding structures that occurs due to an external force or impact. This type of trauma typically involves physical damage to the teeth, gums, or jawbone and can happen due to various causes, such as falls, sports accidents, car accidents, or physical alterations. Types of direct dental trauma include chipped or fractured teeth, tooth displacement, avulsion, intrusion, or root fractures. Direct dental trauma causes fractures of front teeth, especially in the upper jaw[12].

Indirect dental trauma refers to injuries to the teeth and surrounding structures that occur due to forces transmitted through the jaw or other parts of the head rather than a direct impact to the teeth themselves. This type of trauma can occur when an external force such as a blow to the face, a fall, or a sudden jolt causes damage to the teeth, gums, or supporting structures indirectly, without direct contact with the tooth. Indirect dental trauma causes fractures of the premolars and molars[13].

Enamel-dentin fractures involve the upper central incisors, upper lateral incisors, or lower incisors. Patients with this type of fracture don't feel spontaneous pain. The tooth is just sensitive to temperature changes or chemical irritations, and the pain is present due to mastication. Early treatment of a fractured tooth gives the best chance for full recovery[8].

This paper reports a case of a permanent maxillary central incisor with crown fracture treated using composite resin restoration.

Case Report

Parents with a 7.5-year-old male came to the Clinic for Pediatric and Preventive Dentistry at University Dental Clinical Center "St. Panteleimon", Skopje with a chief complaint of tooth enamel dentin fracture without pulp exposure one day after a fall in his house. The extraoral examination revealed no laceration or injury of the soft tissue. The surrounding soft tissue was uninjured.

The dental history revealed that he had a trauma as a result of a fall at home. The patient reported no treatment until that moment, and the crown fragment had been lost during the accident.

The patient had an Uncomplicated Crown Fracture (dentin and enamel): A coronal fracture confined to enamel and dentin without pulp exposure in teeth 21. The parents didn't find the missing tooth fragment. The surrounding soft tissue was not injured. The child and his parents were visibly upset, and we were not able to do an X-ray.

Figure 1. *Coronal fracture of maxillary central incisors involving enamel and dentin.*

Clinical examination (Fig. 1) revealed a horizontal fracture with the leftmaxillary central incisor (21) involving enamel and dentin. An extraoral examination revealed no significant abnormalities. Soft tissue examination revealed lacerations of the upper lip. The tooth was tender on percussion and palpation. Periodontal probing depths were within the normal parameters. The tooth was grade I mobile and gave an early response to vitality tests.

The intraoralexamination showed that the injury had caused an uncomplicated crown fracture of the tooth (21) without pulp exposure (Figure 1). Clinical examination evidenced a fracture involving only the enamel aspect with no symptoms. Objective symptoms – there was missing part of the crown, and the pulp was not exposed.

In order to prevent pain and pulp infection, we made a temporary restoration with glass ionomer cement (GJC). The fractured incisor was just covered with calcium-hydroxide paste and glass ionomer cement becausethe child was anxious and didn't cooperate, and the restoration was scheduled for the next visit.

A check-up was scheduled two weeks after the day they came.During the second check-up, the child was uncooperative again, and we couldn't take any photos or x-rays.We just took the information from the parents that the boy did-

n't complain of any toothaches. We scheduled the next visit for two weeks later.

On the next visit, we checked the pulp vitality, and the pulp had a normal reaction.The glass ionomer cement was no longer there. The parents said that two days before the visit, they noticed that (Figure1). The boy didn't complain of any cold or hot sensations or during mastication. Then, the reconstruction of enamel-dentin injuries with composite resin (Tetric Evo Ceram Bulk Fill, Ivoclar Vivadent, Schaan, Liechtenstein) was done.

Figure 2. *Build-up of the left central incisor.*

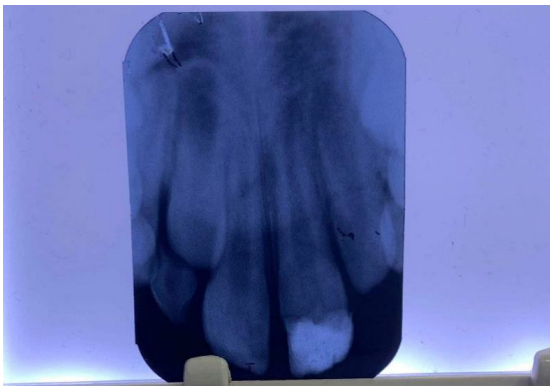

Figure 3. *Radiographic follow-up after composite restavration*

Figure 4a. *The restoration was then polished with FlexiDiscs and Astropol points*

Figure 4b. *Frontal appearance of the restoration.*

The restoration was initiated with a small amount of composite from the palatal surface of the tooth. After that,we made the approximal surface using flexible matrices for anatomical anterior proximal restorations. Then, layer by layer, we reconstructed the labial surface of the fractured teeth (Figures 2). After that, we finished and polished the external enamel surface using abrasive disks, silicone points, and cups. Then, the occlusion should be carefully checked and adjusted to avoid a heavy occlusal load on the restoration. After the reconstruction, we took x-rays (Figure 3) and photos (Figures 4 a, b).

