Avulsed Tooth Revascularization after 13-Hour Extra-Oral Time

Introduction

Tooth avulsion is a complex injury that affects dental hard tissues, alveolar bone, gingiva, the pulp tissue and the periodontal ligament. Following tooth reimplantation surface resorption of cementum and dentin takes place. In larger trauma cases, the replanted tooth could face replacement resorption or inflammatory related resorption. During the replacement resorption, dentin and cementum are replaced by bone, leading to ankylosis. The inflammatory related resorption of the alveolar bone is the result of infection of the periodontal area, due to the diffusion of remnants from the necrotic pulp. Trauma extent and thus factors affecting the outcome of tooth reimplantation, is affected by: extraoral time and storage media before tooth reimplantation, and the extent of mechanical tissue injury.

Case Report

An 8-year-old girl sustained facial trauma inside her house, which resulted in upper left central incisor (#21) avulsion. The tooth had fully shaped root with open apex (>1 mm). Avulsed tooth was left for 2 hours in dry conditions on the floor and after it was found, it was maintained for 11 hours in a glass full of cubes in a freezer.

Table 1 and figures 1-7 summarize the case management.

Figure 1. Clinical image 13 hours after accident
Table 1. Case Management

<table>
<thead>
<tr>
<th>Examination Time</th>
<th>Clinical and Radiographic Findings</th>
<th>Clinical Steps</th>
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<tbody>
<tr>
<td>1h after the accident</td>
<td>Wound care, lip stitching and tetanus prophylaxis at a public hospital</td>
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<td>13 hours later (first visit)</td>
<td>#21 tooth avulsion, #11 tooth fracture (Fig. 1)</td>
<td>Alveolar socket and avulsed tooth rinsing with sterile saline, #21 reimplantation, semi-rigid splinting, antibiotic prescription (amoxicillin for 7 days)</td>
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<tr>
<td>2 weeks recall</td>
<td>Increased tooth mobility Positive vitality test</td>
<td>Clinical examination Splinting removal</td>
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<tr>
<td>4 weeks recall</td>
<td>Clinical Examination Increased tooth mobility Positive vitality test</td>
<td></td>
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<tr>
<td>6 weeks recall</td>
<td></td>
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<tr>
<td>3 months recall</td>
<td>Clinical &amp; Radiographic Examination (Figs. 2 and 3) Increased tooth mobility Positive vitality test Radiographic signs of possible root resorption</td>
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<tr>
<td>6 months recall</td>
<td>Clinical &amp; Radiographic Examination (Figs. 4 and 5) Increased tooth mobility Positive vitality test Radiographic signs of possible root resorption</td>
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<tr>
<td>12 months recall</td>
<td>Clinical &amp; Radiographic examination (Figs. 6 and 7) Normal tooth mobility Positive vitality test Radiographic signs of possible root absorption are stable</td>
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Figure 2. Clinical image at 3 months recall

Figure 3. Radiographic image at 3 months recall

Figure 4. Clinical image at 6 months recall

Figure 5a and b. Radiographic images at 6 months recall
of avulsed teeth might be indicated as a potential means of preservation. Socket was rinsed with saline before reimplantation, but no mechanical scraping or chemical root surface treatment was performed in order to avoid causing additional mechanical trauma.

The most practical method that allows normal tooth movement and acts as a functional stimulus for periodontal healing is the use of wire splints and composite resin for 1-2 weeks.

In conclusion, in cases of avulsed permanent teeth with prolonged extra-oral storage time, reimplantation should be the first possible treatment, although the risk of replacement resorption and tooth loss may be highly probable. If managed properly, avulsed teeth can remain functional for many years and minimize the need of applying other prosthetic restorations, or in worse apply them in later time with more options available.

References


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