

# INTERDISCIPLINARY APPROACH IN MANAGEMENT OF DENTAL TRAUMA IN A YOUNG CHILD

Krishna Kumar<sup>1</sup>, Priya Subramaniam<sup>1</sup>, Girish Babu<sup>1</sup>

Department of Pedodontics and Preventive Dentistry,

<sup>1</sup>The Oxford Dental College and Hospital, Bangalore, India

**Introduction:** Traumatic injuries to the teeth of children present unique problems in diagnosis and treatment. Dental injuries are considered an emergency that requires immediate care. The challenge to the dentist is the young age of the child, parental anxiety and unfavorable sequelae such as tooth discoloration, loss of teeth, dilaceration and odontoma-like malformations. Injury to the maxillary incisors during preadolescence or adolescence is common.

**Case report:** A 13 year old boy presented with a two year old history of dental trauma accompanied with loss of a permanent anterior tooth. He also complained of mild sensitivity of an intermittent nature in relation to the lower anterior teeth since 6 months. Clinical examination showed a discolored non-vital permanent maxillary left central incisor with crown fracture, which gave a negative response to both thermal and vitality tests. The adjacent permanent lateral incisor was missing, with space loss. There was a localized swelling in relation to the mandibular anterior region which was firm in consistency and non tender on palpation. All permanent mandibular anterior teeth were vital and showed no mobility. There was no expansion of cortical bone. There was absence of regional lymphadenopathy. The medical history was not contributory. Parental consent was obtained prior to treatment.

## Treatment Objectives:

- To retain the traumatized permanent teeth and restore them to normal function and esthetics.
- To maintain integrity of the dental arch in a young growing adolescent.
- To manage oral pathological lesions by a conservative surgical approach.
- To apply tissue engineering to achieve bone regeneration and short term healing.

## Pre operative

### Maxillary arch

#### Clinical



Discoloured 21, missing 22 with space loss

#### Radiographic

#### IOPAR



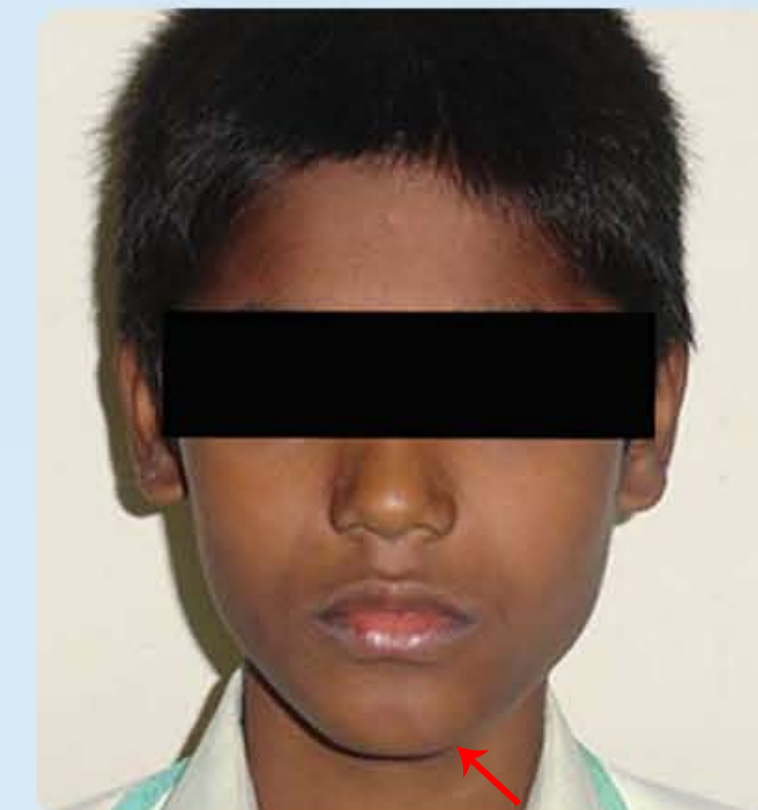
#### Occlusal



Wide open apex (3mm) irt 21 with thin lateral walls, missing 22 and calcific structures in the midline

### Mandibular arch

#### Clinical



Extra oral swelling (arrow) irt anterior region

#### Radiographic

#### IOPAR



#### Occlusal



A well circumscribed radiolucency with scalloped outline extending from 33 to 43 (1.5cm X 1cm)

