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Rehabilitation of esthetics after dental avulsion and impossible replantation: A case report

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Abstract

Dental avulsion requires a very fast management. The choice of treatment depends on the extraoral time which partly determines the fate of the avulsed tooth. If replantation is impossible, a prosthetic management is necessary to restore function and esthetics in order to prevent any negative psychological impact. This case reports on a procedure used to restore esthetics to a young adult female patient who had lost a central incisor in a traumatic event without having the tooth replanted in a timely manner. This is a prosthetic alternative that the patient can benefit from while pending for the definitive therapy.

Keywords: Esthetic, dental avulsion, replantation

Introduction

Avulsion is a complete displacement of the tooth out of its alveolar socket, with subsequent damage to the pulp as well as periodontal ligament [1, 2]. Avulsion of permanent tooth is seen in 0, 5-3% of all dental injuries [1]. It's one of the most complicated dental injuries to manage. Consequently it requires an appropriate and rapid treatment to improve prognosis [2, 3, 4]. According to the recommendations of the International Dental Association of Traumatology, replantation of the avulsed permanent tooth is the ideal treatment [3], which can yield the restoration of function and esthetics [3, 4]. The prognosis depends on the extra alveolar time and the storage media [1, 3, 4]. However, when replantation is not possible, the loss of the tooth may cause psychological discomfort leading to a negative impact on life quality [5].

This case addresses a transitional management of dental avulsion sequelae of the superior incisor. The crown of the avulsed tooth was used for the esthetic restoration of the edentulous area while pending for the completion of definitive treatment.

Case presentation

A 20 year old healthy woman was presented in the department of endodontic and restorative dentistry. The patient was suffering from an orofacial trauma that occurred one week before the dental consultation. The injury had caused the avulsion of the maxillary right central incisor. The patient reported that she was referred immediately after the injury to the nearest hospital, where the wound on the upper lip mucosa had been sutured and antibiotic therapy (Amoxicillin 2g/Day) was prescribed. However, no dental care had been performed. The patient had kept the avulsed tooth in milk.

After reviewing the general medical and traumatic history, clinical and radiographic examinations were conducted.

The extraoral examination revealed a swelling of the upper lip. Intraoral examination showed a sutured laceration on the upper labial mucosa with pus discharge [Fig 1]. Palpation of the alveolar labial process of the anterior maxillary region was tender and also revealed that the labial socket's wall of the tooth (11) was lost. The maxillary right central incisor was avulsed. The maxillary right lateral incisor was displaced and had been locked in palatal direction. The tooth (12) was tender to touch or tapping and was not sensitive to thermal tests. Periapical radiographs showed an empty socket of the tooth (11) and a widened periodontal ligament space of the tooth (12) [Fig 2].

The diagnosis was:

- Avulsion of the tooth (11)

- Lateral luxation of the tooth (12)
- Fracture of alveolar process and loss of the labial socket's wall of the tooth (11).

It was explained to the patient that her situation requires an emergency care. The treatment had to include the repositioning of the tooth 12 and then the reduction and the immobilization of the alveolar process. Thereafter, the avulsed tooth (11) can be eventually replaced by an implant. However, due to the patient's limited financial means, she could not afford an implant or any prosthetic solution. So, after having the patient's consent, we managed this case as follows:

The displaced tooth (12) was repositioned. Then, a flexible wire-composite splint was achieved [Fig 3] and occlusal adjustment was performed. The right positioning of the tooth 12 was checked radio graphically [Fig 4]. The antibiotic therapy previously prescribed was adjusted (Amoxicillin 3g/Day, Metronidazol 750g/Day for one week). Instructions about plaque control were advised to the patient. As for the avulsed tooth, it was stored in a saline solution that was being changed daily.

One week after the emergency dental care (explained in the previous paragraph) the crown of the avulsed tooth was prepared for splinting: The root was cut at the cemento-enamel junction [Fig 5.2]. The pulp chamber was emptied and rinsed using sodium hypochlorite 2,5% [Fig 5.3]. The pulp cavity was then subjected to dental conditioning with 10% polyacrylic acid for 10s and filled with Glass Ionomer Cement [Fig 5.4]. The crown of the tooth (11) was entirely well polished and was splinted into its own space by means of a palatal flexible splint [Fig 7 and 8]. The palatal surface of all involved teeth (13-12-11-21-22-23) were etched with a 37% phosphoric acid for 30s. Thereafter, the adhesive was applied and polymerized for 40s. An orthodontic wire was then fixed to the teeth by micro-hybrid composite material that was polymerized for 40s on each tooth. The crown of the tooth (11) was finally included in the splint. The position of the tooth was ensured with finger pressure. Oral hygiene instructions were given.

3 months follow-up period revealed a satisfactory esthetic result [Fig 11.1, 11.2]. The lateral incisor (12) was asymptomatic and showed normal response to mobility, percussion and palpation tests. However, the sensitivity tests results remained negative. Periapical radiographs of control of 3 months showed an early apical resorption [Fig 11.3].



