Oral surgery in paediatric dentistry: type of surgical treatment and age distribution in a Public Dental Service in Northern Italy



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Abstract

Aim To describe the organisation of the oral dental surgery service of the Department of Pediatric Odontostomatology and Orthodontics, "G. Gaslini" Hospital of Genoa (Italy), as well as type and frequency of the interventions carried out in the considered period of time.

Materials and methods Study design: Descriptive retrospective aepidemiological study about the access and surgery interventions in the years 2015–2018 and the first semester of 2019. This study was conducted at the Department of Pediatric Odontostomatology and Orthodontics of the "G. Gaslini" Hospital of Genoa, Italy, in which treatment is offered to children and adolescents aged between 0–14 years, to whom continuity of care is ensured also after this age range, and to special needs patients, even older that 18 years. The clinical data were extracted from the Hospital database and then statistically analysed with the SPSS programme.

Results Out of a total of 27,663 subjects, the patients who required oral surgery were 1,928 corresponding to 6.96%, for a total of 2,499 surgical interventions of which 1,667 were performed as outpatient surgery (dental chair) and 832 in the operating theatre. All the surgeries were performed by the same three doctors. In the group of patients under 18 years (1,773 subjects) the average age is 9.22 years; it should be underscored that over 70% of oral surgeries are performed on subjects between 7 and 13 years.

Conclusions Given the low frequency of paediatric oral surgery, this type of intervention should be entrusted to operators and structures that have a wider experience in such cases in order to ensure the highest levels of safety.

KEYWORDS Dental care and general anaesthesia, Paediatric Dental care, Dental Care for patients with special needs, Paediatric oral surgery, Public health dentistry, Unrerupted teeth.

Introduction

Oral surgery deals with the diagnosis and surgical treatment of diseases that can involve the soft and hard tissues of the oral cavity [British Association of Oral and Maxillofacial Surgeons, 2017]. Childhood and adolescence are characterised by teeth eruptions and shedding. This complex process may require oral surgery to allow normal dentoalveolar development of the arches [Digman and Abramowicz, 2012]. In addition to dental and tissue abnormalities and mucosa lesions, the psychological aspect should not be underestimated because it represents one of the most difficult aspects in the treatment of children. Few data are available on the frequency of oral surgery in children and adolescents and little information on the organisation of this service at the hospital level. To our best knowledge, only one study described the reality observed in a Danish hospital and highlighted how the need for surgery in the paediatric population is low but includes a wide range of surgical interventions. For this reason, the possibility of interdisciplinary dialogue available in a hospital is an invaluable resource for the management of such patients [Gronbaek et al., 2017].

In Italy dental visits are provided through the National Health System (SSN) on the patient's or family doctor's request and a contribution is paid based on the income. Public dental care is limited to programmes aimed at dental treatment in the developmental age (0–14 years) and dental and prosthetic treatment to specific categories of subjects, namely those with special needs or social vulnerability. Dental treatment in patients 0 to 14 years includes monitoring of caries and malocclusions treatment of various diseases, correction of severe malocclusion (IOTN grade 4 or 5), extractions, periodontal surgery, reconstructive oral surgery etc. as per Ministerial decree (DPCM 12/01/2017, DLgs. 30/12/1992 n. 502 - 17A02015) [Official Gazette of the Italian Republic, 2017].

Since oral surgery is included among the services provided by the National Health Service in Italy, especially to patients in developmental age, the analysis of the data on these interventions is useful information about the oral surgery needs of children and adolescents.

The aim of this study is to describe the organisation of the oral dental surgery service provided by the Department of

Paediatric Odontostomatology and Orthodontics of the "G. Gaslini" Hospital of Genoa (Italy) on the types of surgeries most frequently performed for each age group.

Materials and methods

The study was conducted at the Department of Paediatric Odontostomatology and Orthodontics "G. Gaslini" Hospital of Genoa, Italy. This department offers treatment to children and adolescents aged between 0–14 years, to whom continuity of care is ensured also after this age range, and to special needs patients, even older that 18 years (patients older than 14 years are treated only for continuity of care or because they have special needs). It is in fact the reference center for the SIOH (Italian Society of Odontostomatology for the Handicap). Patients are referred by paediatricians or dentists for diseases of particular relevance that require hospitalisation for surgical treatment or by the hospital emergency room for injuries or traumas. Moreover, patients suffering from systemic diseases under treatment in other departments of the same hospital are also sent for consultatation. With this access method, we mainly visit subjects with suspicion of oral pathologies but not diagnosed yet. The number of accesses per year is around 6,000; in this study, the years 2015, 2016, 2017, 2018 and the first semester of 2019 were analysed.

