Dental Traumatology 2005; 21: 306–308

DENTAL TRAUMATOLOGY

Case Report

Apexification of a replanted tooth using mineral trioxide aggregate

Villa P, Fernández R. Apexification of a replanted tooth using mineral trioxide aggregate. Dent Traumatol 2005; 21: 306–308.

Abstract – The most important factors determining periodontal healing after replantation of an avulsed tooth are the extra oral period and the media in which the tooth is preserved before replantation. This case report describes an adequate periodontal healing of an avulsed immature tooth replanted after 20 min of extra alveolar dry time. Vitality was not regained and after disinfection of the pulp space mineral trioxide aggregate was used as the root filling. Follow-up confirmed complete healing periradicularly.

Paula Villa[1], Rafael Fernández[2]

[1]Endodontics department of Universidad de Antioquia, [1,2]Universidad Cooperativa de Colombia, and [2]Instituto de Ciencias de la Salud CES+, Medellín, Colombia

Key words: tooth replantation; root resorption; periodontal healing

Paula Andrea Villa Machado, Cra 48 no. 12 sur 70 cons. 307, Medellín, Colombia
Tel.: +574 3133982
Fax: +574 3133982
e-mail: paulavilla@epm.net.co

Accepted 22 September, 2004

When a tooth is avulsed, damage occurs to the periodontal cells and it is necessary to keep it moist in an adequate media for a short period of time in order to preserve the vitality, and allow favorable healing of the ligament once it is replanted (1).

Loss of pulp vitality is another undesirable consequence of tooth avulsion. Several authors maintain that teeth with an immature apex and replanted within a period of 3 h could achieve pulp revascularization (2). However, this often does not occur as this tissue is highly susceptible to bacterial contamination (1). In the event of necrosis and canal infection, it is necessary to disinfect the root canal and stimulate the formation of an apical barrier that would allow an adequate filling, i.e. an apexification procedure. Different techniques to apexification have been suggested, the most common being calcium hydroxide for an undetermined period of time (3, 4).

Mineral trioxide aggregate (MTA) has been suggested for apexification because it provides an adequate seal in the root canal (5), and it appears to offer a biological active substrate that stimulates periodontal cell production (6). It is composed of tricalcium silicate, tricalcium aluminate, tricalcium oxide and silicate oxide, and in a moist environment its setting time is approximately 4 h.

Case report

A 8 years old female patient had an avulsion of the upper right central incisor that occurred 6 months previously. Extra oral period was 20 min wrapped in a paper towel. The tooth was replanted and splinted with a flexible splint for 3 months without endodontic treatment.

Clinical and radiographic examination indicated pulp necrosis with chronic apical periodontitis. There were no signs of root resorption (Fig. 1). The root canal was instrumented and filled with calcium hydroxide for a period of 8 months, during this time complete healing of the periradicular lesion was observed. However, clinically there was no apical barrier that would allow an adequate filling with gutta-percha (Fig. 2). It was decided to completely fill the canal with MTA (Pro Root®, Dentsply Tulsa Dental, Tulsa, OK, USA) (Fig. 3).

Healing continued and at the 24 month follow-up, there were no clinical or radiographic signs of root resorption, and a mineralized barrier of apical tissue was also observed (Fig. 4).

Discussion

When a tooth suffers avulsion, the pulp loses its blood supply. Although revascularization is a

Fig. 1. Preoperative radiograph of the upper right central incisor.

Fig. 3. Radiograph of the upper right central incisors filled with mineral trioxide aggregate.

possibility, often the canal becomes infected. An infected pulp in a traumatized tooth is particularly dangerous because the root damage makes the tooth susceptible to root resorption. In young teeth, this process happens rapidly because of the wide dentinal tubuli which permits easy penetration of bacterial irritants (7–11).

Although in this case the extra alveolar dry time was 20 min and the initial management was not the one recommended by the literature, after 24 months there were no clinical or radiographic signs of root resorption; possibly the damage to the cells of the periodontal ligament was not as extensive as to produce areas of ankylosis or inflammatory

Fig. 2. Radiograph of the upper right central incisor 8 months after treatment with calcium hydroxide.

Fig. 4. Radiograph of the upper right central incisor 24 months after final filling.

resorption. As the coronal length was so short, it was completely filled with MTA (Pro Root®) which favored an adequate seal and created an environment that allowed the formation of an apical barrier of mineralized tissue.

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