

Original Article

# Pediatric oral surgery – A retrospective analysis on prevalence and treatment outcome

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## ABSTRACT

**Objectives:** The intention of this study is to record the role of oral surgery in treating pediatric age group also to understand and emphasize the surgical protocol in pediatric patients.

**Material and Methods:** In this retrospective study, data about the pediatric patients treated for maxillofacial fractures, cyst, and tumors were recorded since 2017 from the archive of Department of Oral and Maxillofacial Surgery, Rajah Muthiah Dental College, and results were analyzed.

**Results:** Since 2017, almost 220 cystic and fracture cases including pediatric and adult patients have been recorded of which 72 cases were odontogenic cysts and tumors and 148 were maxillofacial fractures. Among these, 17 cases were reported in patient <15 years that account for 7.72% of all cyst and fracture. Of these, nine cases were pediatric fractures and eight cases were pediatric cyst and tumors.

**Conclusion:** The practice of pediatric dentistry demands a holistic approach toward oral health with thorough understanding of the anatomy, behavior, and growth potential of the child. Thus, the role of oral surgeons in providing care for such age group remains cardinal as they treat the pathology and maintain growth as well without any setback.

**Keywords:** Pediatric age, Fractures, Cysts, Tumor, ORIF, Enucleation, Marsupialization, Surgery

## INTRODUCTION

Pediatric dentistry is an age-defined specialty which provides dental care for children. Oral and maxillofacial traumas affect children differently than they do adults. Thus, pediatric patients can also have a wide range of surgical needs such as soft-tissue injury, treatment of pathology, fracture management, and so on.<sup>[1]</sup> The anatomy and physiology of children differ from adults; hence, while managing pathology, trauma, deformity, and upper airway obstruction in the young growing patient, care has to be taken in planning the treatment.<sup>[2]</sup> Pediatric oral and maxillofacial surgery (OMFS) is a subspecialty that has evolved to manage the specific needs of neonates, infants, and the growing child and it involves the care of patients with congenital craniofacial and developmental facial anomalies, cleft lip and palate, trauma, abnormal jaw growth, TMJ disorders in children, dentoalveolar conditions/anomalies, pediatric pathology, and obstructive sleep apnea.<sup>[3]</sup> This paper will provide an overview on the incidence of various fractures and pathologies in children and the need of oral surgery in such patients.

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## MATERIAL AND METHODS

The data of the present retrospective study were obtained from the archive of Oral and Maxillofacial Surgery Department of Rajah Muthiah Dental College and Hospital from 2017 to 2021. The study included those maxillofacial fractures and pathologies in children that required surgical treatment. We selected patients younger than 15 years for this study, excluding those with improper record of personal data, tumor size, and position. Cases mostly were under fracture and cyst categories apart from which clefts, tongue tie, and mucoceles were also reported. Most of the cases were treated under general anesthesia and few were treated under local anesthesia and conscious sedation as well.

### Findings

Based on the findings, 220 cystic and fracture cases were noted, of which 72 cases were odontogenic cysts and tumors and 148 were maxillofacial fractures (which included both pediatric and adult age group). Seventeen cases were reported in patient <15 years (1.4% of all the cases and 7.72% of all cyst and fracture). Out of these, nine cases were pediatric fractures and eight cases were pediatric cyst and tumors. The male/female (M/F) ratio was higher in both conditions.

### Pediatric fractures

Among 17 pediatric cases; nine were pediatric fractures; M/F ratio was 8:1. Fracture of parasymphysis of mandible was more frequently encountered. Furthermore, fracture of symphysis, angle, body of mandible, frontal bone, condyle, and zygomatic complex were evident [Table 1].



**Figure 1:** (a) Pre-operative image, (b) fracture site exposure, (c) ORIF, and (d) layered closure done with 3-0 Ethilon.

### Case 1: Frontozygomatic fracture

The images on surgical management of a pediatric patient with frontozygomatic fracture is illustrated below in Figure 1.

### Pediatric pathologies of odontogenic origin

There were eight pediatric cases reported with odontogenic cyst and tumors. Of those, five were odontogenic cyst among which dentigerous cyst was commonly incident. Furthermore, odontogenic keratocyst (OKC) was evident as one of the five odontogenic cysts. With regard to odontogenic tumors, three pediatric cases were reported which includes odontome, plexiform ameloblastoma, and fibro-osseous lesion [Table 2].

