



DIAGNOSIS FOLLOWING DENTAL AVULSION: A LITERATURE REVIEW

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ABSTRACT

Dental trauma refers to injury to the teeth and periodontium (gums, periodontal ligament, alveolar bone), and nearby soft tissues such as the lips, tongue, etc. Dental trauma is accounting for a major part of dental problems in children and adolescents. Among various types of dental injuries-Tooth avulsion (exarticulation) implies total displacement of the tooth out of its socket. This kind of dental trauma causes the periodontal ligaments to be severed with or without fracture of the alveolus. Dental avulsion is an emergency in which prompt diagnosis and management (within 20–40 minutes of injury) results in favourable prognosis of the tooth.

Keywords: Traumatic dental injuries, Dental Avulsion, Neurologic assessment, Hard tissue and soft tissue examination .

INTRODUCTION

Oral health influences the quality of life as it directly affects how people look, speak, smile, chew, taste and enjoy food. Thereby, it affects the socialization process, self-esteem, self image and the feeling of social well-being. Traumatic Dental Injuries (TDIs) are significant conditions affecting oral health, esthetics and quality of life.¹ Prevalence of dental trauma varies among different countries, age groups, genders, socioeconomic environments etc. Traumatic injuries to permanent teeth include coronal and root fractures, subluxations, luxations and avulsions. Avulsion (exarticulation) implies total displacement of the tooth out of its socket. This kind of dental trauma causes the periodontal ligaments to be severed with or without fracture of the alveolus.² Reported incidence of dental avulsion is 0.5-3% of all dental injuries.³ One of the ideal treatment of avulsion injury is immediate replantation. But before giving the definitive treatment in avulsion injuries it is important to follow some important examination and diagnostic protocol.

HISTORY TAKING, EXAMINATION AND DIAGNOSIS FOLLOWING AVULSION INJURY

History taking and an examination leading to a diagnosis are fundamental in all aspects of clinical dentistry. But in case of traumatic dental injury as the child have recently sustained traumatic injuries, will be in a state of emotional stress. When examining such a patient, it is important to record all relevant findings in one attempt if at all possible. The first step in such cases is to do neurologic assessment.

1) Neurologic assessment: Damage to the cranial nerves may be associated with both the minor and major trauma to parts of the craniofacio-oral complex. Before any definitive diagnosis or treatment, a quick initial patient assessment, based on observation, must be made to determine whether neurologic damage has occurred. Following are the signs and symptoms of neurologic damage⁴:

- Inability of the patient to walk or stand unsupported: YES /NO
- The patient appears lethargic or confused : YES/ NO
- Unusual verbal response to questions: YES/ NO
- Nausea or vomiting : YES/ NO
- Headache: YES/ NO
- Bleeding or discharge of clear fluid from the ears or nose: YES /NO
- Abnormal position or movements of the eye : YES/ NO
- Asymmetric or decreased reactions of the pupils: YES/ NO

If there are any suggestions of neurologic damage, a neurologic referral need to be made prior or after the dental management depending upon the severity of the condition.

2) History of traumatic injury and accident details : Maximum information can be elicited in just three questions.

- **When did the accident occur?** For tooth avulsion, the time elapsed between the injury and the replantation of teeth determines its prognosis as it had been stated that periodontal ligament cells can be expected to survive healthily a dry time of 15 min or less and if dry time is from 15-60 mins the periodontal ligament cells will be in compromised condition which need to be managed accordingly to achieve favourable prognosis but periodontal ligament cells are unlikely to survive a dry time of more than 60 min.⁵
- **Where did the accident occur?** If the accident occurred in particularly dirty environment, prophylactic tetanus treatment is indicated after evaluation of the immunisation status of the patient. The whereabouts of the accident may be important if liability for the accident has to be determined for legal purposes.

- **How did the injury happen?** This information will guide us toward the associated injuries which might have occurred along with avulsion. A child may fall while sucking an object and will possibly suffer dislocation of the anterior teeth palatally along with avulsion. A direct blow to the chin may cause a fracture in the condylar region and fracture of molar and premolar crowns.⁶ In children, when there is marked discrepancy in clinical findings and the history given, then child abuse and neglect should be suspected.

2) Clinical examination: An adequate clinical examination depends upon a thorough examination of the entire injured area and the use of special examination techniques. The clinical examination can be categorized as following: a) Extraoral examination b) Intraoral examination

2(a) Extra oral examination: The extra oral examination begins immediately as the patients enters the clinic. It can be performed by inspection and palpation.