The total number of dentists working in this department is 3 and all contributed to the surgeries performed in the considered period: all 3 in outpatient basis and 2 also in the operating room. All oral surgery cases were treated at our department, except maxillofacial cases that were sent to another facility and therefore are not included in this study.

Ethical approval was not required for this descriptive retrospective aepidemiological study, so only the approval of the head of the Department of Paediatric Odontostomatology and Orthodontics was required to obtain data from the hospital's electronic database by calendar years.

The data extracted from the electronic database are: admission number of the subject, date of birth, gender, date of the surgery, preoperative diagnosis, place where the intervention took place (at the dental chair of the clinic, as outpatient surgery, or in the operating theatre), surgical procedure performed, possible concomitant non-dental surgery, operator. All the data were entered in an Excel spreadsheet and subsequently statistically analysed with the SPSS programme.

Results

During the 4 and a half years analysed in this study, out of a total of 27,663 subjects visited (Table 1), 1,928 (6.96%) needed oral surgery, for a total of 2,499 interventions of which 1,667 were performed on an outpatient basis and 832 in the operating theatre. In the "G. Gaslini" Hospital no conscious sedation is performed by the dentists, so when it is required patients are treated in the operating theater; also, patients with special needs are treated in the operating theater.

All surgeries were carried out by 3 operators in outpatient basis and 2of them also in the operating room.

A slightly higher percentage of males (51.8%) was operated compared to females (48.2%). For the calculation of the average age of patients at the time of surgery, subjects of age ≥18 were excluded. The average age of the 1,928 subjects considered is 9.22 years (Table 2). It has to be considered that more than 70% of oral surgery are performed in subjects between 7 and 13 years. With regard to the interventions in the operating theater, the average age is 8.54 years with an almost uniform distribution of frequencies by age, while for interventions in the dental clinic it is noted that almost 65% is in the range 8–11, with modal age equal to 10 and average equal to 10.12 years. Of the 883 surgeries in the OR, 400 have been carried out under local anaesthesia, 40 with local anaesthesia associated with various levels of sedation assisted by the anaesthesiologist and 392 under general anaesthesia. In 55 cases general anaesthesia was used because the dental surgery was concomitant with another non-dental surgical intervention (including otorhinolaryngology, heart surgery and gastroenterology interventions), while in the remaining cases general anaesthesia was required for patients with special needs (75%), for uncooperative patients due to their young age or because of dental phobia though in good general health (15%), and for the intrinsic complexity of the oral surgery itself (10%). The cases of dentoalveolar surgery, which involved the highest number of patients, included

Year	Number of admissions ATS
2015	5927
2016	6015
2017	6174
2018	6080
2019 Firstsemester	3467
TOTAL	27663

TABLE 1 Number of visits per year in the Department of odontostomatology and pediatric dentistry of the G. Gaslini Hospital.

AGE	Operating room	Outpatient surgery	TOTAL
0	11	40	51
1	15	8	23
2	22	3	25
3	23	21	44
4	24	25	49
5	33	25	58
6	44	50	94
7	51	87	138
8	61	236	297
9	57	213	270
10	51	187	238
11	54	150	204
12	53	71	124
13	56	53	109
14	41	26	67
15	35	4	39
16	20	3	23
17	21	0	21
18 e >	54	0	54
TOTAL	726	1202	1928

TABLE 2 Distribution of subjects who required oral surgery by age.

