

# A Retrospective Study of Paediatric Dental Patients Treated under General Anesthesia\*

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## ABSTRACT

Dental care under general anesthesia (DGA) was found to be a safe, efficient and effective quality treatment for children.

**Purpose:** To describe the characteristics of child dental patients treated under DGA and describe the indications of the treatments and types of treatments provided. **Method:** The sample consisted of 40 patients treated under DGA at Department of Paediatric Dentistry of school and Hospital of Stomatology of Wuhan University between June 2011 and December 2012. Detailed information was collected from dental records. SPSS software package was used for statistical analysis. **Results:** The age of the patients ranged from 2.5 years to 24.1 years. Males were more common than females M:F 1.5:1. The mental retardation patients accounted for (5%) of the sample. The most common indication was inability to cooperate and accept dental treatment under local anesthesia (95%). The treatments rendered included: caries restorations (37%), root canal treatments (34%), extractions (7%), fluoride application (6%), fissure sealants (6%), indirect pulp capping (5%), stainless steel crowns (4%), pulpotomies (0.8%) and labial frenectomy (0.1%). In the follow-up visit fillings were found to be lost in 3 patients, with 2 anterior teeth and one posterior tooth. **Conclusion:** Caries restoration and root canal treatments were the most common treatments provided. Preventive strategies should be targeted toward children to reduce the number of healthy children receiving treatment under general anesthesia. **Clinical Significance:** This study provides baseline information regarding the types of treatments for paediatric dental patients in Wuhan and it is hoped that the data from this study will be useful for other researchers.

**Keywords:** General Anesthesia; Dental Treatment; Child

## 1. Introduction

Dental general anesthesia (DGA) is a very efficient treatment modality taking a single appointment and requiring little or no cooperation of the child. However, it is often the last resort because of the expense and risk-benefit considerations [1,2]. In addition, some parents may find it hard to accept dental treatment for their children under DGA [3].

Current approaches to general anesthesia can provide total relaxation of the patient, allowing for successful treatment of even the most phobic dental patient [4].

General anesthesia does not diminish dental fear, as reported in children [5]. The aim in using DGA is to re-

store the child's oral health at a single visit allowing behavior modification methods to be introduced more readily afterwards.

The American Academy of Paediatric Dentistry indications for DGA in children includes: 1) patients who cannot cooperate due to a lack of psychological or emotional maturity and/or mental, physical, or medical disability; 2) patients for whom local anesthesia is ineffective because of acute infection, anatomical variations, or allergy; 3) patients who are extremely uncooperative, fearful, anxious, or uncommunicative; 4) patients who require significant surgical procedures or immediate, comprehensive oral/dental care and 5) patients for whom the use of DGA may protect the developing psyche and/or reduce the medical risk [6].

The American Academy of Paediatric Dentistry encourage dentists to consider other techniques as alterna-

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tives to DGA and use preventive care in order to find best treatment modality and achieve good results in the long term [6].

The majority of studies on DGA for comprehensive dental care for children have come from developed countries. Few studies have been reported in China, where there are appropriate facilities.

The objective of this study was to describe the characteristic of child dental patients treated under DGA and describe the indications of the treatment and types of treatment provided at department of paediatric dentistry of School and Hospital of Stomatology of Wuhan University between June 2011 and December 2012.

## 2. Materials and Methods

The study was carried out through assessment of dental records. A total of 44 patients received treatment at department of paediatric dentistry of School and Hospital of Stomatology of Wuhan University between July 2011 and December 2012. All patients were regular attenders at the paediatric dentistry department. Records were unavailable for 4 cases, these cases were excluded. The study, therefore, included information for a total of 40 patients who received comprehensive treatment under G.A.

Permission to carry out the study was obtained from the chief hospital administrator. Data obtained from the records included: age of patient at the time of surgery, sex of patient, medical history, physical status, indication for treatment under DGA and nature of treatments carried out. Prior to operation routine laboratory tests consisting of complete blood count, chest X-ray, routine urine analysis, PT, PTT and ECG were ordered for all patients. Preoperative radiographs were taken for caries diagnosis. Parents were given written and verbal instruction to ensure fasting from midnight. On the morning of surgery, a final pre-operative assessment was carried out and then written consent obtained. The child was accompanied by a parent into the operating room until induction was achieved. Antiseptic mouth rinses were applied immediately prior to dental procedures to decrease the incidence of bacteremia in patients with poor oral hygiene. Children were admitted to the hospital on the morning of the surgery and discharged later on the same day. Instructions for home prevention and recall visit one week after G.A were given to the parents before discharging the patient. Data analysis was carried out with the use of the SPSS statistical package (version 18; SPSS) chi square test on a personal computer. Chi square test was used to assess the significant association between the age of the patient and the gender, and between the age of the patient and the procedure that have been done.