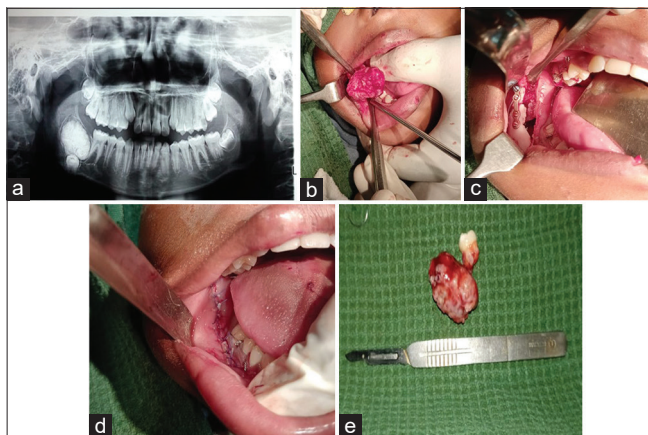
Odontogenic cysts are mainly treated by enucleation and marsupialization. In case of odontogenic tumors, segmental resection followed by reconstruction seems to be the

**Table 1:** Pediatric fracture.

Fracture type	Age	Sex	Treatment
Parasymphysis fracture	15	Male	ORIF in the right parasymphysis
Parasymphysis fracture	9	Male	Fixation done under wiring
Symphysis fracture	8	Male	Circummandibular wiring done using cap splint under LA
Angle fracture	15	Male	ORIF in the left angle of mandible
Body fracture	13	Male	ORIF done on the body of mandible
Frontal bone fracture	15	Male	ORIF done using titanium mesh; augmentation with free fat graft, temporalis; fascia; and muscle
Condylar fracture	7	Female	Cap splint with circummandibular wiring
ZMC fracture	14	Male	ORIF done under GA
Frontal and nasal bone fracture	15	Male	Indirect reduction of nasal bone

**Table 2:** Pediatric pathologies of odontogenic origin.

Odontogenic cyst and tumors	Age	Sex	Treatment plan
Dentigerous cyst	13	M	Enucleation
	15	M	Enucleation
	10	F	Enucleation
	13	M	Marsupialization
Odontogenic keratocyst	15	M	Marsupialization
Plexiform ameloblastoma	15	F	Hemi-mandibulectomy
Odontome	11	M	Enucleation
Fibro-osseous lesion	13	M	Segmental resection



**Figure 2:** (a) Pre-operative OPG, (b) excised odontome, (c) reduction of surgical site, (d) wound closure with 3-0 Vicryl, and (e) surgically excised odontome.

treatment option if it is of aggressive or malignant type. Furthermore, conservative management can be opted in case of benign tumors like odontome.

### Case 2: Odontome

The images on surgical management of a pediatric patient with odontome is illustrated below in Figure 2.

### RESULTS

After the surgery, patients were asked to report back for follow-up after 2 weeks. Post-operative monitoring of the pediatric patient is similar to that of adults. Wound healing was satisfactory. Chronic pain was one of the major factors assessed postoperatively using the visual analog scale. Of those nine fracture cases, two patients reported with trismus; they were put on muscle relaxants and asked to return back after a month; on the second follow-up, they did not have any fresh complaints. Other than which, no major acute post-operative complications or complaints were reported. Moreover, since none of the patients reported back with complaints on restricted jaw growth and unerupted teeth, it was interpreted that surgical procedures did not hamper the growth potential of the patients.

### DISCUSSION

The pediatric population is a very dynamic group of patients. Pathologies requiring surgical approach are always quiet challenging among them. Here, in this study, we have tried to report the incidence of pediatric fractures, cyst, and tumors along with their surgical approach carried out in our institute.

First is about anesthetizing the patient, since behavior management is toughest in these age groups; choosing the mode of anesthesia is important. Local anesthesia is the most

preferred option, followed by conscious sedation if the patient is cooperative; but still anxious and fearful. At last, general anesthesia is also widely known for pediatric anesthesia; but the titration of sedation can be more challenging in this age group.

Kaban and Troulis stated that mandibular fractures are the most common facial skeletal injury in hospitalized pediatric trauma patient. Boys are affected twice as frequently as girls.<sup>[3]</sup> Understanding the dentofacial injuries are important because of their associated risk for complication in tooth eruption, alveolar development, occlusion, and facial growth.

