



## Traumatic displacement of maxillary permanent incisor into the nasal cavity

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### **ABSTRACT:**

This paper was aimed to illustrate a case of severe alveolar repositioning of an intruded tooth into the nasal cavity, its diagnosis and further management. A 10-year-old male, case of road traffic accident caused due to sudden deceleration was brought to emergency department. Intraoral examination revealed an anterior maxillary dentoalveolar fracture and absence of the left central maxillary incisor. Cone beam computed tomography was done and displaced tooth in the nasal cavity was located. The “missing” left maxillary central incisor was surgically retrieved from the floor of the left nostril. There are many complications related to dislocation or displacement of tooth after a dentoalveolar trauma such as a frontal sinus abscess, an airway complication, a respiratory tract obstruction, and a complicated lung abscess or sinusitis which may follow if the missing tooth is considered for avulsion and no diagnostic imaging is done. Thus the possibility of a fully intruded tooth should be considered if the tooth is not visible after a dentoalveolar trauma. Computed tomographic scan should be a routine diagnostic study in all cases with associated missing or altered anatomical structures in the oral and maxillofacial region following self fall and road traffic accidents. The dental professional plays a very major role in the initial assessment of dental trauma in emergency rooms in hospitals in order to assess oral defects after dental trauma and to correctly as well as timely manage and treat the same.

**Keywords:** Traumatic Avulsion, dentoalveolar trauma

### **INTRODUCTION:**

Facial trauma following motor vehicle accidents is the major causative factor for most of dental injuries such as crown/root fracture, subluxation,

avulsion, and concussion.<sup>[2,3]</sup> Various other causes like sports<sup>[4]</sup> and some medical conditions like seizure disorders are other rare causes <sup>[5]</sup>. Majority approximately 15–61% of dental traumas comprises of luxation injuries to permanent teeth, while frequencies ranging from 62% to 73% have been reported of luxation injuries for the primary dentition <sup>[6]</sup>. Among the five types of luxation-Intrusive luxation injuries that can be assessed and diagnosed by displacement of the tooth deeper into the alveolar bone accompanied by fracture or comminution of alveolar bone socket. The direction of dislocation follows the axis of the tooth. With increasing age, the frequency and the pattern of injury change. In the primary dentition, intrusions and extrusions comprise the majority of all injuries, a finding which is possibly related to the resilience of the alveolar bone at this age. In contrast, in the permanent dentition, the number of the intrusive luxation injuries is considerably reduced and usually seen in younger individuals <sup>[6]</sup>. Current management strategies for this injury include: waiting for the tooth to return to its primary position (passive repositioning), immediate surgical repositioning, and repositioning with dental traction by orthodontic devices (active repositioning). In cases of dentoalveolar trauma with extreme loss of alveolar bone, repositioning of an intruded tooth may be difficult.

