African Journal of Emergency Medicine 10 (2020) 99–102

Contents lists available at ScienceDirect

African Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/afjem

Case report

Bull horn injury causing traumatic tooth intrusion – ultrasound and CT imaging

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ARTICLE INFO

Keywords:
Animal attack
Bull
Dental trauma

ABSTRACT

Introduction: Traumatic injury to upper alveolus may result in apical displacement of the affected tooth/teeth into the underlying alveolar bone. The tooth while being driven into the socket under the upwardly directed impact force usually causes a crushing fracture of the alveolar socket bone. The tooth may also be displaced through the labial plate of bone or may even impinge upon the bud of the permanent tooth.
Case report: We present a case of tooth intrusion due to bull horn injury and its imaging features on ultrasound and CT scan.
Discussion: Most common teeth involved in dental trauma in children of 6 to 12 year age group, are the maxillary anteriors, and this age group also constitutes the most common group in whom tooth intrusion is seen. Tooth intrusion usually involves a single dental element. Common etiologic causes are injuries, falls, sports accidents, violence and traffic accidents. Traumatic intrusion due to injury by animals is rarely described and is more commonly seen in less developed areas that too in rural set-up where man-animal encounters are frequent.
Conclusion: In such cases, whenever the conventional imaging modalities like the X-rays such as intra oral periapical views and orthopantomograms are unavailable, or where use of ionizing radiation is a grave concern (especially in children and pregnant patients), ultrasonography offers a non-invasive diagnostic imaging method which helps in diagnosis of the condition and also helps in supplementing the clinical information, thereby helping in better understanding of the underlying condition.

African relevance

- Tooth intrusion should be included in the differential diagnosis besides other diagnosis like tooth avulsion.
- Ultrasound is a non-invasive diagnostic imaging modality without risk of radiation.

Introduction

Traumatic injury to upper alveolus may result in apical displacement of the affected tooth/teeth into the underlying alveolar bone. The tooth while being driven into the socket under the upwardly directed impact force usually causes a crushing fracture of the alveolar socket bone [1]. The tooth may also be displaced through the labial plate of bone or may even impinge upon the bud of the permanent tooth [2,3]. We present a case of tooth intrusion due to bull horn injury and its imaging features on ultrasound and CT scan.

Case report

A six year old boy was brought to the emergency outpatient department by his parents with complaint of injury to his mouth after being hit by a bull (by its horns) while playing in a grassland 4–5 h ago. The child fell after being hit but there was no loss of consciousness. The parents gave history of bleeding from the wound site that had decreased after they applied pressure bandage at the site. The parents gave history of single episode of vomiting about an hour back. At the time of presentation, the boy was conscious, cooperative but in severe pain. His vitals were normal. Local examination revealed a contusion injury to the chin, lacerated lower lip and missing upper central incisor teeth. No injury to the upper lip was noted. The parents did not give any history of previous tooth extraction or shedding, nor did they report finding of the teeth at the site of injury. Mouth opening was normal. Intraoral examination, revealed multiple small lacerations of the gingival tissue and bleeding from the tooth sockets of the upper incisors. A midline

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https://doi.org/10.1016/j.afjem.2019.12.002
Received 5 May 2019; Received in revised form 12 December 2019; Accepted 12 December 2019
Available online 08 January 2020

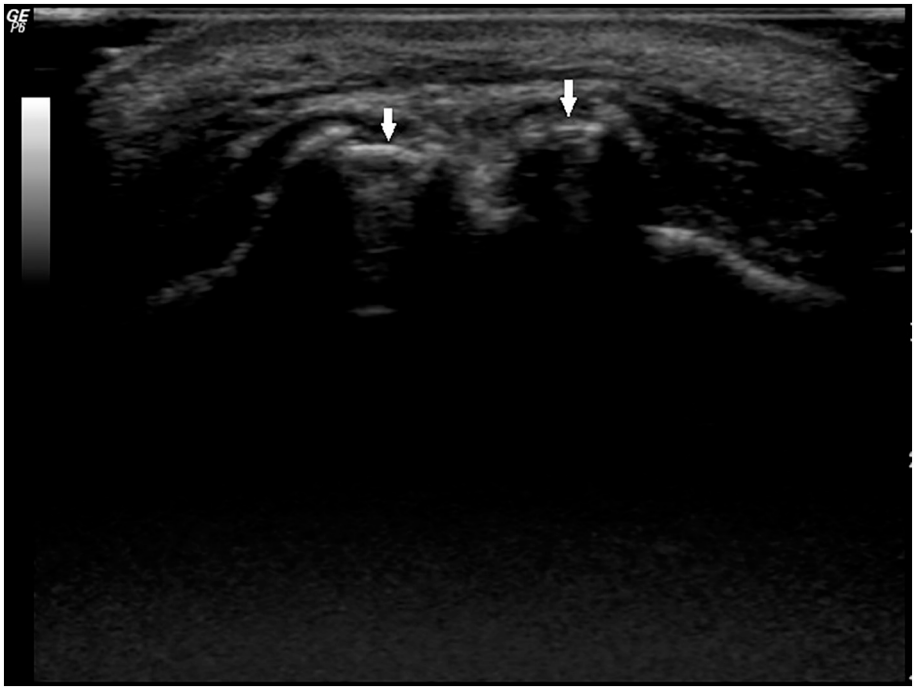

Fig. 1. Ultrasound performed using a high frequency (10–13 MHz) probe revealed two linear echogenic structures with posterior acoustic shadowing (arrow) in the upper part of gingiva (above the level of cervical aspect of other normally lying adjacent teeth) suggestive of tooth intrusion.

