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Zygomatic Fracture in 15 Months Old Girl: Case Report

SUMMARY

Facial fractures are considered infrequent and scarce between paediatric patients. From the total percentage of facial fracture incidents, children younger than 5 years account for approximately 1% and is even lower in younger ages. What is more, midfacial fractures are much rarer, with zygomatic fractures being so uncommon in young children that no case of a child younger than 3 years experiencing such a fracture exists in the literature. **Case Report:** *In this report we present the case of a 15-month-old girl, who was examined in the Oral and Maxillofacial Department, General Hospital of Nicosia. The patient had been in a car accident which led to a zygomatic fracture on the right side. This was confirmed with a computed tomography followed by a closed reduction surgery with the aid of intraoperative ultrasonography. The reduction was controlled three days postoperatively with a planned MRI and the results correlated with the ultrasonography. The patient made an uneventful recovery.*

Conclusions: *To the best of our knowledge, after an extensive review of the literature, no similar case report with a patient of this young age exists. The reasons for the rarity of these fractures in the paediatric population are discussed together with the step by step management.*

Keywords: Children Midfacial Fractures, Facial Fractures, Maxillofacial Trauma, Paediatric Zygomatic Fractures

Georgios Pantelas[1,3], Rafaellos Dimitriou [2,3], Marios Salloumis[1]

[1]Clinic of Oral and Maxillofacial Surgery, General Hospital Nicosia, Cyprus
[2]Private practice, Cyprus
[3]School of Dentistry, European University Cyprus, Nicosia, Cyprus

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Introduction

Facial fractures in children are relatively rare compared to adults, patients younger than 16-years old who suffer a facial fracture account for only 15% or even lower of the total facial fractures in the population[1]. The number is significantly lower in children younger than 5-years old, where the occurrence lies between 0.6% and 1.4%, but it steadily increases every year by approximately 4.4%[1].

As expected, the frequencies for midfacial fracture occurrence in children are even lower with the highest incidence occurring in the ages 13-15 years, where the percentage is closer to those seen in adults. These frequencies are ranging from 0.2% to 13%[1].

The only similar case we were able to find in the literature was a case report from the Department of Plastic and Reconstructive Surgery, Soonchunhyang University College of Medicine, Seoul, Korea about a 3-year-old boy[2], which is much older compared to our case.

Ferreira et al., 2014 divided the mechanisms of injury in children and adolescents into six categories: motor vehicle crash, including car, motor-bicycle, and car-pedestrian crashes; bicycle collisions; falls; sports injuries; interpersonal violence; and other incidents. Motor vehicle collisions were the most common cause of maxillofacial fractures[3].

Some research[4] has shown that boys were more affected than girls, with ratios ranging from 2:1 to 6:1.

Case Report

The patient was brought to Nicosia General Hospital after being involved in a car accident. According to the

parents' report, the girl was in the back seat held by her mother and during the collision hit the back of the front seat as the car came to a sudden stop.

Immediately, an initial assessment was performed. The clinical examination showed step deformities in the zygomatic arch and the infraorbital buttress on the right side of the patient, where also periorbital haematoma and oedema were observed (Figure 1). Due to the patient's lack of compliance and agitation, no functional tests were able to be carried out and the decision to proceed with a CT was undertaken (Figure 2), confirming a right zygomatic fracture. She was admitted to the paediatric ward for surveillance.

Figure 1. Superior view exhibiting displacement of the zygomatic bone of the right side

Due to the extent of displacement of the zygomatic fracture, close reduction surgery was performed. During the surgery, ultrasonography was used perpendicularly to the skin along the region of interest (zygomatic bone), which allowed a real time visualization of the displacement before (Figure 3) performing the skin section. Followed by insertion of the bone hook and reduction of the fracture, again simultaneously with the use of ultrasonography and continuous comparison of the findings (Figure 4). Ultrasonography was proven as a valuable medium in this case due to its accuracy while being non-invasive.

The findings of the intraoperative ultrasonography prior to the surgery showing the displacement correlated with the findings of the CT. Three days later the patient was scheduled for a programmed MRI from the clinic of Paediatric Surgery, which showed the reduction of the fracture as expected from the final ultrasound during the surgery (Figure 5).

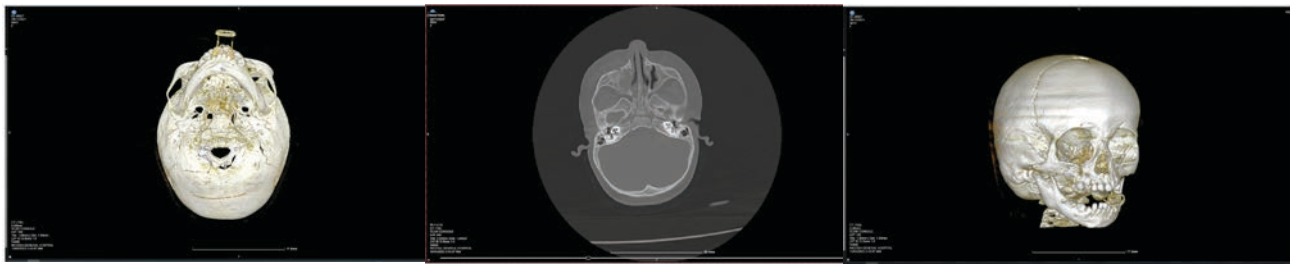

Figure 2. 3d-reconstruction of Computer tomography (1, 2) and axial view- (3rd image)

