

ORIGINAL ARTICLE

A SURVEY ON CURRENT TRENDS IN PRIMARY TOOTH PULPOTOMY IN KARACHI

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Background: In comparison to USA and United Kingdom where Paediatric Dentistry is considered a separate specialty; there very few formal teaching programs in Pakistan for Paediatric Dentistry. Many surveys have been carried out internationally, but no survey has been carried out locally to ascertain practice of dentists when treating paediatric patients. Therefore, it appears important to map features of Paediatric Dentistry practice in our country. The purpose of this study was to assess practice regarding pulpotomy of primary teeth among dentists of Karachi and to compare difference in pulpotomy practice of primary teeth between private practitioners and teaching dentists. **Methods:** Questionnaire was distributed by hand to dentists working in private clinics and teaching hospitals of Karachi, involved in treating primary teeth of children. Questions captured information on aspects related to pulpotomy procedure as carried out by dentists. Descriptive statistics and frequency distribution were computed. Chi-square test was applied to compare difference between dentists working in teaching hospitals versus private practitioners. Level of significance was kept at 0.05. **Results:** Although majority of dentists use the preferred medicament for pulpotomy, i.e., formocresol, it was seen that only a small proportion reported frequent use of radiographs and rubber dam. There was a significant difference in selecting post pulpotomy restorations for anterior teeth by teaching dentists (Composites) compared to private practitioners (who favoured GIC). Only 20–27% of dentists reported use of stainless steel crown for definitive restoration after pulpotomy. **Conclusions:** Although majority of dentists use formocresol as a preferred medicament for pulpotomy, it was seen that only a small proportion of participants reported frequent use of radiographs, rubber dam and stainless steel crowns which is far below the standard of care.

Keywords: Pulpotomy, paediatric dentistry, formocresol, stainless steel crown

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INTRODUCTION

Primary teeth; although present for a small part of a person's life, have a very important role to play because they give the face its normal appearance, aid in the development of clear speech and help a child attain good nutrition. Most importantly, they reserve spaces for their permanent counterparts.¹ The perception of these teeth being temporary results in negligence of maintaining a good oral hygiene by the children and their parents. As a result, a very large proportion of children require treatment of their teeth at a very young age. Childhood caries is a common but serious public health issue faced by the children today. It is said to be present in as many as 70% of children in developing countries.² Timely diagnosis and treatment of a carious lesion in primary teeth is important to prevent infection, which would otherwise result in early loss of the tooth. A survey in U.K. conducted by Duggal *et al.*³ showed that almost 40% of 5-year old children have evidence of dentinal caries with 17% of children having teeth which were pulpally involved at a young age.

When only the coronal pulp is infected as diagnosed by the patient's symptoms and by clinical and radiographic examination, a pulpotomy is advised. This procedure has been under scrutiny for decades because

of lack of consensus on the ideal medicament to 'treat' the uninfected radicular pulp once the infected coronal pulp has been amputated.⁴ Medicaments that have historically been used include formocresol, glutaraldehyde, ferric sulphate and calcium hydroxide. Newer medicaments include MTA, bioactive glass, enriched collagen solution and use of lasers.⁵

Dental care in Karachi is provided either by dentists working at private dental practices or those working in teaching hospitals. It has been observed that the majority of dentists do not observe the formulated guidelines for diagnosis and treatment of primary tooth indicated for pulpotomy in their routine practice.⁶

It was decided to conduct this survey (1) to assess the practice regarding pulpotomy of primary teeth among dentists of Karachi and (2) to compare the difference in practice of pulpotomy of primary teeth between private practitioners and teaching dentists.

MATERIAL AND METHODS

This was a cross-sectional analytical study carried out in the teaching hospitals and private practices of Karachi for three months where 100 survey forms were distributed by non-probability convenience sampling. Only licensed dentists in Karachi, who had at least one year of clinical experience after graduation, were

included in the present study. Dentists who did not consent to be included in the study were excluded from the study group. The study protocol was approved by the Aga Khan University Ethical Review Committee (Ref# 2811-Sur-ERC-13).

A covering letter explaining the purpose of the study was attached alongside the questionnaire distributed to the practicing dentists. Written informed consent was obtained from all the study participants. The first part of the questionnaire included details of the participant's demographics. The second part consisted of multiple choice questions, which inquired about their practice of pulpotomy procedure in primary teeth. To accommodate the need for more than one approach, depending on different clinical scenarios, the respondents were given the choice of selecting more than one option.

Data was analysed using SPSS-19.0. Mean and standard deviation of quantitative variables and frequency distribution of categorical variables was determined. Chi-square test was applied to see the difference in clinical preferences between dentists. Level of significance was kept at <0.05.

RESULTS

Total 100 forms were distributed, out of which only 56 were returned. Despite of two reminders, the final response rate remained 56%. The mean age of the participants who responded to the questionnaire was 29.06±3.9 years. There were 26 males (46%) and 30 females (54%). Twenty six of the participants were working in teaching hospitals, while 30 were working as private practitioners.

Among the respondents, there were 28 restorative dentists, 15 general dentists and 12 dentists

of other specialties and only one was a paediatric dentist.