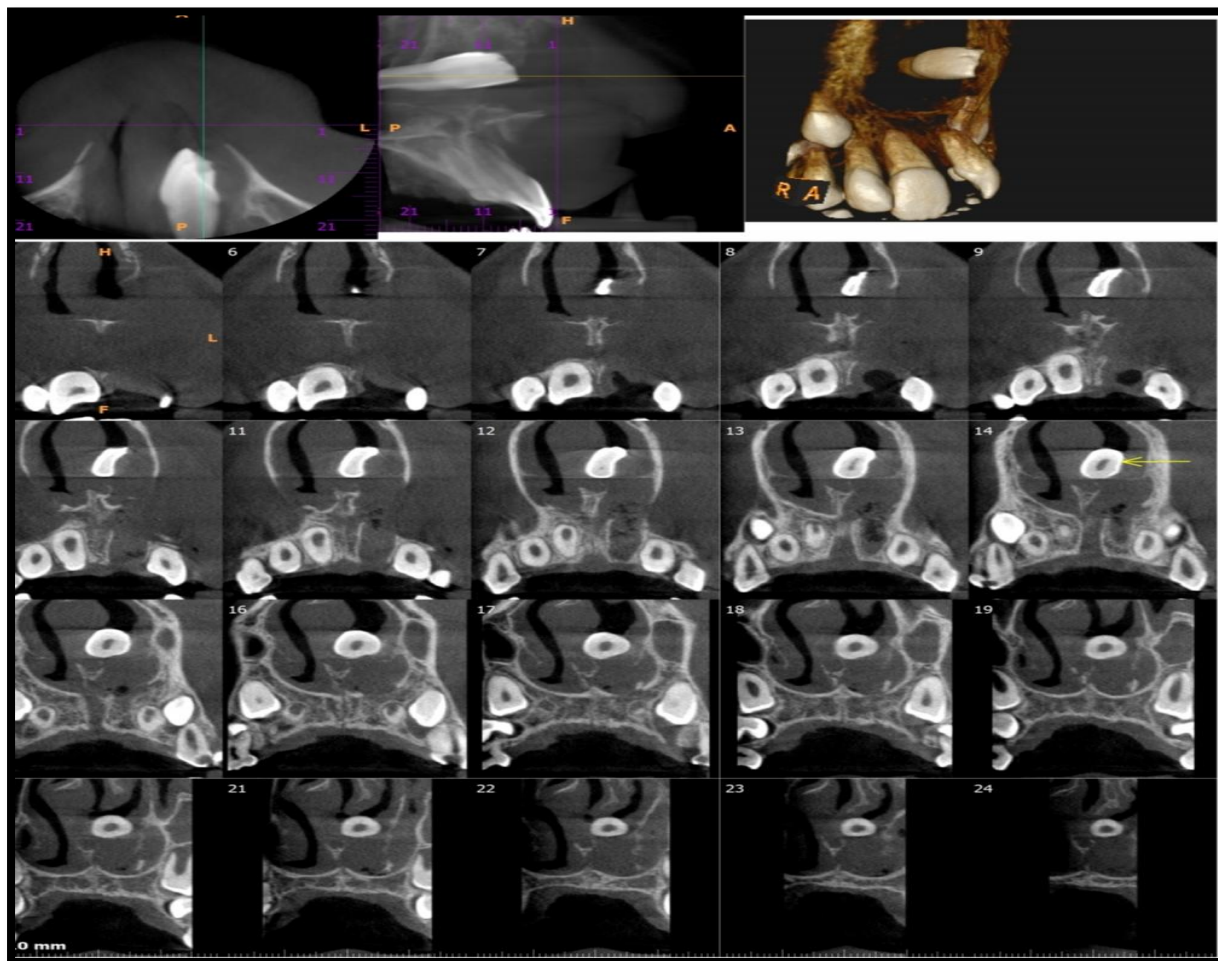
The purpose of this paper was to describe a case of severe alveolar repositioning of an intruded tooth into the nasal cavity and to illustrate the importance of diagnosis and timely management of dentoalveolar fractures to the attention of trauma surgeons.

## **CASE REPORT:**

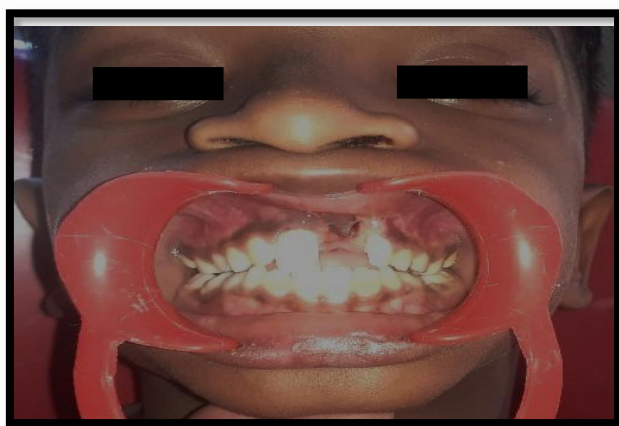
A 10-year-old male presented to the emergency department with history of road traffic accident. He was involved in a car accident and was brought to the centre. He was sitting at the front passenger seat without seatbelt and crashed his mouth against the dashboard due to sudden deceleration.

Past medical history was unremarkable and had no comorbidities. Clinical examination showed laceration of the left nasal vestibule. The patient reported partial left nasal obstruction. Intraoral examination revealed an anterior left maxillary dentoalveolar fracture and absence of the left maxillary central incisor. Gross gingival trauma was present. There were no clinical signs of other facial fractures.