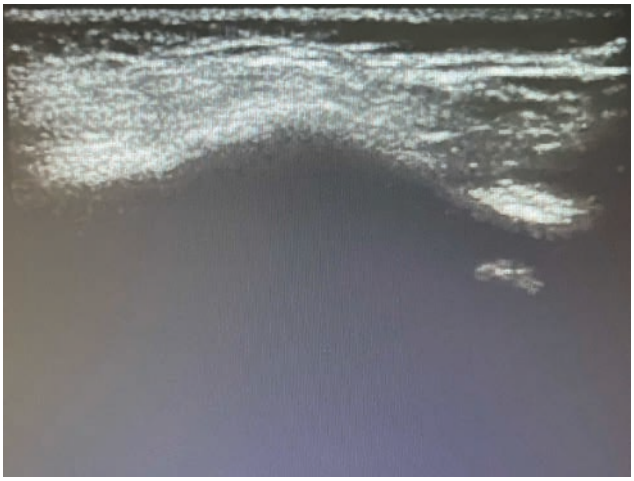

Figure 3. Preoperative ultrasound showing displacement of the zygomatic bone

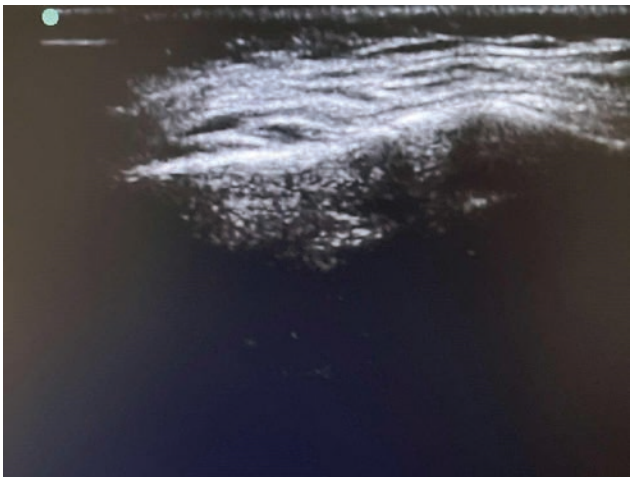

Figure 4. Post reduction ultrasonographic control

Figure 5. Postoperative MRI

Discussion

Facial fractures in children should be considered distinct entities from facial fractures in adults for 2 main reasons[5]. First, the surrounding environments that may lead to facial fractures are largely different between children and adults. It is very common for children to be raised in protected and supervised environments, thus minimising the chances of injury in the first place[4-6]. Second, the structure and biological composition of the facial bones are different and are constantly changing as the child grows. Many factors come into play that render children less prone to fractures. These include the decreased facial-to-cranial proportion from 8:1 found in newborns to 2.5:1 in adults. This implies that if an infant receives a direct trauma to the head, is more likely to suffer a fracture of the cranium than a face fracture, which would be the case for an older individual[4]. Moreover, the immature skeletal structures are much more pliable[4-6] combined with the flexibility of the osseous suture lines and the elasticity of the cancellous bone found in larger ratios compared to adults make the children less prone to bone fractures[1].

In addition, several more protective factors exist including the higher prevalence of soft tissues and thicker adipose tissue that act as a shock absorber by cushioning the impact and lessening the force transmitted[1,4-7]. Unerupted dentition provides added strength to the midface and the mandible[4-6]. The lack of aeration and thickened walls of the immature paediatric sinuses reinforce the zygomaticomaxillary buttress.

Fractures of the zygomatic bone are especially rare among other facial fractures in children, and it is presumed that the paranasal sinus not being fully pneumatized plays a role. One can thus deduct that for such a fracture to occur, regardless of the ‘‘protective’’ factors, it would have to be associated with a severe or high-velocity trauma usually accompanied by intracranial, spinal, and ophthalmologic injuries, as well as combination fractures[6].

Facial bone fractures can be challenging to diagnose due to the differences in the skeletal bones in paediatric population[8]. A CT scan is considered the gold standard in such cases, as it provides adequate visualisation of fracture extent and displacement of fracture fragments. In addition, it allows a more detailed planning for treatment and postoperative assessment[9]. It is possible for zygomatic fractures to go undiagnosed in young children, owing to the fact that routine Computed Tomography is avoided after trauma due to radiology restrictions at those ages following ALLARA principles. It is therefore important that if a clinician suspects such a fracture to keep in mind that Computed Tomography can aid the diagnosis.

The use of Ultrasound guided surgery has significant advantages including “real time” imaging, accuracy, nil radiation exposure and reduced operative time. However, the surgeon needs to have good technical skill or guided by a radiologist for accurate scanning and interpretation[7]. With the correct training, it has shown to reduce the operative time and confirm accurately the correct position of the fracture. In our opinion it is a great tool for clinicians as it is easily available, cost-effective, safe and allows intraoperative adjustments and correction.

Conclusions

The incidence of facial fractures in children is significantly lower than in adults and increases with age. It is traditionally more prevalent in boys, with the most common site being mandibular fractures. Motor vehicle collisions are at present the most common cause of these injuries. It is therefore important for parents to take the correct safety measures, especially safety belts, use of baby car seat and avoid holding their children.

Even if rare in the literature, such cases exist despite the modern advancements in prevention and diagnosis. As mentioned, it is possible yet unknown how many of those cases remained undiagnosed or are overlooked until any symptoms appear. It is therefore important to follow a correct protocol when it comes to patient examination and take into account the importance of CT or the use of ultrasound. The clinician should be able to weigh against the potential side effects of radiation and decide accordingly for each particular case.

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Correspondence

Rafaellos Dimitriou
Clinic of Oral and Maxillofacial Surgery, General Hospital Nicosia, Cyprus
School of Dentistry, European University Cyprus, Nicosia, Cyprus
e-mail: raf.dimitriou@gmail.com, r.dimitriou@external.euc.ac.cy