

All About A Central Incisor- Traumatic Implication & Endodontic Prospective

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The upper central incisor is often thought to be the easiest tooth to treat in the oral cavity. But an experienced clinician well knows the variety of pathology that can befall a central incisor. We present a case series of non-surgical endodontic management of the entire spectrum of endodontic pathologies that can occur in relation to an upper central incisor.

Introduction

Traumatic injuries of teeth are one of the main causes of emergency treatment in dental practice. They occur most commonly in young patients, and vary in severity from enamel fractures to avulsion. They can also occur secondary to falls, fights, sporting injuries and road accidents.

Epidemiological studies have shown that the most common tooth to become traumatized is the maxillary central incisor. The maxillary central incisor is usually the most visible of all teeth in the mouth. Its function is for shearing or cutting food during mastication, phonetics and aesthetics.

Andreasen (1990) has stated that all dental traumas must be considered as emergency cases and treated rapidly, so that, the prognosis will be improved by pain removal and correction of displaced teeth. However, the traumatized anterior tooth needs more attention. It is noteworthy that the traumatized teeth improve their chances of survival through careful evaluation and correct treatment done rapidly, unless complications such as teeth misshaping, pulp necrosis, apical radiolucencies, partial or total pulp calcification, root resorption, marginal periodontal bone loss, mainly happen. In some conditions even the displacement of the

teeth or tooth loss may occur.

Zadik et al. (1979) studied the teeth which had suffered from fracture of the enamel and dentin without pulp exposure to assess the period during which delayed pathologic changes may occur. They concluded that the most pathologic changes occur within the first 6 months following trauma. This finding necessitates the need for rapid management of traumatized teeth.

In an investigation done by Al Nazhan et al (1995), the complications arising from delayed management of traumatized permanent teeth were studied. It was found that most of the patients had a treatment delay exceeding 1 month. When the fracture involved both enamel and dentin, the frequency of pulp necrosis was 53%. It should be considered that the prognosis of traumatized teeth is also different. Treatment delay, affected region, type and extent of trauma and developed treatment option are some determining factors of the prognosis.

In this paper, we present the management of various traumatic clinical presentation of the maxillary central incisor in our department.

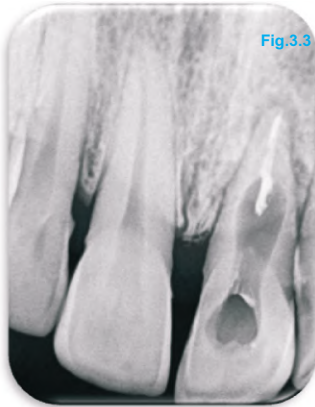
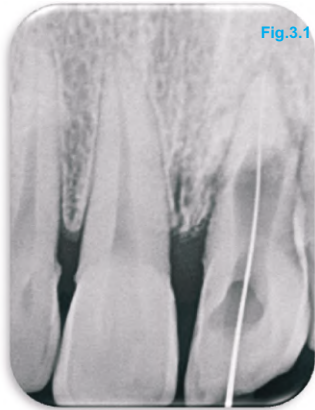
Case Report

Case 1: A young female patient with unclear history of trauma and tooth discolouration reported to the department of Conservative Dentistry and Endodontic. Her medical history was non-contributory. Clinical examination revealed that there was discolouration in relation with upper left central incisor (Fig. 1). Vitality testing by thermal method yielded no response, the affected tooth was diagnosed non-vital. Radiographic examination showed unusual

oval enlargement (ballooning out) of the root canal space which was indicative of Internal Resorption in relation to 21. (Fig. 2)

The treatment of choice was pulpectomy followed by cleaning and shaping, sectional obturation of apical 4mm and thermoplasticized gutta-percha obturation technique using Calamus™ was carried out to fill the remaining canal. (Fig. 3)