A cone beam computed tomography (CBCT) scan with axial and coronal sections was carried out either to rule out or visualise the intrusion of the missing teeth and show the true extent of the dentoalveolar fracture. A hyperdensity image at the axial CT section (Fig. 1) into the nasal cavity was noted and suspected to be a tooth (arrow).



**Fig. 1: Axial CBCT. Hyperdensity image into the nasal cavity and thus confirmed the suspicion of a tooth into the nasal cavity.**



**Fig. 2 Clinical image of the left maxillary socket region.**

Patient was taken under general anesthesia with orotracheal intubation. After the preoperative preparation, 2% lignocaine with adrenaline was administered. The intraoral wound was debrided and irrigated with betadine and saline solution. Exploration was done through the contused gingiva and revealed loss of alveolar bone in the left maxilla and no visual signs of the missing teeth. The “missing” left maxillary central incisor was recovered from the floor of the left nostril (Fig. 3).



**Fig. 3** Exposure of displaced tooth



**Fig. 4: Recovery of the tooth through the nasal vestibule**



**Fig. 5 Reimplantation and splinting done**

The recovered tooth was reimplanted back in the left maxillary central incisor socket and splinting was done. Sutures were placed and the defect was closed. Patient was extubated uneventfully and shifted to post operative recovery room. The patient received a 5-day course of IV antibiotics-Augmentin and analgesics and 0.12% chlorhexidine gluconate mouth rinse was advised and was discharged after 3 days. The patient's postoperative course was uneventful and tooth showed no mobility.



**Fig. 6: Follow up after 1 month.**

## **DISCUSSION:**

One of the challenging dental injuries with difficult treatment is the Intrusive tooth injury, which is defined as the displacement of a tooth deep into the alveolar bone and more frequently involves maxillary teeth.[7] Maxillary central incisor which sustains approximately 80% of all dental injuries is more vulnerable to trauma whereas the canines are rarely involved because of the medial pillar of maxillae which is difficult to penetrate.[8] The posterior teeth are seldom involved because of their anatomic position and multiple roots unless massive force is delivered.[9] Primary dentition teeth are more often involved than permanent dentition because of the apices of intruded teeth which can shove through the relatively thinner vestibular bone.[10] The difference lies also in the marrow spaces of the bone which are larger and elastic than those in older individuals [14].

The study of Onetto et al. [10] analyzed traumatic injuries in the primary and permanent dentition in children. The most common injuries in primary teeth were luxation (26%), intrusion (21%), and subluxation (18%). Falling was the most common cause of injury in both groups (82% primary dentition, 58% permanent dentition), followed by striking against objects (13% primary, 19% permanent) and bicycle accidents (9% permanent). Motor vehicle accidents were reported to be the major causative factor for intrusive injuries in primary and permanent dentition.[9, 11, 12, 13]. It has also been reported that older individuals were prone to bone fractures and younger persons were more susceptible to dentoalveolar trauma [15].

Intrusively displaced teeth has the poorest prognosis among other tooth displacements. Pulpal necrosis, pulp obliteration, external and internal root resorption, ankylosis, and loss of marginal support are some of the potential complications [16, 17]. For intruded teeth with closed apices, the incidence of pulpal necrosis is 100%, whereas in intruded teeth with open apices, the incidence of pulpal necrosis is 63% [17]. External root resorption has been reported as a complication of intrusive injuries in 58% of teeth with immature root formation and in 70% of teeth with complete root formation [17]. The anterior dentoalveolar area being the most prominent region of the face is most affected by facial trauma than the posterior dentoalveolar region [2, 18, 19]. The major disadvantage in the anterior region is the high esthetic demands and in the posterior dentoalveolar area, the maxillary floor over the roots of the teeth is thin which can result in a tract

between the oral cavity and maxillary sinus after the dentoalveolar injury [20].

