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Management of Trauma to the Teeth and Supporting Tissues

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Management of Trauma to the Teeth and Supporting Tissues

Injuries to the teeth of children or adults present unique problems in diagnosis and treatment. The diagnosis of the extent of the injury after a blow to a tooth, regardless of loss of tooth structure, is difficult and often inconclusive. Trauma to a tooth is invariably followed by pulpal hyperemia, the extent of which cannot always be determined by available diagnostic methods. Congestion and alteration in the blood flow in the pulp may be sufficient to initiate irreversible degenerative changes, which over time can cause pulpal necrosis. In addition, the apical vessels may have been severed or damaged enough to interfere with the normal reparative process. Treatment of injuries causing pulp exposure or tooth displacement is particularly challenging because the prognosis of the involved tooth is often uncertain.

One of the most common dental problems in children is an injury to both the primary and permanent teeth and the supporting structures which vary in its severity from a simple condition like mild chipping of the enamel to severe cases like in maxillofacial injury that demand specific dental treatment. Complications, like malformation, degeneration, necrosis, abscess formation and even tooth loss from the arch, will result if the condition is left untreated. The likelihood of success often depends on the rapidity with which the tooth is treated after the injury, regardless of whether the procedure involves protecting a large area of exposed dentin or treating a vital pulp exposure.

Trauma has a great psychological impact on both the child and his parents, since these fractures may affect the child's appearance and make him the target for teasing by other children. Trauma to the dentition should always be considered an urgent condition, which should be treated immediately and efficiently.

Prevalence of dental trauma:

The prevalence of dental injury varies according to different nationalities. It is more in primary dentition than it is in the permanent dentition.

Age distribution:

Peak incidence for primary dentition is 2-4 years (This is the age when a child learns to toddle and is relatively uncoordinated).

For permanent dentition and according to many Iraqi studies, the highest occurrence of dental injury was found in the age interval of 9-11years of age (This could be attributed to the fact that children are usually more active in this period of life and they cannot precisely evaluate velocity and danger)

Gender:

For permanent teeth, boys are more susceptible to traumatic injuries than girls in the ratio of 1.5: 1(according to Iraqi study in 2011). In primary dentition no sex predilection was seen.

Seasonal variation:

A relationship seems to exist between the time of the year and the prevalence of dental injuries. These seasonal studies have shown that the frequency of the injuries increases during autumn and winter (time of school beginning).

Site:

Majority of the injury occurred to the anterior teeth and in particular to the maxillary central incisor.

Notes:

Injuries to anterior teeth can be classified as **direct** or **indirect**.

Predisposing factors for traumatic dental injuries include physical features such as increased incisal over jet, open bite, protrusion and lip incompetence.

The common causes of trauma to teeth are listed below:

- ✓ Falls and collisions
- ✓ Sporting activities
- ✓ Domestic violence (e.g. Child abuse)
- ✓ Road traffic
- ✓ Inappropriate use of teeth.
- ✓ Presence of illness (e.g. learning difficulties or physical limitations: Epilepsy, Cerebral palsy, Learning difficulties, Hearing and visual impairments).

In primary teeth, injury usually results in displacement or avulsion of teeth rather than fracture.

Trauma to the face:

It will cause either tooth fracture or displacement. Tooth fracture may be the cause of concussion or subluxation, displacement which is either partial or total.

1. Tooth Fracture: The first thing occur:

a. Concussion: Sensitivity of the tooth due to trauma without abnormal loosening or mobility. The tooth may be sensitive to percussion usually caused by a mild blow.

b. Subluxation: Loosening of the tooth without displacement, due to a more severe blow resulting in injury to periodontal ligament.

2. Displacement /luxation: a. partial displacement

b. total displacement **(avulsion)**

Partial displacement: caused by direct or indirect trauma.

Injuries caused by direct trauma may cause:

1. Palatal or lingual movement of the tooth with palatal fracture of the alveolar bone.
2. Palatal or lingual movement of the tooth with buccal alveolar bone fracture.
3. Displacement of the tooth from its socket without alveolar bone fracture and the tooth appear longer **(Extrusion)**.

Injuries caused by indirect trauma may cause:

1. Labial movement of the tooth with fracture of palatal or lingual alveolar bone.
2. Labial movement of the tooth with fracture of labial alveolar bone.
3. Displacement of a tooth in an apical direction **(Intrusion)**.Tooth is pushed into the socket, the tooth appear shorter and it may cause fracture of the bone at the floor of the socket in most of the cases.

HISTORY OF THE INJURY

A dental injury should always be considered as an emergency and be treated immediately to relieve pain, facilitate reduction of displaced teeth and improve prognosis. Rational therapy depends upon a correct diagnosis, which can be achieved with the help of various examination techniques.

The time of the injury should first be established. Unfortunately, many patients do not seek professional advice and treatment immediately

after an injury. Occasionally the accident is so severe that dental treatment cannot be started immediately because other injuries have higher priority. Patients and parents do not give importance to traumatic dental injuries and have tendency of attending after a time elapsed or waiting until they had acute symptoms of inflammation and/or esthetic problems.