Inspection • Initial signs of neurologic involvement can be noted as it has been previously described • Facial asymmetry should be recorded • Soft tissue lacerations should be noted. • Extra oral wounds might give us an idea about the internal dentoalveolar injuries e.g. a wound located under the chin suggests dental injuries in the premolar and molar regions and concomitant fracture of the mandibular condyle or symphysis.⁶ • Wounds penetrating the entire thickness of the lip can frequently be observed, often demarcated by two parallel wounds on the inner and outer labial surfaces .If present, the possibility of tooth fragments buried between the lacerations should be considered. Careful radiographic examination of the involved soft tissues is necessary to disclose these fragments. ^{7,8}

Palpation: The frontal cranium and midface (zygomatic bone, zygomatic arches, orbital rims and the nasal complex) should be palpated to detect bony irregularities, step-offs, crepitus and sensory disturbances. It is crucial for decision making to ensure that one hand stabilizes the skull so that the examiner's contralateral hand can provide movements which can be assessed. • Outline of the mandible should be traced bilaterally and sites of tenderness or step deformities should be recorded. • Evaluation for the movement of mandible should be performed along with temporomandibular examination to check any difficulty in opening, closing, lateral excursions ,deviation and deflection. • If fracture of any of the bone of craniofacial complex is suspected while extraoral examination, further investigation should be performed using radiographs to confirm the findings.

2b) Intra oral examination: The procedure for intraoral examination should follow the following set order: • The soft tissues • The hard tissues in general • The hard tissues specifically

Soft tissue examination: Note any laceration and abrasion of the gingivae, labial and buccal mucosa. Examine the tongue for penetrating wounds ,the presence of embedded

tooth fragments should always be suspected in these case. Move tongue to one side and inspect the floor of the mouth. A hematoma in the floor of the mouth indicates mandibular fracture. Note any bleeding from the gingival sulcus of adjacent teeth of avulsed tooth that may indicate injury to the peridontium of the adjoining teeth.

Hard tissue examination in general: Note any occlusal abnormalities and in addition examination of the alveolar socket is done to ascertain if it is intact and suitable for replantation. This is accomplished by facial and palatal palpation. The socket is gently rinsed with saline and, when clear of the clot and debris, its walls are examined directly for the presence, absence, or collapse of the socket wall. Movement of a segment of bone as well as multiple teeth (together) is suggestive of an alveolar fracture. ⁷

Hard tissue examination specifically: Here the results of trauma to teeth should be looked at in detail. Along with avulsion of tooth other types of traumatic dental injuries can also be expected.

- Type of fracture: Note the type of fracture sustained by other teeth , using the descriptive classification for traumatic dental injuries.
 - Displacement: Teeth may suffer labial, lingual, palatal or lateral displacement as well as intrusion, extrusion along with avulsion injury .These should be noted and treated accordingly.
 - Mobility: On clinical examination mobility can be recorded in the adjoining teeth of the avulsed tooth. Horizontal mobility is determined by placing a mirror handle on labial and palatal aspect of the tooth and gently applying the alternate pressure. To determine the vertical mobility a gentle pressure is applied to the incisal or occlusal surface of the tooth.
 - Root fracture: The presence of root fracture is more difficult to determine clinically, and the use of radiographs is mandatory for accurate diagnosis

Special investigation: Special investigations are used to confirm or re-enforce a clinical diagnosis and should not themselves be used in isolation. The most useful special investigative tool available to the dental surgeon is the radiograph. Radiographic evaluation for an avulsed tooth should be carried out in following conditions:

- When there is suspicion of bone fracture: In cases where the avulsed tooth is found, radiographs should only be taken if the clinical examination arouses suspicion of bone fracture. Extra oral radiographs should be taken in these cases. The panoramic and the lateral oblique views are very useful for this purpose.
- When avulsed tooth is not found: Moreover in cases where the avulsed tooth is not found there is an indication for radiographic examination since a fractured root may be left in the alveolus and there are also possibilities of aspiration or swallowing teeth at

the time of injury,so it is always advisable to refer the patient to a hospital for the radiographs of chest and the abdomen.

- Suspicion of root fracture in adjoining teeth: When root fracture is suspected in the adjoining teeth,then a occlusal radiograph should be made and the position of the beam should passes obliquely through the tooth and so in line with the fracture. However, the fracture will only be visible if the central beam is within a maximum angular deviation of 15-20⁰ from the fracture site. If a fracture is suspected take two more periapical views, one at an angulation of 15⁰ more than the original occlusal view and one 15⁰ less.

- Suspicion of tooth fragment in soft tissue: Tooth fragments in the lip can be demonstrated by placing a film in the buccal or labial sulcus using a short exposure time i.e ¼ th of the time used for conventional radiographs or low kilovoltage. ⁹

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