The advice given to the parents is regular visits to the dentist, during which the vitality of the restored teeth will be monitored. It is necessary to control the vitality of the pulp after 6-8 weeks, after 1 year, and as needed.

Discussion

The restoration of the front teeth is more challenging in the practice of esthetic dentistry. Today, there are significant improvements in the esthetic materials and techniques. The changes in composite resins over the years have led to success in treatment with minimal loss of tooth structure, short operating time, and minimal cost for parents compared to veneers and porcelain crowns[12,18].

Enamel-dentin fractures are common dental injuries involving the hard outer enamel and the underlying dentin. These fractures typically occur as a result of traumatic impacts such as falls, accidents, or sports injuries. The severity and treatment of these fractures can vary depending on the extent of damage to the tooth structure, the location of the fracture, and the timing of treatment.

The upper central incisors are the most affected teeth by trauma because of their position on the dental arch. Also, they are the most visible in the smile. Because of this, it is important to reconstruct them with satisfactory esthetic. Dental trauma of the incisors is a very challenging emer-

gency situation, especially when the patient is a young child[9,10].

This situation requires immediate assessment, especially in young permanent teeth, where the apexogenesis is incomplete, like the one in this case.

Composite resins provide satisfactory treatments for young and adult patients.

Aesthetic and functional rehabilitation is the primary goal of the treatment of crown-fractured teeth. Actually, an alternative approach, which is becoming more attractive due to the technology of new dentin bonding agents, is fragment bonding; however, in cases of absence of the fragment, it becomes essential to preserve the remnant tooth structure with a composite resin restoration[11,12].

The current case offers a conservative, time-saving, inexpensive treatment option for a common type of esthetic problem following dental trauma. This case involves direct composite restoration using the layering technique. This technique is indicated for young patients because of the fewer clinical appointments, tooth preservation, and satisfying esthetic results[13].Composite resins provide satisfactory treatments for young and adult patients.

In the present case, the patient sustained a fracture to the maxillary incisor, with the involvement of both enamel and dentin. The fracture line extended through the enamel and into the dentin, leaving the pulp intact. This type of injury, known as enamel dentin fracture, represents a moderate level of damage that requires prompt intervention to prevent further complications such as pulp exposure or infection.For uncomplicated crown fractures, as in this case with enamel and dentin involvement without pulp involvement, direct adhesive restorations are the most common reconstructive treatment[14]. However,if the parents have the fractured fragment, that would be the first choice of treatment. The patient in this case did not have the fragment, so the reconstruction was planned with composite resin.

The composite resin restoration of permanent incisors with crown fractures is a simple procedure that should be planned and restored with attention to detail. Good results can be obtained by following a protocol aimed at preserving the pulp's vitality and restoring the injured tooth's functional and esthetic characteristics. The variation of some characteristics of the composite materials, like translucency and opacity of composite resins, requires the professional to know the different esthetic restorative materials and their optical behavior and may thus replace or correct color tones during the restorative procedure[15,16].

Several variables can affect the longevity of this type of restoration, including the extent of the crown fracture, the restoration size, the occlusion of the restored tooth, and the overall prognosis of the injured tooth[17,18]. The choice of resin should be focused on aspects related to strength and aesthetics. The present hybrid resins, due to their high percentage of inorganic filler and diversity of colors for enamel and dentin, allow satisfactory clinical results in terms of the longevity of the restoration.

Conclusions

Enamel-dentin fractures are frequent clinical occurrences that can be successfully managed with timely and appropriate intervention. The careful assessment of fracture severity, coupled with the selection of suitable restorative materials, can significantly affect the long-term outcomes. The case underscores the importance of early diagnosis and intervention in minimizing complications and preserving the function and aesthetics of the affected tooth.

They must employ minimally invasive therapies, and an indirect composite resin restoration may be a suitable option with numerous advantages (i.e., reversibility, reparability, optimal esthetics, and more economical than ceramics) and may provide acceptable long-term success.

The composite resin restoration of permanent incisors with crown fractures is a simple procedure that should be planned and restored with attention to dental contours and convexities, facilitating the re-establishment of function and aesthetics.

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