According to Andreasen and Andreasen [24], a sufficient radiographic evaluation of the trauma is very important and increases the possibility of making a correct diagnosis with over 10%-from 80% to 91%. Conventional plain films are the least expensive and require less radiation, but recently they have been superseded by CT and cone beam computed tomography (CBCT) which offer superior anatomic visualization [25]. Plain films have a major disadvantage of superimposed structures frequently underestimating the extension of fractures [26]. Advanced imaging modalities, such as CT and CBCT, are able to generate images easily in sagittal, coronal, and axial planes, eliminating the superimposition of anatomic structures [27]. CT is an excellent tool in the diagnosis and management of any type of maxillofacial injury [9,10]. CT scan offers a better image resolution than routine roentgenography and is more useful for an early and definite diagnosis in case of any maxillofacial injury. When full intrusion of a tooth in the region of the face is suspected, the facial CT scan may be indicated [9]. In this case, examination of the floor of the nasal cavity confirmed the CBCT diagnosis of tooth intrusion; CBCT study was crucial to establish the diagnosis in this patient.

Management of any maxillofacial injury should keenly evaluate and remove any object that can potentially compromise airway such as avulsed teeth, fragments of tooth or bone, dental prostheses or appliances, and grossly loose teeth especially in patients with low GCS or who may have impaired protective gag reflex. Once the patient is stabilized, the extraoral and intraoral examination for head and neck trauma should also include evaluation of the dentition for missing teeth [21].

On oral examination of patient if an avulsed tooth is not present in the socket it is prudent to rule out intrusion, aspiration, or ingestion of the missing tooth [21]. Tooth aspiration should be suspected and confirmed or excluded by means of a chest radiograph [28]. If a tooth has been ingested, it is likely to pass safely through the gastrointestinal tract [29]. Another possibility is a dislocated tooth to the frontal sinus causing filling of purulent material, as described by Hara et al. [11].

Maintaining the viability of the periodontal ligament fibres on the roots of avulsed tooth is the most critical part when located from dislodged site. The length of extra-alveolar time is a key determinant of the prognosis [30]. Ideally, the tooth should be replanted immediately (within 5 min) after the injury in an effort to preserve the viability of the periodontal ligament cells and so to optimize healing and minimize root resorption [31]. Avulsed teeth should be stored in a physiologic storage medium such as milk, balanced salt solution, tissue culture media, and physiologic saline until the tooth can be replanted if cases where immediate reimplantation is not possible [32]. The mature permanent teeth with extraoral dry time of 1 h or less or teeth stored in a biological medium should be treated carefully to avoid

further damage to the root surface and remaining periodontal ligament tissues. In cases of teeth with open apex, it is recommended to soak the tooth in doxycycline for 5 min before replantation as pulp revascularization was greatly enhanced [33].

Treatment for intruded teeth with fully formed apices includes surgical repositioning or forced orthodontic eruption [5] and in case of completely intruded teeth because of associated comminution of the alveolar bone cannot be reimplanted and should be removed to avoid infection [12].

The poor long-term prognosis of the affected teeth dictated the definitive surgical therapy to be the treatment plan of choice. Prompt and appropriate management can significantly improve prognosis of many dentoalveolar injuries, especially in young patients [20]. Treatment is more important than diagnosis because the long-term consequences of mismanagement can be devastating as it is either overtreated or untreated.

## **CONCLUSION:**

Over the years many rules and advancements has been implicated to reduce road traffic accidents as it one of the predominant causes of injury such as protection for both driver and passenger (increased seat belt and air bag use in cars), lower speed limits, better highway design and thorough eye and medical examinations [34].

Majority of times a common finding of missing teeth is presumed to be avulsed during the accident and more attention is focussed on other facial injuries [21]. But all missing teeth should be considered for to verify and confirm that they have not been dislodged into the body [9]. Depending upon the location of dislodged tooth, it can result in life-threatening ramifications [21] like a frontal sinus abscess [11], an airway complication, a respiratory tract obstruction, a complicated lung abscess, or sinusitis [9]. Therefore whenever a tooth is observed to be missing, the possibility that it has been intruded should be considered and should be diagnosed with the CT, supplemented by use of radiographs [21]. CT scan is currently used as routine diagnostic study in all cases of maxillofacial trauma. It can be supplemented with other radiologic methods of investigations such as x-ray of face or chest or abdomen focussing on the areas where the teeth can possibly be dislodged.

The indispensable role of an oral and maxillofacial surgeon in emergency room in hospitals in the assessment of dentofacial trauma is of utmost importance especially in above discussed case where identification and repositioning was done of the displaced tooth thus reducing or even nullifying the adverse effects and morbidity caused otherwise.



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