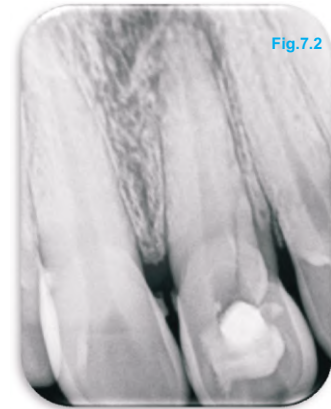
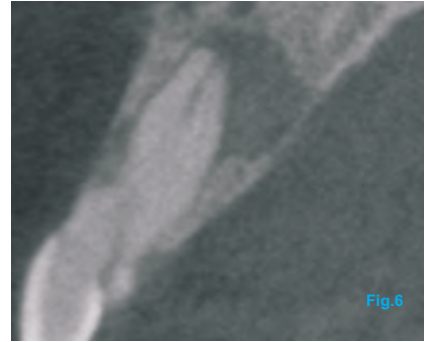
Clinical examination revealed that there was a swelling on the palatal surface located on the transverse folds of mucous membrane of palate of approximately 1×1.5 cm in size (Fig. 4). Pulp vitality testing by thermal method yielded no response in relation to 21.

Radiographic assessment showed periodontal widening in the apical 3rd area of the root of 21 and diffuse radiolucency periapically. (Fig. 5)

CBCT evaluation revealed presence of a cyst of size 5.6×6.1 mm with well corticated border apical to 21. (Fig. 6)

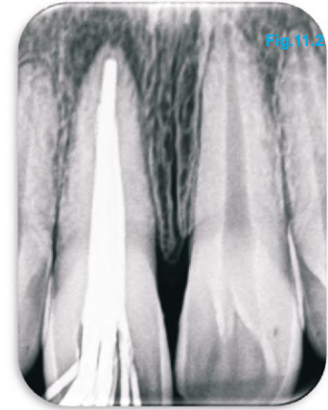
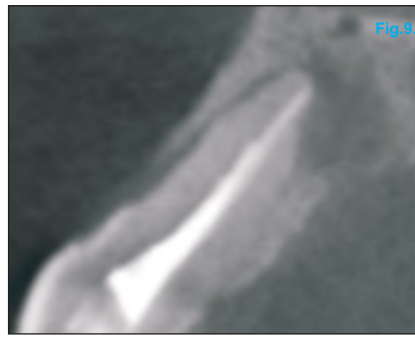
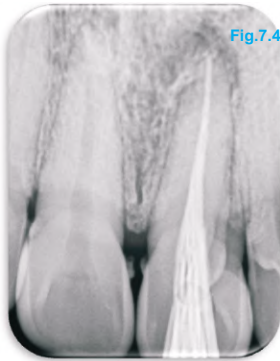
Based on history, clinical examination and radiographic examination, a diagnosis of radicular cyst in relation to 21 was made and treatment plan was formulated to manage the case through conservative non surgical approach. Pulpectomy followed by cleaning and shaping and Ca(OH)₂ dressing for 2 weeks was carried out and obturation with lateral condensation technique was done (Fig. 7).

After 3 month follow-up, reduction in the size of cyst was seen (Fig. 8). Patient was completely asymptomatic. Increase in cortical plate thickness and initiation in trabeculation was seen in the CBCT. Clinical evaluation revealed that the swelling had subsided intraorally (Fig. 9).



Case 2: A 23 year old female patient reported to the department with a chief complaint of swelling on the hard palate and a history of trauma in upper front region 10 years ago.

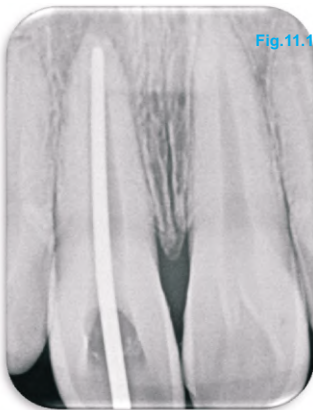
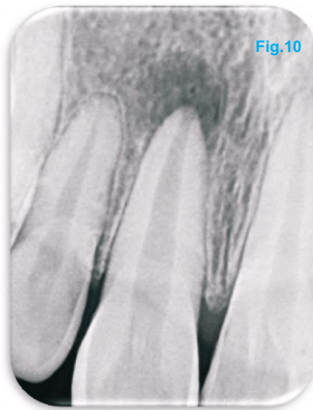




Case 3: A young male patient presented to the department with a chief complaint of discoloration with upper front tooth. He had no significant medical history. Clinical examination revealed tooth discoloration in relation to 11. Vitality testing with thermal method yielded no response.