## Treatment

### Surgical procedure

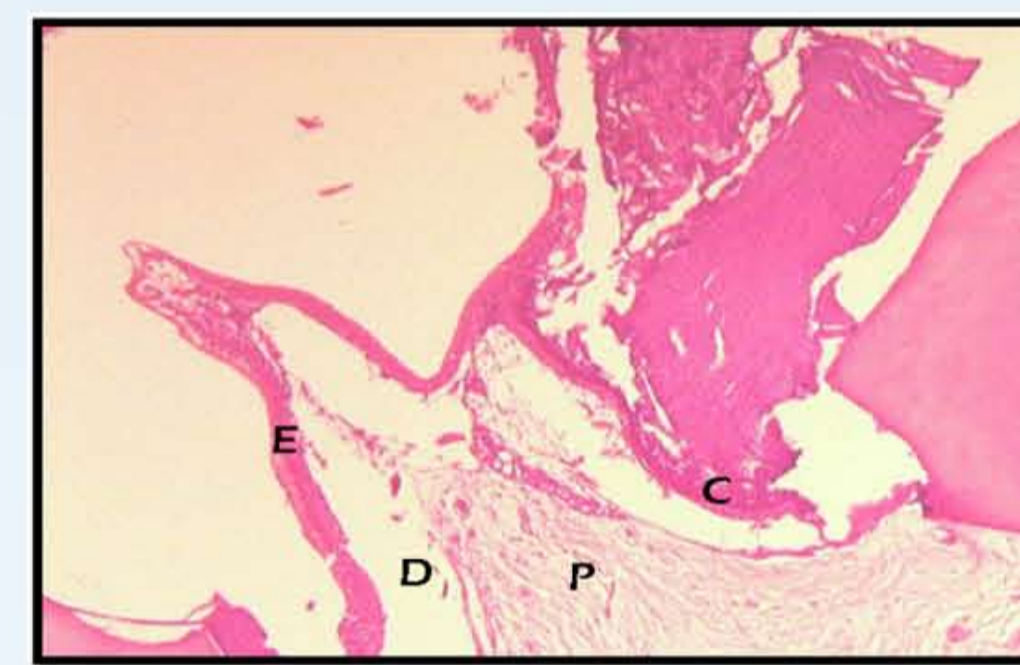


Palatal Flap Elevation and surgical removal of odontoma



### Maxillary arch

#### Histological picture



Specimen is composed of dentin (D) and cementum (C) with centrally located loose fibrous tissue representing pulp (P)

### Orthodontic correction



Space regained irt 22 with fixed orthodontics and light forces Porcelain fused to metal crown was cemented on 21



### Endodontic procedure



Retrograde apical sealing of 21 with MTA

#### IOPAR



Apical barrier with MTA



### Mandibular arch

#### Histological picture



Presence of fibrous connective tissue and normal bone

### IOPAR showing lesion resolution and bone regeneration



Immediate post operative



3 Months



6 Months



1 year

### Functional and esthetic rehabilitation



Interim replacement of 22 using resin reinforced fibre and flowable composite resin - "Besin Bonded Bridge"



**Discussion:** Traumatic injury in this young patient resulted in dental disturbances that required an interdisciplinary approach. Various treatment modalities including surgical, endodontic, orthodontic and esthetic procedures were planned over multiple visits, so as to provide complete oral rehabilitation. Odontomas are often seen with delayed eruption or impacted permanent teeth and retained primary teeth. An unusual finding was the association of compound odontomas with "fully erupted" maxillary incisors. The compound odontoma recapitulates the organization of a normal tooth. Although it is composed of enamel, dentin, cementum and pulpal tissue, mature enamel was lost during decalcification processing.

Apexification with Mineral Trioxide Aggregate (MTA) at the time of surgery was crucial to retain a young permanent tooth. MTA is biocompatible, has excellent sealing capacity and the apical barrier formed resists displacement during obturation of thin-walled immature canals. During adolescence, esthetics is a major concern, and therefore space was regained by orthodontic intervention and a resin-bonded bridge was given. Although implant restoration is a popular option, they cannot be placed until skeletal growth is complete.

In the mandibular arch, differential diagnosis of the cystic lesion was odontogenic keratocyst (OKC) and traumatic bone cyst (TBC). However, OKC grows aggressively and may cause cortical thinning, tooth displacement, and root resorption. Microscopic examination shows typical cystic lining and is filled with a "cheesy material" mainly consisting of keratin. TBC is an uncommon cyst that could develop in response to trauma. Apart from pain, an unusual symptom includes tooth sensitivity. Teeth adjacent to the lesion are usually vital with no mobility, displacement or root resorption. Characteristic radiographic feature of TBC is the "scalloped effect" extending between roots of the teeth. Definitive diagnosis is the empty cavity without epithelial lining, leaving normal bone and occasional fibrous tissue on the cavity wall.

Following cystic enucleation, a relatively newer regenerative agent, Platelet-Rich-Fibrin (PRF) was used to promote tissue healing and bone induction through its various growth factors. PRF is a second-generation platelet concentrate, which has advantages over Plasma Rich Protein (PRP). These include simplified processing and lack of biochemical handling of blood, which makes it strictly autologous. The patient's blood was centrifuged at 3000 rpm for 10 minutes, and the middle fraction containing the fibrin clot was collected to obtain PRF. During preparation, the slow polymerization seems to generate a fibrin network leading to more efficient cell migration and proliferation. PRF is able to progressively release cytokines during fibrin matrix remodeling, which might explain resolution of the lesion and healing over a relatively short period of time.

**Conclusion:** Treatment of severe traumatic injuries in growing patients requires interdisciplinary cooperation to optimize the clinical outcome and achieve high quality treatment results.

## References:

1. Andreasen FM, Andreasen JO. Textbook and Color Atlas of Traumatic Injuries to the Teeth Oxford, Blackwell 4th ed. 2007.
2. Shafer WG, Hine MK, Levy BM, Rajendran R, Sivapathasundaram B, editors. Shafer's Textbook of Oral Pathology. New York, NY, USA: Elsevier; 5th ed. 2006.
3. Parirokh M, Torabinejad M. Mineral trioxide aggregate: a comprehensive literature review--Part III: Clinical applications, drawbacks, and mechanism of action. J Endod. 2010 Mar;36(3):400-13
4. Par Wiltfang J, Terheyden H, Gassling V, Acyl A. Platelet rich plasma (PRP) vs. platelet rich fibrin (PRF): Comparison of growth factor content and osteoblast proliferation and differentiation in the cell culture. In: Report of the 2nd International Symposium on growth Factors (SyFac 2005).
5. Choukroun J, Diss A, Simonpieri A, Girard MO, Schoeffler C, Dohan SL, et al. Platelet-rich fibrin (PRF): A second generation platelet concentrate: Part I: Technological concepts and evolution. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2006;101:E37-44.