## 3. Results

A total of 40 patients 24 males and 16 females were treated under general DGA with M: F = 1.5:1 (**Table 1**). The age of the patients ranged from 2.5 years to 24.1 years with a median age of 6.4 years. Ten patients (25%) were less than 4 years, 22 patients (55%) aged 4 to 6 and 8 patients (20%) were 6 years and older. The number of patient in relation to age and gender are shown in **Figure 1**.

The majority of the patients 95% were healthy and had no relevant medical history and the main reason for DGA was behavioral problem (extreme non cooperation and dental fear), with the exception of two patients who were mentally retarded (5%) as shown in **Figure 2**.

The dental treatments provided are summarized in **Table 2** which shows the number of treatments that have been done under DGA and the percentage of each

**Table 1. The descriptive statistics of the study population.**

Variable	Number of patients	Percent %
<b>Gender:</b>		
Male	24	60%
Female	16	40%
<b>Age:</b>		
Less than 4 years	10	25%
4 to 6 years	22	55%
More than 6 years	8	20%
<b>Number of patients receiving various types of treatments*:</b>		
Filling	39	97%
R.C.T	37	92%
Flouride application	29	72%
Extraction	15	37%
Stainless steel crowns	10	25%
Pulpotomy	2	5%
Fissure sealants	8	20%
Pulp capping	5	12%
Upper lip frenulum	1	2%
*Accumulated percentage is more than 100% because children presented more than one type of treatment.		
<b>Type of teeth treated*:</b>		
Deciduous teeth	40	100%
Permanent teeth	4	10%
*Accumulated percentage is more than 100% because some children treated both type of teeth.		
<b>Reasons for treatment under general anesthesia:</b>		
Medical problems	2	5%
Behavior problems	38	95%

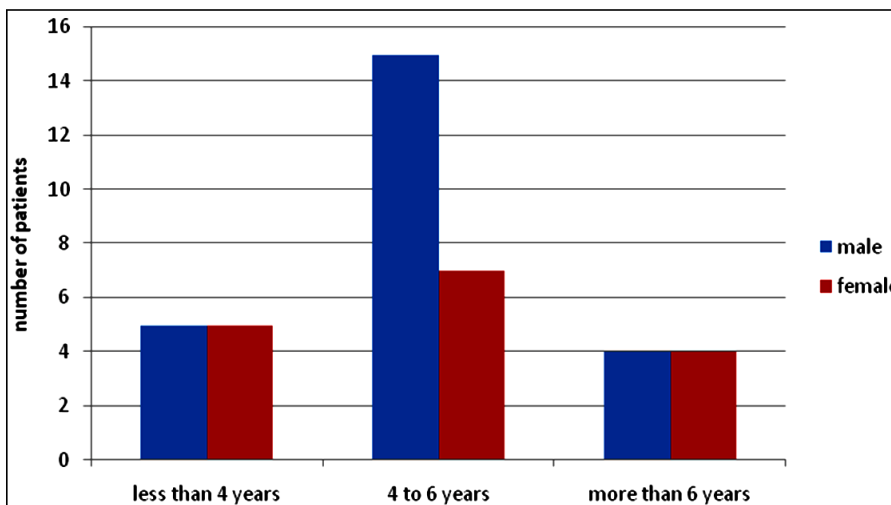


Figure 1. Sex and age distribution of patients treated under G.A.

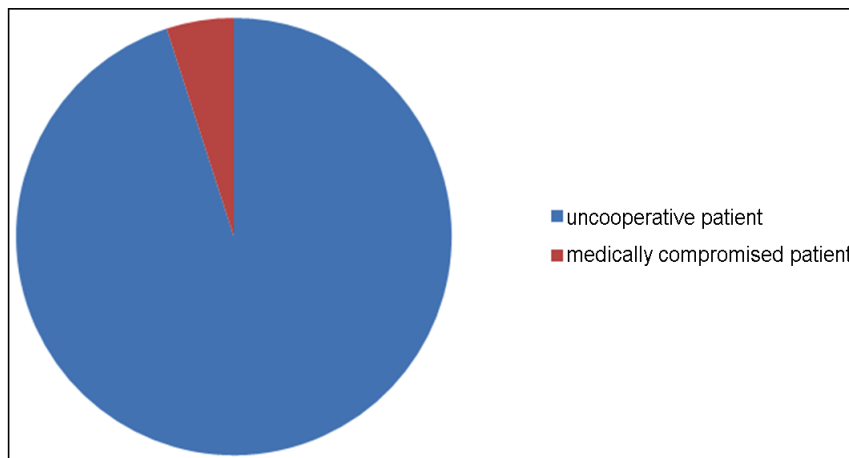


Figure 2. Indication for general anesthesia.

Table 2. Dental treatment rendered under general anesthesia.