Radiographic examination revealed open apex with periapical granuloma in relation to 11 (Fig. 10). Pulpectomy followed by cleaning and shaping was carried out keeping working length 2 mm short of apex according to the working length determination method by Weine followed by lateral condensation obturation with butt-end technique modification (Fig. 11).

Six month patient follow-up radiograph showed healing of periapical lesion (Fig. 12). Patient was completely asymptomatic.

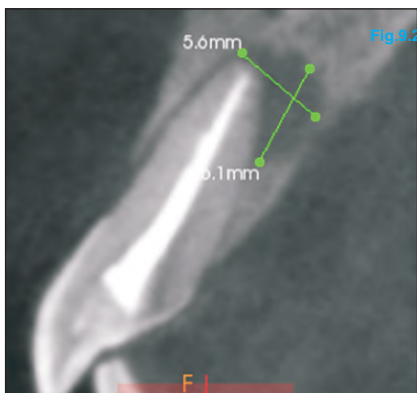
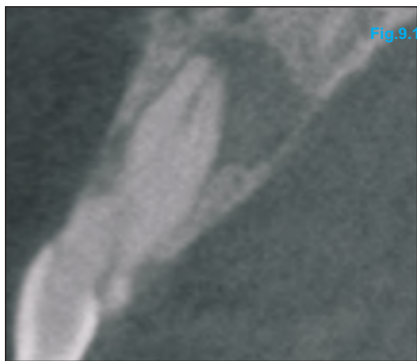


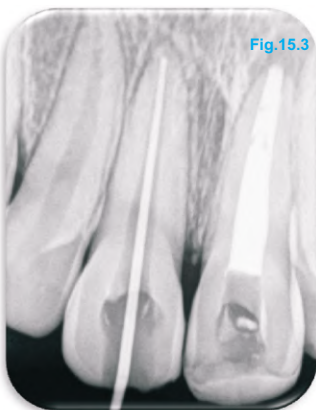
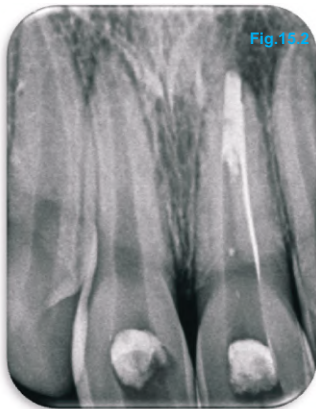
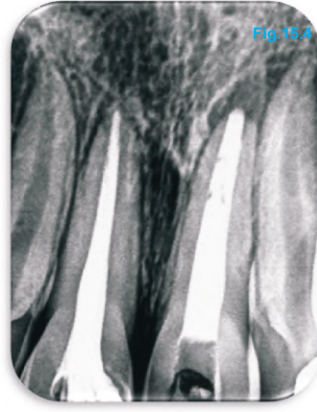
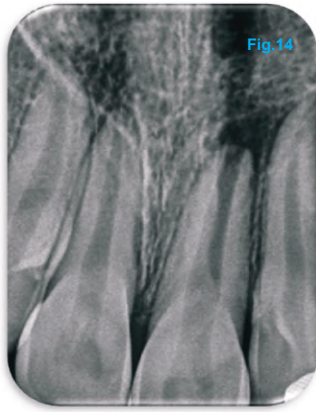
Case 4: A 16 year old male patient with a history of fall 9 years back presented to the department with pain. Clinical examination of 11 showed Ellis & Davey's Class 2 fracture (Fig. 13). Pulp vitality test was performed in relation to 13,12,11,21,22,23. 11 gave no response and 21 gave a delayed positive response.

Radiographically, 11 showed open apex with ill-defined radiolucency and bone loss periapically and 21 showed periodontal widening along the root length (Fig. 14).