fracture of the primary palate was also suspected on palpation. No significant occlusal derangement could be observed. Vestibular examination could not confirm the presence or absence of teeth which was also limited due to child not allowing adequate assessment. Intramuscular analgesics were administered for pain relief along with tetanus toxoid and antibiotics; the lower lip laceration was sutured and antiseptic dressing was done after wound debridement.

Intraoral periapical x-ray, orthopantomogram or Cone-beam CT were not immediately available and it was decided to use ultrasound to check for any impacted foreign body or intruded teeth.

Ultrasound was done using a high frequency (10–13 MHz) linear probe, placed transversely across the nasolabial sulci. It revealed two linear echogenic structures with posterior acoustic shadowing in the upper part of gingiva (above the level of cervical aspect of other normally lying adjacent teeth) suggestive of tooth intrusion (Fig. 1). As there was history of vomiting a non-contrast CT scan was done subsequently to rule out any intra-cranial trauma.

No brain injury was seen, however CT revealed intrusion of primary central incisors (Fig. 2a) causing non displaced fracture of overlying alveolus which was well depicted on volume rendered images (Fig. 2b). The displacement was approximately 7 mm, from the cervical aspect of the adjacent tooth crown. The teeth had well developed roots with their apices displaced towards the palate. The permanent buds could not be adequately visualized due to possible overlap by the intruded primary teeth. A fracture of hard palate was also seen (Fig. 2c).

The palatal displacement of primary teeth towards the developing successors mandated extraction of the intruded teeth so as to avoid interference with future eruption of permanent teeth. Fracture of the hard palate was managed conservatively.

Discussion

Most common teeth involved in dental trauma in children are the maxillary anteriors with 6 to 12 years of age being the most common group in whom tooth intrusion is seen [1–3]. Tooth intrusion usually involves a single dental element. Common etiologic causes are injuries, falls, sports, violence and traffic accidents [1,3–5]. Traumatic intrusion due to injury by animal(s) is rarely described and is more commonly seen in less developed areas that too in rural set-up where man-animal encounters are frequent [6]. An intrusion of 1 mm to 8 mm is seen in most cases [7]. Surgical repositioning of the intruded teeth, orthodontic extrusion, waiting for spontaneous eruption or extraction of the teeth are some of the treatment modalities, which depend upon the type of tooth, its degree of displacement and future prognosis [5,7].

When the affected tooth cannot be detected in its socket or recovered from accident venue, our approach should be to rule out aspiration, ingestion or intrusion of the missing tooth [1,2]. Potential complications of intruded tooth which also need to be considered are tooth impaction into the sinus cavity, commonly the maxillary sinus, but literature has also documented a case of intrusion into frontal sinus [2,5,7]. Dislodgement of the intruded tooth into the respiratory tract, can cause life-threatening airway obstruction or lead to lung abscess [8]. Aspiration of the tooth/or its fragment and ingestion should also receive adequate evaluation. A chest radiograph may be necessary to rule out aspirated tooth, and may lead to symptoms like cough, breathing difficulty, fever etc. [5,7–9].

An ingested tooth may safely pass through the gastrointestinal tract or even lead to obstruction of the GI tract, perforation, bleeding or sepsis. Abdominal radiographs may be necessary at routine intervals with appropriate follow up and stool examination, to ensure tooth has been safely passed out [5].

A CT scan plays an important role in determining the exact position of the intruded teeth, the nature of tooth displacement and associated fracture [4,5]. On the other hand as described in this case, an ultrasound evaluation and application in this area of maxillofacial trauma may open up further avenues where this non-invasive technique could be of possible direct or supplemental diagnostic importance; and even more so as it avoids the radiation exposure associated with other diagnostic modalities keeping in line with the principle of ALARA (as low as reasonably achievable) [10]; it in turn also offers an added benefit especially in the younger age who commonly suffers the brunt of trauma to their primary teeth, and upon initial presentation of the injury may be brought to an emergency set up where teeth specific x-ray equipment may not be readily available especially so in the rural places