If the force strong enough to fracture, intrude, or avulse a tooth, it is also strong enough to result in cervical spine or intracranial injury. The dentist must be particularly alert to such potential problems, be prepared ahead of time to make a neurologic assessment, and make appropriate medical referral when indicated without delay. The patient should be assessed for nausea, vomiting, drowsiness or possible cerebral spinal fluid leakage from the nose and ears, which would indicate a skull fracture, the patient should be evaluated for lacerations and facial bone fractures.

Obtaining a baseline temperature, pulse, blood pressure, and respiratory rate should be considered as information to be gathered before addressing the dental needs of the patient.

A quick cranial nerve evaluation involving the following four areas:

1. Extraocular muscles are intact and functioning appropriately; that is, the patient can track a finger moving vertically and horizontally through the visual field with the eyes remaining in tandem.

2. Pupils are equal, round, and reactive to light with accommodation.

3. Sensory function is normal as measured through light touch to various areas of the face.

4. Symmetry of motor function is present, as assessed by having the patient frown, smile, move the tongue, and perform several voluntary muscular movements.

Taking a complete dental history can help the dentist learn of previous injuries to the teeth in the area. Repeated injuries to the teeth are not uncommon in children with protruding anterior teeth and in those who are active in athletics. In these patients the prognosis may be less favorable. The dentist must rule out the possibility of a degenerative pulp or adverse reaction of the supporting tissues as a result of previous trauma.

1) The prognosis of an injured tooth depends logically, often to a great extent, on the time that has elapsed between the occurrence of the accident and the initiation of emergency treatment. This is particularly true in cases of avulsion and pulp exposure, for which pulp capping or pulpotomy would be the procedure of choice.
2) The prognosis of the injured teeth maintaining pulp vitality diminished when treatment was delayed. The loss of vitality of some injured teeth occurred as early as 3 months and as late as 24 months after the injury, which justifies a long follow-up period after injury.

3) The patient's complaints and experiences after the injury are often valuable in determining the extent of the injury and in estimating the ability of the injured pulp and supporting tissues to overcome the effects of the injury.

A. Pain caused by thermal change is indicative of significant pulpal inflammation.

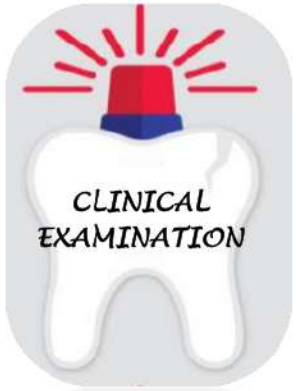
B. Pain occurring when the teeth are brought into normal occlusion may indicate that the tooth has been displaced. Such pain could likewise indicate an injury to the periodontal and supporting tissues.

C. Spontaneous pain can indicate damage to the tooth supporting structures, e.g., hyperemia or extravasation of blood into the periodontal ligament. Damage to the pulp due to crown or crown-root fractures can also give rise to spontaneous pain.

D. Mobility of the tooth at the time of the first examination increase the likelihood of eventual pulpal necrosis. The greater the mobility, the greater the chance of pulpal death.

4) Trauma to the supporting tissues may cause sufficient inflammation to initiate external root resorption. In instances of severe injury, teeth can be lost as a result of pathologic root resorption and pulpal degeneration.

CLINICAL EXAMINATION



For any fracture case, an accurate medical and dental history should be taken with record information about the condition involves that could be related to the:

1. Cause of the fracture
2. Place of fracture which could be dirty, contaminated, or clean place, the place of accident may indicate a need for tetanus prophylaxis.
3. The Time of fracture for the treatment plane (for ex. To see the vitality of the tooth). If the fracture before one year, there is high probability that the tooth is non-vital.
4. Pain is very important in determining the extent of the injury.

The clinical examination should be conducted after the teeth in the area of injury have been carefully cleaned of debris. When the injury has resulted in a fracture of the crown, the dentist should observe the amount of tooth structure that has been lost and should look for evidence of pulp exposure. With the aid of a good light, the dentist should carefully examine the clinical crown for cracks and craze lines, the presence of which could influence the type of permanent restoration used for the tooth. With light transmitted through the teeth in the area, the color of the injured tooth should be carefully compared with that of adjacent uninjured teeth. **Severely traumatized teeth often appear darker and reddish (why?).**

Diangelis and colleagues have advocated the following classification of crown fractures in describing the extent of damage to the crown of the tooth:

Crown fracture–uncomplicated: an enamel fracture or an enamel-dentin fracture that does not involve the pulp.
Crown fracture–complicated: an enamel-dentin fracture with pulp exposure.

A complete history provides information important for diagnosis and treatment. Following points should be recorded:

1) Patient's name, age, sex, address, and telephone number.
2) When did the injury occur?
3) Where did the injury occur?
4) How did injury occur
5) Treatment elsewhere.
6) History of previous dental injuries.
7) General health.
8) Did the trauma cause drowsiness, vomiting, or headache?
9) Is there spontaneous pain from the teeth?
10) Are the teeth tender to touch or during eating.
11) Is there any disturbance in the bite?
12) Recording of extra oral wounds and palpation of the facial skeleton
13) Recording of injuries to oral mucosa or gingival injuries.
14) Examination of crowns of teeth.
15) Recording of displacement of teeth.
16) Disturbances in occlusion.
17) Tenderness of teeth to percussion and change in percussion tone
18) Reaction of teeth to pulpal testing.