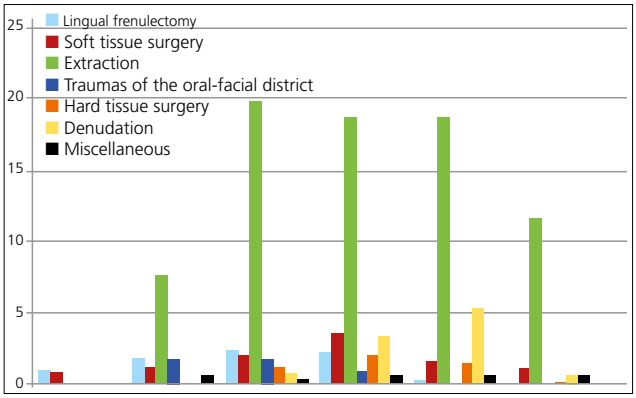


FIG. 1 Frequency of the different types of oral surgery performed in the operating room in relation to age groups

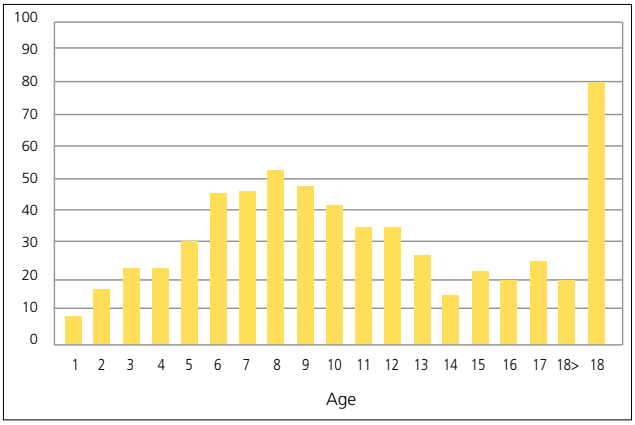


FIG. 2 Distribution of the percentages of extractions by age.

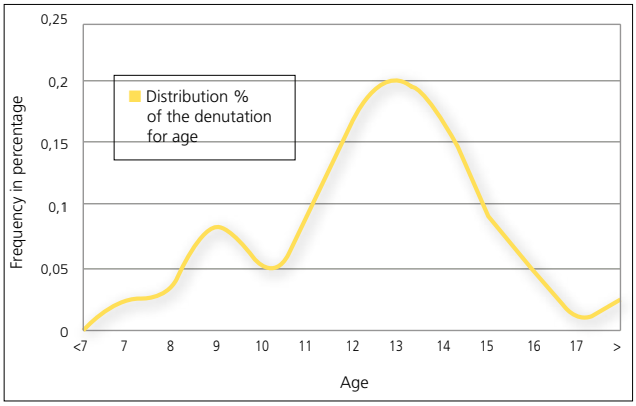


FIG. 3 Distribution of subjects submitted to surgical exposure by age.

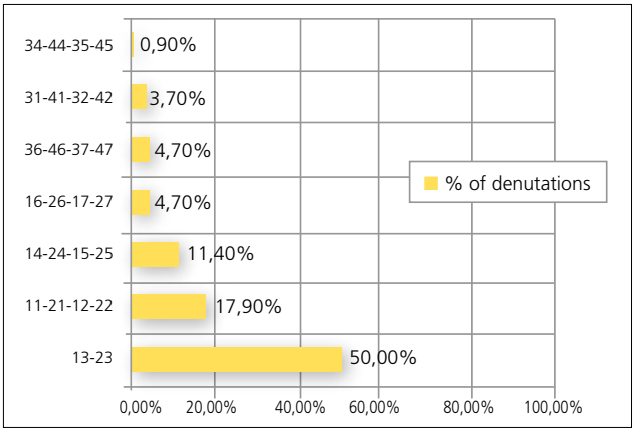


FIG. 4 Distribution of frequency as percentage of exposure by series of teeth.

tooth extraction (deciduous, permanent and supernumerary teeth) were 60.74%, of which 20.88% were represented by surgical extraction, followed by surgical denudation (10.2%), germectomies (8.64%) and lingual and labial frenulectomies (7.92%); the remaining surgeries were exereses and biopsies of the soft tissues and maxillary bones, intermaxillary blockages for the stabilisation of traumatic fractures, replantations after traumatic avulsion, arthrocentesis and infiltration of corticosteroids in the temporomandibular joint (Fig. 1). Of the 2,464 teeth extracted 1,357 were deciduous and 994 permanent of which 84 third molars were extracted by germectomy, 94 supernumerary teeth and 19 natal teeth. The permanent teeth were extracted in more than 50% of cases due to dentoalveolar discrepancies, in 32% of cases for caries and in almost 6% of the cases for trauma. Almost 70% of the deciduous teeth were extracted due to the presence of destructive caries and odontogenic abscess; 21% due to eruptive problems affecting the permanent and the remaining due to trauma (Fig. 2). The denudations were more frequent in females (58.82%) than males (41.18%). The teeth involved were the upper canines (50%) followed by the upper incisors (17.9%), upper premolars (11.4%), lower canines (6.7%), upper and lower molars (4.70% combined), lower incisors (3.7%), lower premolars (0.9%). All the denudations included the preparation for the subsequent orthodontic treatment with the application of a button and a chain for traction in the arch.

