

## Teeth Avulsion Secondary to Oro-Tracheal Intubation in a Tertiary Healthcare Facility: A Case Series

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### *Abstract*

*General anaesthesia using endo-tracheal intubation, carried out to provide pain-free, surgical and medical procedures, sometimes results in Traumatic Dental Injuries [TDIs]. Among the rarely reported TDI complication is tooth avulsion. We present two cases of such complications, factors which can be responsible, management of such cases, and the need to educate medical and paramedical personnel on what to do if such complications arise before definitive management can be carried out by the dentist. Such awareness will go a long way in preventing unnecessary litigations which might likely occur from such routine procedures.*

**Key words:** Traumatic Dental Injuries, oro-tracheal intubation, Tooth Avulsion

### **Introduction**

The advancement in anaesthetic practices has revolutionised the practice of modern-day medicine as it provides pain-free surgical and medical procedures. The primary goal of general anaesthesia is rendering a patient unconscious and unable to feel painful stimuli, while controlling autonomic reflexes.<sup>1</sup> This procedure is carried out with endotracheal intubation using endotracheal tubes and laryngoscopes to access the airway via the oro-trachea for administering anaesthetic medications and mechanical ventilation during surgeries.

Among the complications which can occur during this procedure are Traumatic Dental Injuries [TDIs].<sup>2</sup> Previous retrospective studies have shown a prevalence range of between 0.02-0.05%<sup>3,4</sup> for TDIs while a prospective study reported a higher prevalence of 25.0%<sup>4</sup>. These peri-anaesthetic dental injuries have also been reported as a leading cause of medico-legal claims following anaesthesia, accounting for about one third of medico-legal cases according to a report.<sup>4</sup> Such injuries include enamel/tooth fractures, tooth avulsion, concussion injuries, subluxation, intrusion, severe form of crown

fracture, anterior dislocation of mandibular condyle, and a variety of pressured-induced lesions of the oral cavity, and soft tissue<sup>5,6</sup>. The effects of such TDIs include low self-esteem, decreased quality of life, speech impediment and some degree of functional disability.

The aim of these two case reports is to show avulsion of maxillary central incisor teeth, an uncommon Traumatic Dental Injury (TDI) following oro-tracheal intubation, its management, and the importance of educating medical personnel on what to do whenever such complication arises.

### Case presentations

**Case 1:** A forty-eight (48) year old woman presented to the dental clinic on account of avulsed upper right and left central incisors (11 and 21) following traumatic intubation (Fig1) during a general anaesthetic procedure one month previously. Patient claimed she was not given the avulsed teeth which could possibly have been re-implanted and splinted. However,

she claimed there was a midline space between the 11 and 21.

Intra-oral examination revealed missing 11 and 21, grade 1 mobility of 12 using Miller's grading system, missing 14 and 15 which she claimed has been longstanding, anterior open bite, and Class 11 Angle's malocclusion incisal relationship. An assessment of Ellis Class V injury secondary to traumatic intubation was made on missing 11 and 21.

Periapical Radiograph of teeth number 12, 22 revealed empty sockets of 11 and 21 with no widening of their periodontal ligament (PDL) spaces, nor apical radiolucency of 12 and 22. Due to lack of facility for fabrication of an implant-supported restoration coupled with lack of financial capability for a fixed denture fabrication [fixed PFM bridge], upper and lower alginate impressions were taken for the fabrication of acrylic upper replaceable partial denture (URPD) to replace the missing teeth. The denture was delivered at the next appointment.



**Fig1:** A shows missing (11,12), anterior open bite; B shows the edentulous spaces of the missing upper central incisors edentulous space; C shows periapical radiograph (PAR) revealing the empty

sockets of 11 and 21 with no widening of the PDL spaces nor apical radiolucency of 12 and 22; D shows upper removable partial denture replacing 11 and 21.

**Case 2:** A forty-six (46) year old woman who presented at the dental clinic on referral from the Obstetrics & Gynaecology department, following avulsion of the upper right central incisor secondary to traumatic intubation from an elective surgery she underwent two days prior to presentation. She came along with the avulsed tooth already sealed inside a nylon envelope.

She was asked to spit her saliva inside the nylon envelope, while temporarily agitating the tooth in the envelope in order to remove loose debris and visible contamination. Comprehensive history was thereafter taken and thorough examination was done. The examination revealed presence of granulation tissue in the socket of tooth number 11 with incomplete re-epithelialization. extraction socket with There was presence of midline diastema measuring about 1cm with presence of high frenal attachment. The teeth numbers 12 and 22 are pegged shape and have about 1cm of spacing distal to each of them. An assessment of Ellis class V injury resulting from traumatic intubation was made.