Fig 1: Initial view showing the infected sutured laceration on the upper mucosa, the absence of the (11) and the lateral luxation of the tooth (12)

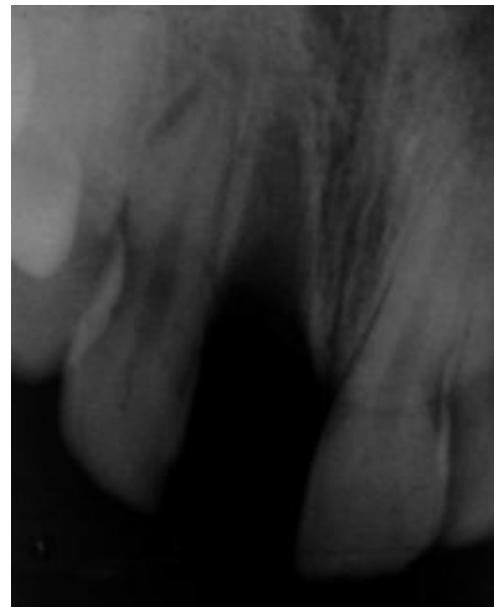


Fig 2: Periapical radiograph reveals the avulsion of the (11) and a widening of periodontal space of the tooth (12)



Fig 3: Repositioning of the tooth (12) and placement of vestibular flexible splint



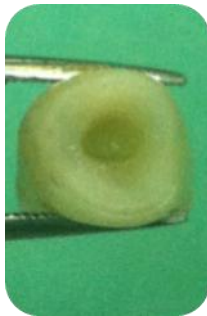
Fig 4: Periapical radiograph showing reduction periodontal space width of the tooth (12)



5.1: The avulsed tooth (11)



5.2: Cutting of the root at the cemento-enamel junction



5.3: Elimination of the pulp chamber content



5.4: Filling of the pulp chamber with glace ionomer cement

Fig 5: preparation of the crown of the tooth (11)



Fig 6: Frontal view showing healing of the alveolar mucosa of the tooth (11)



Fig 7: Placement of the palatal flexible splint



Fig 8: Placement and fixation of the crown of the tooth (11)



Fig 9: Immediate frontal view of the final aspect



Fig 10: A smiling view showing the esthetic integration of the crown (11)



11.1: A Smiling view



11.2: Frontal view



11.3: Periapical radiograph showing an early apical resorption of the (12)

Fig 11: 3 months follow-up

Discussion

In dental trauma, the delay of dental consultation influences therapeutic directive and compromises prognosis [1]. Prognosis of replantation of a permanent avulsed tooth depends on the extra alveolar time [3, 4]. This case presents a complex situation, because the patient was presented late to the dental consultation.

Seven days after tooth avulsion, the alveolar socket was invaded by granular tissue. So the alveolar healing process was advanced. In addition, the labial (vestibular) wall of alveolar socket was lost. Thereby the tooth replantation became unfeasible. Aimed at minimizing the psychological impact of the loss of the tooth, it was essential to restore

transiently esthetic and function [5]. This was not possible on the day of consultation because the injured area was infected. The infection should be controlled first by adjusting the antibiotic therapy to the weight of the patient. However, the infection did not prevent the management of the lateral luxation and alveolar fracture. So the tooth (12) was repositioned and flexible splint was implemented allowing physiologic movement of the teeth during the healing process [6, 7, 8].

In order to restore function and esthetic of the avulsed tooth, it was wise to think about prosthesis or implant treatment. But the limited financial resources of the patient prevented her to currently benefit from one of these options. For this reason, it was suggested to temporarily adopt an alternative solution using the crown of the avulsed tooth as a pontic in a way to get an esthetic and harmonious result. This restoration can be achieved only after the disappearance of all trace of infection or symptoms [Fig 6].

During the second visit, the crown of the tooth 11 was prepared, with respect to the cervical line in order to allow esthetic integration. The pulp chamber was filled and the crown was well polished to prevent plaque retention that may cause gingival inflammation. The fixation of the crown by a flexible palatal splint was made, in order to allow physiologic movement and avoid visibility of wire in smile.

Regarding the tooth (12), as a result of displacement of the tooth following luxation, the vascular supply at the pulpoperiodontal interface could be either partially or totally severed [9, 10]. For teeth with mature root development, the healing process is affected by the small contact area between the ischemic pulp tissue and the periodontal tissue. The incidence of pulp necrosis [11] following lateral luxation injuries in teeth with closed apices has been shown to be 77% [1, 9]. Pulp necrosis can be confirmed if in addition to the loss of pulpal sensibility one of these signs is present: a Grey discoloration of the crown, Periapical radiolucency or other clinic symptoms of infection [10, 11]. So, the only negative response to sensitivity tests does not necessarily mean necrosis. Therefore endodontic treatment should not be initiated systematically. The monitoring must be maintained until the reappearance of pulp sensitivity or confirmation of pulp necrosis [9, 11].

The apical resorption seen in the radiograph follow-up is considered among the changes that can be observed in the first months after luxation. It is a subsequent osteoclastic activity whose purpose is to remove the damaged hard tissue prior to healing. In this case, it is appropriate to take time to observe the progress or regression of eventual clinical and radiographic changes [10].

After 3 months of follow-up, the case showed an esthetic integration of the crown (11). The optimum cooperation of the patient and her rigorous oral hygiene had a primary role in maintaining favorable results with no gingival inflammation.

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