

## The dental treatment of children under general anaesthesia at a hospital in Taif, Saudi Arabia

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الهدف من هذه الدراسة كان لتصنيف الأطفال المعالجن تحت التخدير العام حسب حاجتهم ونوع المعالجة السنية المقررة في مستشفى الهدا العسكري بالطائف خلال الفترة من سبتمبر ١٩٩٩ إلى مارس ٢٠٠١ م . تم مراجعة جميع الملفات السنية للأطفال المعالجن تحت التخدير العام وتم جمع البيانات بالتفصيل: سبعون طفلاً تم علاجهم وكان متوسط أعمارهم (٦٨.٥ شهرا) وكان أكثر الدواعي شيوعاً لعلاجهم تحت التخدير العام عدم قدرتهم على التعاون وقبولهم للعلاج السني تحت التخدير الموضعي. (٦٣ % ) من هؤلاء المرضى احتاجوا إلى معالجة ترميمية بالإضافة إلى قلع الأسنان. متوسط الترميم والقلع للأسنان اللبينية لكل طفل كانت (٥.٨ و ٦.٢ ) على التوالي. وقد خلصت الدراسة إلى أن الأطفال الأصغر من ٩٠ شهرا ( ٨٢ % ) والأطفال الغير قادرين على التجاوب ( ٤١.٤ % ) وكانوا هم الأغلبية المستفيدة من خدمات العلاج التي تحت التخدير العام.

The objectives of this retrospective study were to describe the characteristics of the children treated under general anaesthesia (GA), the indications, and types of dental treatment rendered at the Al Hada Armed Forces Hospital, Taif between September 1999 and March 2001. The dental records of all the children treated under GA during this period were reviewed and detailed information was collected. There were 70 children treated and their mean age was 68.5 months. The most common indication was inability to cooperate and accept dental treatment under local anaesthesia. Sixty-three percent of patients had treatment involving a combination of dental restorations and extractions. The mean restored and extracted primary teeth per child were 5.8 and 6.2, respectively. We concluded that children younger than 90 months (82%), and those unable to cooperate (41.4%), were the majority beneficiaries of the dental GA services.

### INTRODUCTION

General anaesthesia (GA) is an important and necessary behavior management technique which ensures optimal conditions to accomplish complex dental procedures. The goals in the pediatric dental patient are to eliminate cognitive, sensory, and skeletal motor activities to facilitate the delivery of good quality comprehensive dental services.<sup>1</sup> Some children with multiple carious teeth are very young and their dental treatment should not cause any adverse psychological impact on them. Others present with acute infections or special needs such as medically compromising conditions.<sup>2,3</sup> A fearful child with early childhood caries or rampant caries requires general anaesthesia to provide comprehensive dental care at one visit.<sup>4,5</sup> If a child frustrates efforts toward treatment under local anaesthesia, and does not respond to conventional behavior

management techniques, GA is one of the options in a hospital environment to facilitate delivery of safe, efficient, and quality care by a pediatric dentist.

A review of the literature shows that a majority of studies on GA for comprehensive dental care of children have come from developed countries.<sup>2-9</sup> Only two studies<sup>10,11</sup> have reported on GA in Saudi Arabia, and one study<sup>12</sup> in Kuwait. Bello<sup>10</sup> reported that 61% of the children treated under GA were 5 years or younger, and the main indications were extensive caries (80.7%) and behavior management (73.1%). Jamjoom *et al.*<sup>11</sup> reported that 93% of the children were 8 years or younger, and the indications for GA were rampant caries (77%) and lack of cooperation (49%). In Kuwait, 79% of the 146 cases treated were 7 years or younger, and all were uncooperative.<sup>12</sup>

The objectives of this retrospective study were to describe the characteristics of children treated under GA, the indications, and types of dental

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treatment rendered at the Al Hada Armed Forces Hospital, Taif during the period of September 1999 to March 2001 inclusive.

## MATERIALS AND METHODS

The dental records of all the children treated under GA at the Al Hada Armed Forces Hospital, Taif over a period of 19 months between September 1999 and March 2001 were reviewed. The information collected included the following: age of the patient (in months) at time of treatment, gender, general health status, indication for GA, number of decayed teeth, type of procedure and its duration (in minutes), prescription of post-operative antibiotics and analgesics, and attendance at the post-operative review appointment.

Following medical clearance, the anticipated treatment was explained to the parents and the consent to operate was signed. Verbal and written instructions were given to the parents, to ensure nothing by mouth (NPO) from midnight on the day before, and early attendance, on the day of treatment. The medically compromised patient was admitted to hospital at least 24 hours prior to treatment, and referred to the specialty consultant and anaesthetist for pre-anaesthetic assessment.