More than 50% of denudations involved children between 12 and 14 years, the lower age detectability is 7 years and the frequency of interventions related to age has a Gaussian distribution (Fig. 3, 4). Germectomies showed a higher frequency in females than males (65% vs 35%). Due to the characteristics of the surgical intervention, the age range was between 10 and 17 years with a maximum peak between 13 and 15 years. Almost all germectomies involved teeth 38 and 48. Regarding the surgery after traumatic events, 142 interventions have been recorded, of which 128 due to dental trauma which led to the extraction of deciduous teeth in 86 cases, of permanent teeth in 18 cases and in 24 cases to the replantation of permanent teeth. There were 7 condylar fractures, 6 fractures of the alveolar processes and 1 mandibular fracture. Soft tissue surgeries were mainly frenulectomy (145), of which 91 lingual (52 in the operating theatre and 39 at the dental clinic) and 54 labial (14 in the operating theatre and 40 as outpatient surgery at the dental clinic). Other surgeries included removal of mucoceles (16 cases), soft tissue biopsies of the oral cavity (22 cases) and exeresis of soft tissue lesions.

Surgery of the hard tissues includes biopsies of maxillary bone tissues (20 cases), removal of composite odontomas (5 cases), marsupialisations of cystic lesions (5 cases) and exeresis of cysts and lesions of maxillary bones.

Discussion

This study wanted to focus attention on the need for oral surgery in the paediatric population and its distribution

in relation to the age of the subjects and the type of surgical intervention. This study was based on the data of the population referred to the Department of Paediatric Odontostomatology and Orthodontics at the "G. Gaslini" Hospital of Genoa (Italy), that is the referral center for paediatric oral pathologies of particular severity and for special needs subjects in the Liguria region (Northern Italy), owing to its high level of specialization, and therefore it can be representative of the types of interventions performed. On this regard it must be underlined that the data about the total need for oral surgery in our sample of children and adolescents can be overestimated because of the particular method of admission to our dental clinic, which is a level 2 center for paediatric oral pathologies of particular severity, where patients are referred by other dentists who have a diagnostic suspicion or are unable to manage particularly complex cases.

The only similar aepidemiological study on paediatric dental surgery that we found in the literature reported the need of surgery at 0.55% in Denmark [Gronbaek et al., 2017] versus our datum of 6.96%. On this regard it should be considered that the Danish center is the referral center for all children of that district in Denmark, a country where free comprehensive dental service for children and adolescents (from birth to 18 years of age) is provided by the municipal dental service, including dental screening for all children.This allows to implement protocols for the prevention of oral diseases, and therefore significanlty reducing their onset. Therefore, the different data could be due on the one hand to the different type of admission of patients in our study and on the other hand to the lack of adequate prevention of paediatric oral diseases in Italy. This determines the different prevalence of dental conditions in the two countries and, above all, the greater severity of disease in Italy, where often children visit the dentist only when there is pain. In Italy, in fact, the prevalence of caries is 22% at 4 years and 44% at 12 years [Campus et al., 2009a; Campus et al., 2007], whereas, according to the WHO, Denmark is considered a country with very low-risk for caries [WHO, 1997; Petersen, 2003]. Therefore it is not suprising that tooth extraction due to destructive caries with odontogenic abscess is the most frequent surgical intervention in our study.