Local anaesthesia was administered and the socket was irrigated with normal saline. The avulsed tooth was replanted carefully with slight digital pressure. Its correct position was verified clinically and radiographically, and splinted with flexible 0.5mm<sup>2</sup> stainless steel wire. Composite

splinting of the labial surface of 11 and 12 was done to further reinforce the stability of the splinted tooth within the socket. Pre-operative root canal therapy (RCT) could not be carried out due to the patient's poor medical condition as she was not fully ambulatory. She was placed on antibiotics, analgesic, and chlorhexidine mouthwash rinse for a week. RCT was subsequently commenced on the tooth after re-implantation of 11 and non-setting calcium hydroxide intracanal dressing was placed.

The second visit of RCT was done 4 weeks after the first visit due to the patient defaulting on her appointment. Since there was no fresh history of pain or any associated complaints, the flexible stainless-steel wire and composite splinting was removed. The canal was obturated with gutter percha and AH26 sealant while the access cavity was restored with Glass Ionomer Cement (GIC); post-operative radiographs were also taken. The patient was asked to come for post-op review one week later. However, she failed to show up for review and all efforts to reach her on phone or trace her proved abortive.



**Fig 2:** **A.** Edentulous space from avulsed 11 with low labial frenal attachment ; **B.** Avulsed upper tooth in saliva as medium storage; **C.** Avulsed tooth out for reimplantation; **D.** Avulsed 11 to be re-implanted in the refreshed socket, re-implanted 11, 12 splinted with eyelet wire and reinforced with composite, midline diastema, and low labial frenal attachment; **E.** PAR shows splinted 11, 12 periapical radiolucency on the apex of 11; **F.** PAR showing initial working length of 11 file size 15 with splint insitu; **G.** Access cavity opening for RCT with ZnOE; **H.** Periapical radiographs showing obturated 11; **I.** Obturated tooth and removal of stainless steel wiring and composite splinting.

### Discussion

Two cases, all females, in the 4th to 5th decade of life, were presented to the clinic between July and August 2022. The affected teeth are maxillary central incisors (11, 12).

During laryngoscopy, the blades of the laryngoscope might hit against the upper centrals, or the anesthetist might use the upper

centrals as fulcrum to depress the tongue thereby damaging the teeth, resulting in their avulsion. It can also occur during extubation when a patient involuntarily bites on the oropharyngeal airway using the anterior teeth as a fulcrum<sup>5</sup>. Previous study shows that upper centrals are the commonest teeth involved in traumatic avulsion of the anterior teeth following oro-tracheal

intubation<sup>2</sup>. Hence, there is a possibility of inadvertent dental injury (microscopic) to the upper or the lower incisors which might not result in injuries that are obvious (macroscopic) but may later result in pulpal necrosis with time. A detailed examination of the patient's mouth pre-operatively by the dental surgeon can help in identifying the teeth at risk of damage. And since maxillary and mandibular anterior teeth are more prone to injuries, these teeth should be properly inspected for any mobility or crown fractures before intubation commences.

The two index patients had anterior open bite, midline diastema, generalised poor oral hygiene, and proclined upper central incisors. These findings agree with previous studies which identify these as predisposing factors to TDIs following oro-tracheal intubation.<sup>5,7</sup>

The management followed the 2020 International Association of Dental Traumatology Guidelines for the management of TDIs. The guidelines recommended two weeks of stabilization with short-term passive, flexible splints for replanted tooth, and an additional one week if the avulsed tooth is unable to remain in the correct position<sup>8</sup>. The flexible splint encourages periodontal and pulp healing if the replanted tooth is subjected to slight mobility and function. An animal study revealed that 60% of the mechanical properties of the injured ligament return two weeks following injury.<sup>9</sup>

The patient returned seven weeks post-splinting, claiming inability to transport herself from her

city of residence to the clinic due to financial reasons, delay in ambulation due to slow recovery, and gradual stability of the replanted tooth resulting in less urgency to come for a review. The long duration between the day of the splinting and the presentation has no effect on the likelihood of successful periodontal healing. In this case, due to delayed presentation, the expected outcome is ankylosis-related (replacement) root resorption not periodontal healing.

There are evidence that replantation restores esthetics and function while maintaining alveolar bone contour, width and height<sup>9</sup>. (Fig 2A and 2I).

Throwing away an avulsed tooth following intubation without the patient's or relative's consent as shown in case 1 has medico-legal implication and could result in unnecessary litigation<sup>4</sup>. This might be due to lack of education on the treatment modalities for avulsed anterior teeth by medical and paramedical staff who might never be aware that such a tooth can be replanted if the extra-oral dry time is minimized. This further highlights the importance of improving dental awareness among medical and paramedical staff. In addition, some degree of dental curriculum should be included in the training of medical and paramedical personnel. This will go a long way towards managing our patients holistically and preventing unnecessary and avoidable litigations.

## Conclusion

A detailed examination of the patient's mouth pre-operatively by the dental surgeon can help in identifying the teeth at risk of tooth avulsion, following orotracheal intubation. This will help in the holistic management of such patients and prevent unnecessary litigation that might result from traumatic loss of anterior teeth following oro-tracheal intubation. Further studies will be necessary to identify microscopic TDI (mTDIs) which might likely occur following endotracheal intubation in the future, so as to predict tooth that might undergo progressive pulp necrosis over time.

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