

Dental extractions in Saudi children under general anesthesia at Armed Forces Hospital in Riyadh

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الهدف من هذه الدراسة كان تقصي نمط خلع الأسنان عند الأطفال تحت التخدير العام في مستشفى القوات المسلحة بالرياض. و تم فحص ٥٤٦ طفلاً وتحويلهم إلى قسم طب أسنان الأطفال بالمستشفى وبعد إعادة الكشف عليهم تم الخلع لهم تحت التخدير العام. متوسط الخلع لكل طفل كان 5.92 سناً. و معظم هذه الأسنان المخلوعة كانت من الأسنان اللبنية والأغلب كان الرحس اللبني الأول. أما بالنسبة للأسنان الدائمة فكان الضرس الدائم الأول هو الأكثر خلعاً من بينها. هناك حاجة دائمة للتخدير العام نظراً لانتشار تسوس الأسنان لدى الأطفال وذوي الاحتياجات الخاصة.

The aim of this study was to investigate the extraction pattern of teeth in children under general anesthesia at the Armed Forces Hospital, Riyadh, Saudi Arabia. In the study, 546 children were examined and referred to pediatric dentistry and after clinical radiographic re-evaluation, had extractions performed under general anesthesia. Mean extractions per child were 5.92 (± 2.12) teeth. Most of the extractions were done in primary dentition and in age group 5-9 years. Primary first molar was the most commonly extracted tooth. In the permanent dentition, first molar was again the most commonly extracted tooth. Based on this study and data, it is recommended that intensified and more preventive programs in dental health care be implemented for Saudi children to reduce caries prevalence which was found to be the main cause of dental extractions in these children.

INTRODUCTION

In many developing countries caries prevalence has been found to be significantly high especially in Saudi Arabia and other middle-eastern countries, ranging from 72 to 90 percent.¹⁻⁹ In Saudi Arabia, caries has been reported as the main reason for extraction of teeth.¹⁰ Among primary dentition, molars are more prone to caries than the incisors,^{11,12} and caries has also been reported to tend to be bilateral in this dentition.^{9,11-15} In a recent report on primary dentition, 1st molars followed by upper incisors had very high caries prevalence, with the 'decay' (d) being the main component in dmft of these children in Saudi Arabia.¹² Frequent consumption of sugar and cariogenic snacks has been reported as common in the Arab world.^{6,16,17}

Children with multiple carious teeth need extensive treatment. Some of these children are uncooperative or with special needs and may need dental treatment that is traumatic to cope with and may

often require general anesthesia. General anesthesia has been used in dentistry for almost one hundred and fifty years. In a hospital setting, dental general anesthesia (GA) is quite safe but not without risk of complications.^{18,19} DGA has been used quite commonly in children for dental extractions.²⁰⁻²⁴ Some studies have been carried out regarding extractions of the teeth in children in Saudi Arabia,^{24,25} but none of them investigated the pattern of extraction of teeth. Therefore, the aim of the present study was to investigate the frequency and the pattern of extractions of primary and permanent teeth under GA among children at the Armed Forces Hospital, Riyadh from 1993 to 2003.

SUBJECTS AND METHODS

General anesthesia for dental extractions and complete dental rehabilitation in children is provided as an in-patient service, at the Armed Forces Hospital, Riyadh. The dental clinics of the hospital provide primary dental care to the military personnel and their families. Children in this study totalling 546, male

Received 13 February 2005, Revised 11 May 2005

Accepted 16 May 2005

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and female were the dependants of the military personnel. They were initially referred by the primary care dentists to the division of pediatric dentistry and were re-evaluated by the pediatric dentists, by oral and radiographic examinations, before extractions were carried out under GA. All these children had extractions under GA for multiple extractions and/or dental emergency reasons. All of them were admitted a day before the surgery for preoperative anesthetic assessment. They were discharged on the day of surgery or a day after, depending upon the medical condition of the patients.

The data were collected from 1993 to 2003 on a specially designed form, which was completed after the treatment of each patient under GA. The demographic information collected on the form were: age (at the last birthday), gender, number and type of teeth extracted and reason for the extraction. Data was entered into computer utilizing FOXPRO software and analyzed using Statistical Package for Social Sciences (SPSS ver. 10) software.