Treatment plan of apexification with apical MTA plug was finalised. Cleaning and shaping followed by 1 week of calcium hydroxide dressing was given. Apical MTA plug was placed into the canal upto apical 5mm and backfilling obturation technique to fill the remaining canal was performed using Calamus™ subsequently (Fig. 14).

Radiographic evaluation at 2 weeks showed periapical healing with new bone formation and reduction in periapical radiolucency (Fig. 15).





facilitate flow of MTA in to the fracture line and then the selected file was coated with MTA and inserted into the canal to act as intracanal splint (Fig. 19).

A fiber post was placed in 21 and post endodontic restoration was carried out with composite resin restoration, followed by full coverage with a ceramic crown (Fig. 20).

On 3 month recall the patient was comfortable with no complaints with the treated tooth. Pain on percussion was negative and no mobility was detected. A radiograph at the 3 month follow up showed hard tissue formation between the two fragments of the fractured tooth. The radiolucent fracture line (that was visible in the preoperative radiograph) was not discernible and there was no other radiolucency indicative of any kind of resorptive activity (Fig. 21).



Case 5: A 21 year old male patient reported to the department with a chief complaint of loose tooth. History revealed trauma to upper anterior teeth one and half month back while working on a construction site. Patient gave history of incomplete treatment with the adjacent tooth.

On examination, Grade 1 mobility was observed with 11, and it was non-tender to percussion (Fig 17). The electric pulp vitality test showed it to be non-vital.

On radiographic examination, horizontal fracture was observed in the middle third of the root on the right central incisor, separating the coronal and apical root fragments from each other. There was no significant bone loss. The two fragments were very slightly malaligned. 21 showed a sectional obturation of 5 mm in the radiograph (Fig. 18).

Root canal treatment with 11 using intraradicular splint with MTA was planned. Access opening was done under local anesthesia and working length was taken with a size 10 k file. The 10 k file was precurved so as to engage both the fragments of the fractured root. Pulp tissue was extirpated and the canal was irrigated with saline. Subsequently, cleaning and shaping of the canal was done by conventional method using 2% taper instruments. Sectional obturation of apical 4 mm was carried out with the selected master cone to seal the apex. Then, a new autoclaved 40 k file was selected as intraradicular splint. It was cut to fit in the canal and loosely engage both fragments of the root. During the next appointment, canal was filled with MTA with little pumping action to

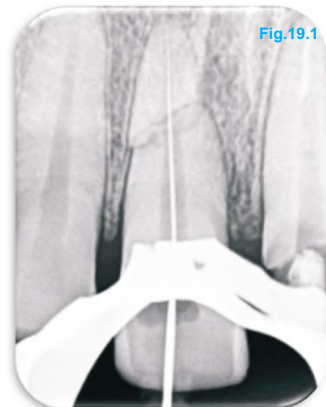




Fig.19.2



Fig.19.3



Fig.19.4



Fig.20

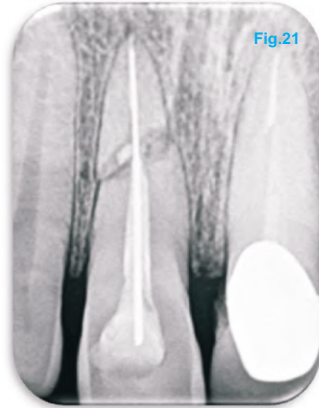


Fig.21

traumatic dental injuries.

It is our endeavour in these cases to highlight the great variety of treatment protocol that can be employed to save the most esthetically important tooth in the oral cavity.

References

References are available on request at editor@healtalkht.com

Discussion & Conclusion

Pulpal degeneration and necrosis are common sequelae to traumatic injuries to young permanent teeth but how the pathology progresses and presents is varied. "Preservation of natural dentition and restoration of the oral cavity to a normal functional state" is the primary goal in dentistry.

Traumatic dental injuries present difficult challenges for both patients and their dentists. Current technological advances allow the dental health care provider to successfully manage clinical situations that, in the past, often resulted in crippled dentition and unsightly appearance. Appropriate treatment can turn what at first glance looks like a hopeless situation into a very satisfactory outcome for patients. The endodontic specialist plays an important role in the team approach to treating patients with