A certified pediatric dentist, and one dental surgery assistant assisting, carried out the elective, full-mouth rehabilitation on the patient. After intubation, packing of the throat, and routine draping of the patient, dental prophylaxis was carried out. Oral cleaning with a diluted antiseptic mouthwash was done additionally for the medically compromised patient, and those with very poor oral hygiene. A final treatment plan was formulated at this stage. Restorations were placed, starting with the teeth whose preparations were unlikely to cause gum bleeding, and full-

mouth topical fluoride was applied before any dental extractions. Treatment started with the dental prophylaxis and ended when haemostasis was achieved, and the throat-pack was removed. Antibiotics and analgesics were prescribed when indicated. Following a few hours recovery, the day-case patient was discharged. The medically compromised patient was observed for a longer period and discharged after consulting with the cooperating specialist. All the patients received appointments for review approximately one week after GA. Data analysis was confined to frequency distribution, and the results presented are descriptive in nature.

## RESULTS

During the study period, 70 children made up of 36 boys and 34 girls were treated under GA. The boys were younger with an average age of 64 months and median age of 60 months. The average age of the girls was 73 months and median age of 68 months. Table 1 shows the age categories of the children. Their ages ranged from 32 months to 148 months with a mean age of 68.5 months (SD 25.5 months). The median age of the sample was 63.5 months and the mode was 45 months. Fifty two children were in the primary and 18 in the mixed dentition stages. The younger children had more caries present, and received more restorations than their older counterparts who had relatively more teeth extracted.

The indications for general anaesthesia are given in Table 2. The most common indication was uncooperativeness. Some children had more than one indication for treatment under GA. However, the most significant indication was chosen for analysis.

A majority of the patients were healthy (Table 3). There were five cases of mental retardation and three with syndromes,

including two cases of Sanjad-Sakati syndrome. There was a case each of von Willebrandt disease, elevated values of prothrombin and activated partial thromboplastin times, and as well as one with acute lymphocytic leukemia.

**Table 1.** Distribution of children by age, decayed, filled and extracted teeth

Age Group (months)	Number children	Percent (%)	Mean number of teeth		
			Decayed	Filled	extracted
32-59	30	(43)	12.7	8.0	4.9
60-89	27	(39)	13.4	6.4	7.7
90-119	11	(16)	11.6	4.1	8.4
120-148	2	(3)	9.5	.5	9.0
<b>Total</b>	<b>70</b>	<b>(100)</b>	<b>12.7</b>	<b>6.5</b>	<b>6.7</b>

**Table 2.** Indications for general anaesthesia

Indications	Number of children	Percent
Uncooperative	29	41.4
Medically compromised	16	22.9
Very young	12	17.1
Extensive Caries	9	12.9
Acute infections	4	5.7
<b>Total</b>	<b>70</b>	<b>100</b>

**Table 3.** Health status of the children

Condition	Number of children	Percent
Healthy	54	77.1
Mental retardation	5	7.1
Syndromes	3	4.3
Coagulation disorders	3	4.3
Congenital Heart Disease	2	2.9
Seizure disorders	2	2.9
Septicemia	1	1.4
<b>Total</b>	<b>70</b>	<b>100</b>

Table 4 shows that the average number of decayed primary teeth among the sample was 12 with a range from 2 to 20. There were a total of 80 decayed first permanent molars, 48 of which were restored with composite resins, and 32 were extracted. Fifteen first permanent molars were protected with fissure sealants. There was a total of 828 decayed primary teeth, 316 of which were restored with glass ionomer cements and

composite resins, and 419 were extracted. Fifty primary teeth pulpectomies and 65 pulpomotomies dressed with zinc oxide eugenol were performed.

**Table 4.** Decayed, restored and extracted teeth among the children

(a) Number of decayed teeth			
	Primary	Permanent	All
Mean	11.83	0.93	12.76
SD	4.12	1.80	3.61
Minimum	2.00	0.00	6.00
Maximum	20.00	7.00	21.00
(b) Number of restored teeth			
	Primary	Permanent	All
Mean	5.84	0.71	6.56
SD	4.66	1.53	4.44
Minimum	0.00	00.0	0.00
Maximum	17.00	7.00	17.00
(c) Number of extracted teeth			
	Primary	Permanent	All
Mean	6.23	0.46	6.69
SD	5.96	1.28	6.03
Minimum	0.00	0.00	0.00
Maximum	20.00	4.00	20.00

Forty-four children had treatment involving both dental restorations and tooth extractions, (Table 5). Of the 14 children who had only extractions, five had all the four first permanent molars, and the primary teeth extracted. Four others, including the two cases of Sanjad-Sakati syndrome, had all 20 primary teeth extracted. Each of the other five had at least 17 primary teeth extracted.