RESULTS

A total of 546 children had extractions under GA during the study period by one of the authors (TRP). There were 290 (53.1%) males and 256 (46.9%) females. Children were divided into three age groups; less than 5, 5-9 and 10-15 years. Children aged 5-9 made up more than half (59.9%) while children aged 5 or less made almost one-third (29.1%) of the sample (Table 1).

Table 1. Gender and age groups of the children

| Age groups | 5 yrs and less | | 5-9 yrs | | 10-15 yrs | | TOTAL | |
|--------------|----------------|---------------|------------|---------------|-----------|-------------|------------|--------------|
| | No. | (%) | No. | (%) | No. | (%) | No. | (%) |
| Male | 87 | (55.7) | 170 | (52) | 33 | (55) | 290 | (53.1) |
| Female | 72 | (45.3) | 157 | (48) | 27 | (45) | 256 | (46.9) |
| TOTAL | 159 | (29.1) | 327 | (59.9) | 60 | (11) | 546 | (100) |

Frequency of Tooth Extractions

A total 3216 extractions were carried out under GA. All the teeth extracted were due to dental caries or dental abscess. Mean extractions per child were 5.9 (SD 2.1), while the median was 5 and the range was 1-20. Mean extractions per child among male were higher as compared to female and among age group 5-9 years than other age groups (Table 2). Almost half (46%) of the children had more than 5 teeth extracted (Table 3).

Table 2. Mean, standard deviation, median and range of extraction of teeth in relation to gender and age

| | Gender | | Age groups (yrs) | | | TOTAL |
|---------------|--------------|--------------|------------------|--------------|--------------|--------------|
| | Male | Female | <4 | 5-9 | 10-15 | |
| Mean | 6.1 (4.3) | 5.8 (4.0) | 5.6 (4.6) | 6.2 (4.0) | 5.4 (3.2) | 5.9 (2.1) |
| Median | 5 | 4 | 4 | 5 | 5 | 5 |
| Range | 1-20 | 1-20 | 1-20 | 1-20 | 1-15 | 1-20 |

Table 3. Frequency of extractions of teeth and number of patients

| Number of extractions | Number of patients | % |
|-----------------------|--------------------|------|
| 1-5 | 296 | 54.2 |
| 6-10 | 181 | 33.2 |
| 11-15 | 52 | 9.5 |
| 16-20 | 17 | 3.1 |

Table 4. Type of dental extractions in relation to gender

| Teeth extracted | Male | | Female | | TOTAL | |
|--------------------------------------|------------|--------------|------------|--------------|------------|--------------|
| | No. | (%) | No. | (%) | No. | (%) |
| Primary teeth only | 260 | (90.0) | 222 | (87.0) | 482 | (88.0) |
| Permanent teeth only | 7 | (2.0) | 8 | (3.0) | 15 | (3.0) |
| Primary & permanent teeth | 23 | (8.0) | 26 | (10.0) | 49 | (9.0) |
| TOTAL | 290 | (100) | 256 | (100) | 546 | (100) |

Table 5. Distribution of dental extractions in terms of tooth type in primary teeth

| Teeth | Upper Right | Upper Left | Total No. (%) | Lower Right | Lower Left | Total No. (%) | Total |
|-----------------------|-------------|------------|--------------------|-------------|------------|--------------------|-------------------|
| Central Incisors | 221 | 230 | 451 (14.9) | 52 | 56 | 108 (3.6) | 559 (18.5) |
| Lateral Incisors | 215 | 215 | 430 (14.2) | 43 | 47 | 90 (3.0) | 305 (17.2) |
| Canines | 67 | 66 | 133 (4.4) | 57 | 49 | 106 (3.5) | 239 (7.9) |
| 1 st Molar | 235 | 228 | 463 (15.3) | 251 | 256 | 507 (16.8) | 970 (32.1) |
| 2 nd Molar | 153 | 156 | 409 (10.2) | 201 | 221 | 422 (14.0) | 831 (24.2) |
| Total | 891 | 895 | 1786 (59.0) | 604 | 629 | 1233 (40.9) | 3019 (100) |

Dental Extractions According to Dentition Type

A total of 482 (88%) children had extractions of primary teeth only, 15 (3%) had extractions of permanent teeth only while 49 (9%) had both primary and permanent teeth extracted (Table 4). Twelve (2.2%) children had all their primary teeth (20) extracted. Among the total extractions, 3019 were primary teeth and 197 were permanent teeth. Among the teeth extracted in the primary dentition, 1786 were upper while 1233 lower teeth.