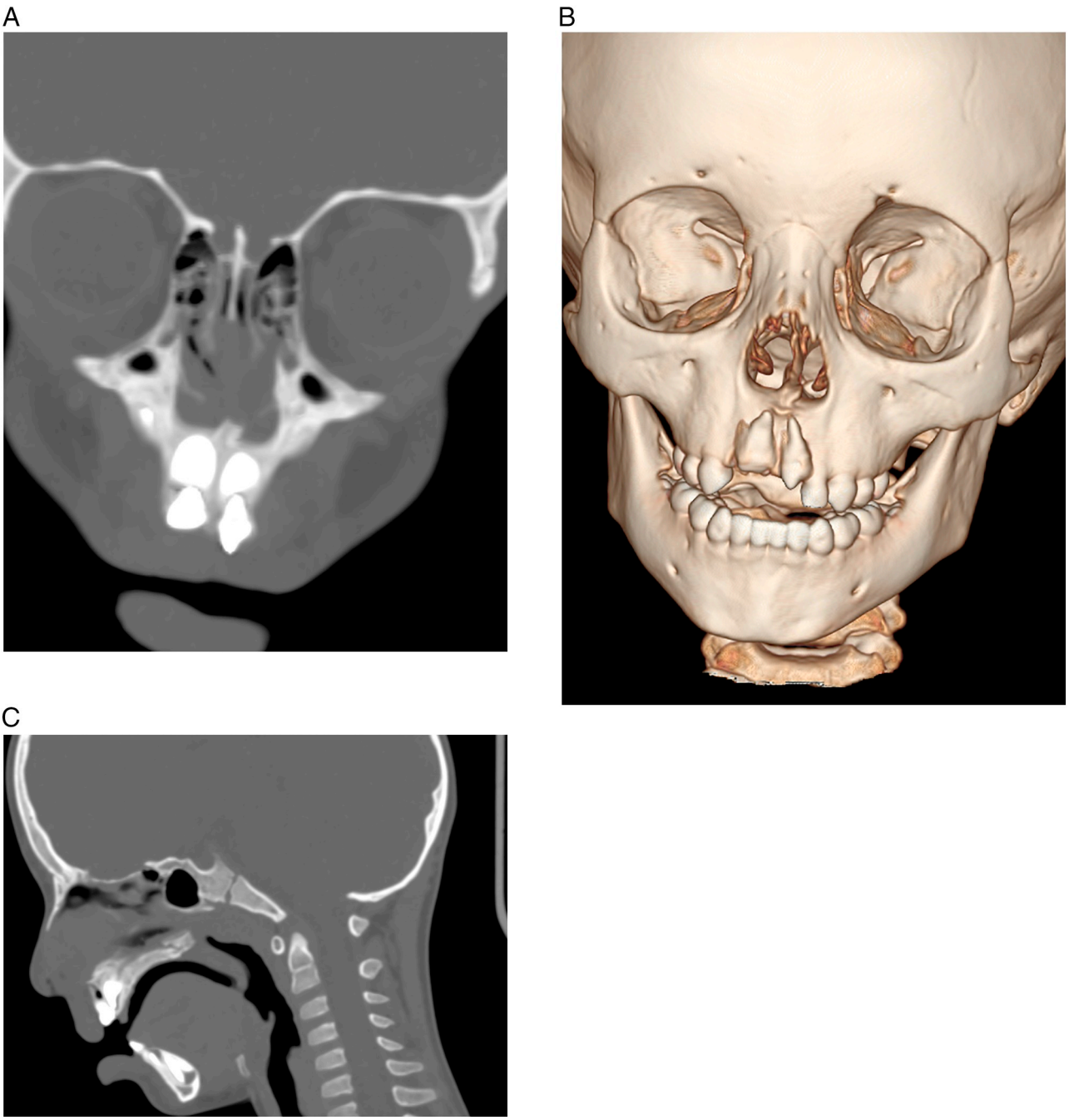

Fig. 2. CT images showing intrusion of primary central incisors (Fig. 2a and b - 3D volume rendered image); A fracture of hard palate was also noted (Fig. 2c).

of the less developed areas. Enamel hypoplasia/hypocalcification is the most common squeal of tooth intrusion which is diagnosed at the time of eruption [7]. Eruption disturbances, root dilaceration and space loss are some of the other sequel which could occur.

Conclusion

In cases of trauma to the oral region, where teeth are missing, especially in case of young children, tooth intrusion should be included in the differential diagnosis besides other diagnosis like tooth avulsion. In such cases, ultrasound is a non-invasive diagnostic imaging modality in contrast to hazardous (radiation involving) conventional 2-D X-rays like intra oral peri-apical views and orthopantomograms; thereby helping in better understanding the underlying condition. Hence due recognition must be accorded to the alternative use of sonography, which does not use harmful, ionising radiations, especially in case of young children or pregnant patients, where use of X-Ray irradiation may be of grave concern.

Authors' contributions

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: Rohan B contribute 55%, MB 25% and Rohit B 20%. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Conflict of interest

The authors declare no conflict of interest.

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