**Table 5.** Types of procedure according to duration

Procedure	No. of Children	No. (%)	Duration (minutes)			
			Mean	SD	Min	Max
Restorations only	12	(17)	83.17	20.51	40	115
Restorations and extractions	44	(63)	82.52	27.86	40	150
Extractions only	14	(20)	26.93	7.84	14	42
<b>Total</b>	<b>70</b>	<b>(100)</b>	<b>71.51</b>	<b>32.66</b>	<b>14</b>	<b>150</b>

Postoperative antibiotics and analgesics were dispensed to 49 children, and 43 children attended the postoperative appointment.

## DISCUSSION

The objectives of this study were to describe the characteristics of children treated under GA, the indications, and the types of treatment rendered at the Al Hada Armed Forces Hospital, Taif. The results showed that, in agreement with other studies, the GA was used primarily to treat young children with dental caries.<sup>2-12</sup>

The average age of the children in this study was 5.7 years compared with 5.3 years in a previous Saudi Arabian study.<sup>11</sup> One half of all the children in this study were aged 5.3 years comparable with 5 years in another study.<sup>10</sup> The proportion of children under 5 years treated under GA which comprised 43% is similar to one study,<sup>11</sup> but lower than the 57% to 63% reported from other centres.<sup>9,10,12</sup> This may partly be explained by differences in dental caries patterns in the populations, referrals, waiting lists, access to the dental facilities, and treatment philosophy. Oral hygiene and dietary practices as well as socio-demographic variables may also be factors.<sup>13,14</sup>

Age is an important variable with regard to timing and sequence of tooth eruption and caries prevalence. Reports indicate that caries experience among children in Saudi Arabia is high, and most of the caries are untreated.<sup>15-17</sup> Untreated caries is a disease that progresses with age. The younger children in this study although had relatively more caries experiences, they received more restorations compared with the older children who had more tooth extractions. For example, all but one of the decayed teeth of the two children older than 10 years (120

months) were extracted, whereas 63% of the decayed teeth of the youngest age group below 5 years (60 months) were restored. The mean number of 12 carious teeth per child and the 20% who had only extractions in this study is corroboration of the high and untreated caries reported in the surveys.<sup>15-17</sup>

Over 41% of children were uncooperative to conventional behavior management techniques. Although some children had more than one reason for treatment under GA, the most significant was chosen for analysis. Thus, some of the uncooperative and very young children also had extensive dental caries. These findings are consistent with results described by other investigators.<sup>5,10,12</sup>

About 23% of the children in this study had medical disabilities compared to 31% and 61% in previous studies in Saudi Arabia<sup>10,11</sup> and 56% in USA.<sup>18</sup> However, this study is unique because of the two cases of Sanjad-Sakati syndrome, a new entity of congenital hypoparathyroidism, severe growth failure, and dysmorphic features found only in the Arabian peninsula.<sup>19,20</sup>

The duration of treatment represented clinical time per procedure and was significant because the operator must accomplish all the dental treatments in the patient's mouth in the given time. Speed and appropriateness were of utmost importance for the dentist to attend to the usually long waiting list of children needing GA. In this study, duration of procedure ranged from 14 to 42 minutes for extractions, from 40 to 115 minutes for restorations, and from 40 to 150 minutes for restorations and extractions. Expectedly, the longer time was spent performing extensive restorations while the extraction of diseased teeth of a child under general anaesthesia was a relatively simple and quick procedure.

Enger and Mourino<sup>18</sup> reported average times of 209 minutes (range 55-360) and 179 (range 75-280) minutes, respectively for two centers. However, their 200 patients ranged in age from 1 year to 52 years. Enever *et al.*<sup>3</sup> reported short duration as lasting up to 30 minutes for 24% of patients; intermediate lasting up to 1 hour for 56%, and long, lasting over 90 minutes for 20%. The mean age of the patients in our study was 5.7 years compared with 10.7 years in their study.

Antiseptic mouth rinses applied immediately prior to dental procedures may reduce the incidence or magnitude of bacteremia.<sup>21</sup> It may also reduce halitosis during the procedure if there is a lack of oral hygiene. In this study, diluted chlorhexidine was used for oral cleansing in combination with dental prophylaxis in the medically compromised, and in patients with very poor oral hygiene.

In this study, 39% did not attend for post-operative review appointment. Poor attendance of patients following GA was also recorded by Jamjoom *et al.*<sup>11</sup> This appointment is important for examination, reinforcement of hygiene and dietary practices, to address parent concerns, and to set a positive tone for future recall dental visits.

It was concluded from this study that uncooperative children and children below the age of 90 months were the majority beneficiaries of the dental GA services. Most of the children received dental restorations and extractions. More than 1 in 3 of the treated patients failed to attend for recall.

Follow-up studies at this hospital are recommended in order to assess future demands for pediatric dental GA, to evaluate any changing pattern in the use of GA, to determine treatment outcomes, and if any of the uncooperative patients can accept any subsequent treatment under local anaesthesia.

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