Dental Extractions According to the Tooth Type

A higher number of primary molars were extracted compared to incisors. Most commonly extracted tooth in the primary dentition was lower first molar (16.8%), followed by upper first molar (15.3%), upper central (14.9%) and upper lateral incisors (14.2%) as shown in Table

Table 6. Distribution of dental extractions in terms of tooth type in permanent teeth

| Teeth | Upper | Lower | Total (%) |
|------------------------|-----------|-----------|------------------|
| Incisors | 2 | 2 | 4 (2) |
| Canine | 0 | 1 | 1 (0.5) |
| Premolars | 4 | 3 | 7 (3.6) |
| 1 st molars | 91 | 92 | 183 (92.9) |
| 2 nd molars | 2 | 0 | 2 (1) |
| Total | 99 | 98 | 197 (100) |

4. Extraction in the primary dentition was found to be bilateral (Table 5). Extractions of canine and lower incisors were relatively infrequent. Among the permanent dentition, first molar was the tooth most commonly extracted (Table 6).

DISCUSSION

In pediatric dental practice, extraction of primary teeth is quite common generally due to caries or trauma. All the primary teeth extracted in the study were due to caries and pulp involvement, and has been reported as one of the major reason of extraction.¹⁰

In the present study, a high number of the children who had extractions under GA, were aged between 5-9 years, which is similar to previous studies.^{20,22,23} Children aged 5 years and less, who had extractions, comprised one-third of the sample, which was alarming. Dental extractions in young children can cause eruption problems of permanent teeth due to space loss. Mean extractions among all age groups, and in both male and female, were very high. It reflected a high caries rate and untreated caries, and children not visiting a dentist on regular basis for early check up and dental care.¹² More extractions were done in males than in females. Extractions done in different age groups were not statistically significant between males and females (Table 1).

In the present study, primary teeth comprised the major bulk of extraction,

which is similar to a study by Holt *et al.*²² Many of the children had their permanent teeth removed due to caries, mostly their first permanent molars. This indicates the importance of early prevention and possibly fissure sealing of this high caries risk tooth in Saudi children. Recent studies^{12,14,15} have reported very high caries bilaterality in Saudi pre-school and schoolchildren.

More than 10 extractions were done in 12.6% of the children and twelve children had all their primary teeth extracted. This showed the high severity of dental caries among the study population. The causes of such a high caries severity in this part of the world have been discussed in several studies.^{1,8,9}

Among primary dentition, first molar comprised one-third of the total extractions. Similar results have been reported earlier.¹⁰ Upper central and lateral incisors were also two of the most commonly extracted teeth in the young children presumably due to the pattern of decay in early childhood caries. A high prevalence of early childhood caries has been reported in Riyadh, Saudi Arabia.⁹ An interesting factor found in this study was that extractions in these children were bilateral when corresponding teeth on the one side of the arch were compared to the other side. The result confirmed the previous reports about bilateral occurrence of dental caries among children in Riyadh.^{14,15}

In spite of the advancement in prevention and management of dental caries in children, dental extractions continue to be a common occurrence in many children. Among the Saudi children where caries prevalence is very high, more aggressive prevention and early restorative treatment is needed. Meanwhile, a need remains for multiple dental extractions in young children with behavior problems under general anesthesia. More preventive measures

should be taken to avoid extraction in these children.

ACKNOWLEDGMENTS

Authors thank Dr. Amjad Wyne for reviewing the manuscript and Dr. Majda Al-Silmi for the Arabic translation of the abstract.

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