In children, condylar, subcondylar, and angle fractures account for 80% of mandibular fractures.<sup>[4]</sup> Symphysis and parasymphysis fractures are more common than in adults. The idea of managing fractures in children differs from that in adults. The reason behind this is the anatomic variation, rapidity of healing, patient cooperation, and growth phase of patient.

The vacuum formed splints; traditionally used as night guards might be a useful alternative to arch bars in managing dentoalveolar fractures, especially in pediatric patients. This novel technique is minimally invasive and preserves the developing tooth buds.<sup>[5]</sup>

Thus, the treatment choice of fracture in pediatric mandible depends on age and stage of tooth development. For managing fractures, we have just two options either we will opt for an open reduction with internal fixation if it is an unfavorable fracture or a closed reduction with intermaxillary fixation if it is a favorable fracture. The presence of tooth buds must be considered while opting for open reduction. In case of internal fixation using rigid wires or plates and screws, trauma to developing tooth bud is common.

The most common odontogenic tumor seen in pediatric population is odontomas.<sup>[3]</sup> However, few mesenchymal lesions may exhibit a locally aggressive pattern like the fibro-osseous lesion. The treatment should totally be planned based on the biologic behavior of the tumor. Gyulai-Gaál *et al.* have also stated that early removal of a slowly growing tumor is necessary to avoid more serious jaw distortions and to prevent severe orthodontic disturbances.<sup>[6]</sup> As multiple options like autogenous bone graft are available, concern regarding stunted facial growth needs to be avoided, since control of the primary tumor is the ultimate goal.

Odontogenic cysts in children, just as in adults, are frequently associated with impacted teeth. The occurrence rate of cysts in pediatric age group is relatively low. Furthermore, the incidence of pediatric jaw cysts is predominated by cysts of developmental origin (63.2%) while those of inflammatory origin accounted only for 33.6%.<sup>[7]</sup> Vinicius Gomes Serra *et al.* justified the infrequent occurrence of inflammatory cysts in children and adolescents, since their pathogenesis starts from the pulp necrosis, and as recently, erupted permanent teeth are generally healthy, not showing the condition necessary

for the development of cystic lesion.<sup>[8]</sup> In pediatric patients, maxillary canine is commonly impacted. Furthermore, dentigerous cyst type is commonly encountered in children.

The treatment option is enucleation of the cyst followed by either removal of the impacted tooth or surgical exposure of the impacted tooth followed by orthodontic movement to a favorable position. OKC though has least incidence in children commonly they are seen as a part of nevoid basal cell carcinoma. The management of OKC includes marsupialization if it is encountered in pediatric patients whereas *en bloc* or marginal resection if seen in adults.

Special considerations are to be noted while studying pediatric age group. Furthermore, the nature of dentition plays a key role; since pediatric patients are mostly falling under mixed dentition; care should be taken that the treatment plan does not hamper the developing tooth buds. The most important factor is growth; for example; in those cases, treated with condylar fractures; care should be taken such that growth is not affected since condyle is the growth center of mandible. Thus, the treatment should be planned in a way, like it should be both conservative and also effective in treating the underlying condition, at times, aggressive treatment plan might also be needed like in cases of malignant odontogenic tumors; these cases are better followed by reconstruction. Furthermore, when it comes to medication; care should be taken regarding the drug dosage; regarding the teratogenic potential of a drug also antibiotics should be prescribed with caution since long-term drug administration might lead to issues like drug toxicity. Since pediatric patients are in their active growing phase; changes can be noticed more frequently, so follow-up is mandatory following the surgery, thus a constant check can be done over the growth and development of the patient.

## CONCLUSION

The management of orofacial pathologies in children differs from that of adults because of the concern over possible disruption of normal growth. Self-fall seems to be the main etiology in most of the pediatric maxillofacial fractures. Conservative treatment are generally given to pediatric age group, with open reduction in few cases on the basis of displacement. However, still complete understanding of the pathology along with the knowledge about the patient's growth phase; most apt treatment option can be offered. Thus, oral and maxillofacial surgeons undoubtedly remain instrumental in treating such pediatric cases. Furthermore, pediatric oral and maxillofacial surgery is now evolving into an important subspecialty of surgery with much to offer in

the care of children. Best results can be achieved through a multidisciplinary approach and always the surgical plan should be based on conservative and minimal invasive procedure; pertaining to the maximum benefit of the patients. Regular follow up is indispensable in these age group.

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## Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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## Conflicts of interest

There are no conflicts of interest.

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