Treatment	Number of treatments	Percent
Filling	188	37%
R.C.T	169	34%
Extraction	35	7%
Flouride application	29	6%
Fissure sealants	29	6%
Indirect pulp capping	24	5%
S.S. crown	22	4%
Pulpotomy	4	0.8%
Labial	1	0.2%

one of them. Out of 501 treatments done, filling and Root canal treatment constituted the most frequent dental

treatments performed on child dental patients under DGA. The filling provided were tooth-coloured restorations (glass ionomer, composite). Other types of treatments carried out in descending order of frequency were: extraction, fluoride application, fissure sealants, indirect pulp capping, stainless steel crown, pulpotomy and labial frenectomy.

All patients carried out treatment for deciduous teeth with the exception of four patients. One patient had extractions of the wisdom teeth and the other three patients had root canal treatment for their permanent teeth.

The only surgical procedures done under G.A were extraction of wisdom teeth and labial frenectomy.

Our study has not found any significant association between the age of the patient and the gender ( $p = 0.508$ ) as well as the age of the patient and the procedures done ( $p = 0.109$ ). As shown in **Tables 3 and 4**.

The average number of filled teeth per child among the sample is 4.62 with a range from 0 to 13, the average

number of root canal treated tooth per child is 4.22 with a range from 0 to 10 and the average number of extracted tooth is 0.87 with a range from 0 to 7 as illustrated in **Table 5**.

Patients were reviewed one week after DGA and checked for any complain. In the follow up visit fillings after R.C.T were found to be lost in 3 patients, with 2 anterior teeth and one posterior tooth.

#### 4. Discussion

The aim of this retrospective study was to describe patient characteristics and dental treatments provided under DGA at Department of Paediatric Dentistry of school and Hospital of Stomatology of Wuhan University. Non-cooperation and extreme dental fear were the most important factors leading to DGA in our sample. This is consistent with findings of previous studies [7,8], and should therefore be taken into account and prevented early on in order to reduce the need for DGA. Alternative methods to provide dental treatment, such as inhalation

**Table 3. Relation between the age of the patient and the gender.**

Patients age	male	female	Total
<4 years	5	5	10
4 to 6 years	15	7	22
>6 years	4	4	8
Total	24	16	40

( $p = 0.508$ ) our study has not found any significant association between the age of the patient and the gender.

**Table 4. Relation between the age of the patient and the dental procedure.**

Procedure	<4 years	4 - 6 years	>6 years	Total
Filling	10	22	7	39
R.C.T	10	22	4	36
Extraction	3	6	7	16

( $p = 0.109$ ) our study has not found any significant association between the age of the patient and the procedures done.

**Table 5. The mean number of filled, root canal treated and extracted teeth among the children.**

Procedure	Mean	SD	Minimum	Maximum
Filling	4.62	2.64	0	13
R.C.T	4.22	2.27	0	10
Extraction	0.87	1.69	0	7

sedation should be kept in consideration in older children [9]. However, there will always be children whose needs are too great or who are too young to accept treatment in dental chair. There for DGA is an important method for providing treatment for this age group.

The present study revealed that dental care received under DGA in Wuhan University is a comprehensive, conservative process characterized by a predominance of filling therapy. As it has been earlier reported in many European countries [10-13], North America [14,15], the Middle East [16-19], Asia [20,21], and New Zealand [22]. Contradictory findings have recently been reported from Australia and England, where DGA is used primarily for extractions in children [23-25]. Recently a move towards comprehensive DGA care has also been induced in the United Kingdom since the publication of the Royal College of Surgeon's guidelines for the use of G.A in paediatric dentistry in 2008 [26].

Root canal treatment is one of most common treatments in our study, and had been reported to be the most common treatment in previous studies in china. The mean number of root canal treated tooth per child is 4.2. Of all 169 root canal treatments done in our study only 3 were carried out for permanent teeth. All other 166 root canal treatments were carried out for primary teeth. Root canal treatment in primary dentition (pulpectomy) are gaining popularity and becoming more widespread. Pulpectomy is one of the most common and straightforward and quick procedure done in china. It benefits the child by avoiding trauma of extraction and preserving the space-maintenance role of the primary dentition. Several studies recorded high success rates of pulpectomy [27-29].

#### 5. Conclusions

- DGA for a healthy, fearful child is extremely safe and, in the long run, is the best outcome for the professions and patients.
- Most of the patients were healthy and the main reason for G.A was behavioral management and extreme non cooperation.
- Treatments provided were characterized by a predominance of filling therapy and endodontic treatments of primary teeth (pulpectomies).
- In general a greater deal of pulpectomies, and fewer extractions and pulpomies were done in our study compared to previously reported studies in other countries.
- Behavior modification methods should be introduced to reduce the need for DGA.

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