The age of the patients undergoing oral surgery varies from 1 month to over 18 years, but most of the surgeries are performed in the 8–11 year age group, an age when orthodontic treatment is often performed, therefore problems also of surgical relevance can be identified during checkups. A slightly older age range, i.e. 12–14 years, than the mean age for surgical need was found for exposure of impacted teeth, because at this age tooth impaction is diagnosed considering the physiological age of permanent teeth eruption, with canine teeth, that generally erupt at the age of 12, being the most frequently impacted teeth for lack of space available. In fact, maxillary canines represent half of the impacted teeth. All interventions for impacted teeth combined the surgical exposure with orthodontic traction to guide correct eruption of the tooth into the dental arch. Germectomy of third molars is the third most frequent intervention, with almost all cases involving mandibular third molars. All surgeries were performed after a diagnosis of disodontiasis of the tooth bud and never for preventive purposes. Soft tissue surgery showed a prevalence of frenulectomies, lingual frenulectomy being almost double compared to labial frenectomy, with an almost uniform age distribution up to 11 years, with a linear decrease after that age. Interventions under general anaesthesia accounted for 17.28% of the surgeries. This number is relevant but should be interpreted in light of the fact that in the "G. Gaslini" Hospital conscious sedation is not performed by the dentists at the dental chair, so when it is required patients are treated in the operating theater; also, patients with special needs are treated in the operating theater. Medically compromised children and children treated under general anaesthesia at the first dental treatment were more likely to undergo another dental treatment under general anaesthesia within four years [Guidry et al., 2017]. General anaesthesia in paediatric dentistry is a safe and routine procedure in terms of perioperative management and complications rate. In patients with medical conditions or congenital syndromes, experienced anaesthesiologists are crucial because of the higher risk of complications [Bartella et al., 2018]. All surgeries due to pain or trauma were performed the same day of presentation, showing the high efficiency of our emergency service.

Conclusions

From the present study we can infer the small need for oral surgery in paediatric age, if we exclude extractions resulting from destructive carious processes. Very small or dental phobic children as well as subjects with cognitive disability require experienced personnel as their treatment is more complicated. The first requirement for working at our department is a postgraduation in specialisation schools, and further direct experience is acquired through the treatment of a wide range of cases, thus increasing knowledge and manual skills of the dental surgeon. This is the case of the specialized dentists at our department, who perform all surgeries in the operating theater or outpatient basis, who guarantee safe interventions. Further and more in-depth studies could explore the possibility to associate dental surgery with other medical procedures under general anaesthesia, in order to achieve this, investigations on how to associate concurrent surgical interventions and, above all, organisation on the timing of different departments are required. This would result in reduced surgical times and disconfort for patients and their family.

References

» Bartella AK, Lechner C, Kamal M, Stegmann J, Holzle F, Bethaus B. The safety of paediatric dentistry procedures under general anesthesia. A five-Years experience of a tertiary care center. Eur J Paediatric Dent 2018, Mar;19(1):44-48.
» British Association of Oral and Maxillofacial Surgeons [Internet]. Dentoalveolar surgery. 2017 [cited 2017 Jun 2]
» Campus G, Solinas G, Cagetti MG, Senna A, Minelli L, Majori S, Montagna MT, Reali D, Castiglia P, Strohmenger L. National Pathfinder survey of 12-year-old Children's Oral Health in Italy. Caries Res 2007a;41(6):512-7.
» Campus G, Solinas G, Strohmenger L, Cagetti MG, Senna A, Minelli L, Majori S, Montagna MT, Reali D, Castiglia P. Collaborating Study Group. National pathfinder survey on children's oral health in Italy: pattern and severity of caries disease in 4-year-olds. Caries Res 2009a;43(2):155-62.
» Decreto del presidente del consiglio dei ministri 12 gennaio 2017 (Definizione e aggiornamento dei livelli essenziali di assistenza", art. 1, comma 7, decreto legislativo 30 dicembre 1992, n. 502. (17A02015) - G.U. Serie Generale n. 65 18 3/2017.
» Digman SW, Abramowicz S. Pediatric dentoalveolar surgery. Dent Clin North Am 2012;56:183–207.
» Gronbaek AB, Petersen F, Haubek D, Poulsen S. Dentoalveolar oral surgery in children and adolescent: organization and surgical treatment in a large, Danish municipal dental service. Acta Odontologica Scandinavica 2017 August; 75:8,603-607.
» Guidry J, Bagher S, Felemban O, Rich A, Loo C, Reason of repeat dental treatment under general anaesthesia: a retrospective study. Eur J Paedriatric Dent 2017 Dec;18(4):313-318.
» Petersen PE. The world oral health report 2003 continuous improvement of oral health in the 21st - the aproach of the WHO global oral health programme. Community Dent Oral Epidemiol 2003; 31 (suppl 1): 3-23.
» World Health Organization. Oral health surveys. Basics methods.4. Geneva: World Health Organization; 1997.