When comparing the two study groups for their use of pre-operative radiographs before a pulpotomy procedure, 14 out of 26 (53.8%) dentists working in teaching hospitals and only 11 out of 30 (36.7%) dentists in private practice routinely took a preoperative radiograph for diagnosis. On the question of administration of local anaesthesia before pulpotomy procedure, more than half the teaching dentists (53.8%) reported that they always administered local anaesthesia, compared to only one third (33.3%) of the private practitioners and there was a statistically significant difference ($p=0.036$) between the two groups. When asked about the use of rubber dam during a pulpotomy procedure, it was observed that 58% (15 out of 26) dentists working in teaching hospitals and 63% (19 out of 30) of the private practitioners never placed a rubber dam. A very small number of dentists in both groups always took a postoperative radiograph but the difference in the two groups was not found to be statistically significant. (Table-1)

Dentists in both groups reported the use of more than one medicament for pulpotomy procedure. Formocresol was the most widely used medicament by both groups, with its 1:5 dilution preferred. There was a statistically significant difference ($p=0.003$) found between the groups in their choice of material for restoring anterior teeth after pulpotomy. In contrast, there was no statistically significant difference between the two groups in the choice of restoration after pulpotomy in posterior teeth. GIC based restoration remained the most desirable choice by both the groups. (Table-2)

Table-1: Clinical practice of dentists during a pulpotomy procedure

Clinical Situation	Group	Never	Occasionally	Frequently	Always	p-value
Pre-operative radiograph	Teaching hospital	0.0%	11.5%	30.8%	53.8%	0.253
	Private practice	0.0%	26.7%	36.7%	36.7%	
Administer local anaesthesia	Teaching hospital	3.8%	38.5%	0.0%	53.8%	0.036
	Private practice	6.7%	36.7%	20.0%	33.3%	
Use of rubber dam	Teaching hospital	56.0%	24.0%	20.0%	0.0%	0.684
	Private practice	63.3%	26.7%	10.0%	0.0%	
Post-operative radiographs	Teaching hospital	11.5%	34.6%	15.4%	38.5%	0.691
	Private practice	10.3%	44.8%	20.7%	24.1%	

Chi square test was applied $p < 0.05$.

Table-2: Medicaments and restorations used in the pulpotomy procedure

Clinical Situation	Group	Formocresol- full strength	Formocresol- 1:5 dilution	Ferric Sulphate	Formocresol- dual strength	p-value
Medicament for pulpotomy	Teaching hospital	4.0%	24.0%	12.0%	36.0%	0.699
	Private practice	6.7%	26.7%	10.0%	33.3%	
Restoration of anterior tooth after pulpotomy		GIC	Composite	Acrylic crowns	GIC/ Composite	0.003
	Teaching hospital	12.0%	56.0%	4.0%	20.0%	
	Private practice	46.7%	43.3%	6.7%	0%	
Restoration of molar after pulpotomy		GIC	Amalgam	Composite	Stainless Steel crown	0.193
	Teaching hospital	26.9%	11.5%	11.5%	26.9%	
	Private practice	40.0%	3.3%	3.3%	20.0%	

Chi square test was applied. $p < 0.05$.

DISCUSSION

The present study evaluated the practice of dentists in Karachi when carrying out pulpotomy of primary teeth. Although, preoperative radiographs are an essential diagnostic modality, it was alarming to note that in the present study, only 37–54% of the study participants routinely took preoperative radiographs, compared to 76.5% of the respondents in a survey conducted by Hunter *et al.*⁶ in U.K. Routine practice of rubber dam placement for isolation during a pulpotomy procedure was done by only 10–20% of the dentists in present study group. This usage was far less when compared to the survey by Hunter *et al.*⁶ in which 62.6% dentists always placed rubber dam when carrying out a pulpotomy procedure. This also is far below the academic standards which state that rubber dam isolation is mandatory when performing a pulpotomy.

Even though the use of formocresol has been controversial due to its carcinogenicity and mutagenic potential, it is still considered the best medicament for radicular pulp fixation because of its high clinical success rate over a number of years.⁷ Other surveys^{8,9} also show that formocresol was the preferred material for pulpotomy and same results were found in the present study.

Stainless steel crowns as means of a definitive restoration to restore functionality of the tooth post pulpotomy, was favoured by only 20-27% of the respondents in our sample as compared to a study by Al-Dlaigan⁸ in which 55.2% dentists used stainless steel crowns. Our results were comparable to the survey conducted by Toogo RA *et al.*⁹ in which 24% dentists used stainless steel crowns post pulpotomy. This figure, however, is far below what is quoted in literature as the standard of care.^{10,11} Respondents in the present study also took far less postoperative radiographs when compared to those done in U.K.⁶

The general lack of sound decision making and below standard practice of pulpotomy procedure as evident by the results of this study may be attributed to dearth of teaching programs both at the undergraduate and the postgraduate level in the discipline of Paediatric Dentistry in our country.¹² This is in contrast to other developed countries of the world, like U.K. and U.S.A, where Paediatric Dentistry is considered as a separate specialty at the under graduate level and post graduate residency programs are being offered in the same.³ Because of limited number of post graduate programs in this domain, we have very few dentists countrywide who have specialized in the field of Paediatric Dentistry; only one dentist in our study group had any formal training in the said specialty. The current study

included data on practice of pulpotomy procedure on both strata of dental care provision i.e. private practices and teaching hospitals, which gives a good comparison of current practices in Paediatric Dentistry in both divisions. It provided baseline statistics on current trends in pulpotomy of primary teeth in our city.

The study had an overall low response rate of 56%. The response rate may seem low but is in fact higher when compared to other similar questionnaire based studies; Khan¹³ had a response rate of 48.25% from private dental practices of Karachi. Slaus¹⁴ had a response rate of 25.1% in Belgium, while Forss¹⁵ received a response rate of 53.6% from dentists in Finland. It was a single city study, collected by convenience sampling; therefore giving us data on a very select group of dentists in only one major city of Pakistan. A study on a larger group of dentists, in other major cities of Pakistan should be carried out to extrapolate the results and compare any differences in practicing pattern of dentists in different cities of Pakistan. The below standard practice of dentists during a pulpotomy procedure as revealed by infrequent use of rubber dam, radiographs and stainless steel crowns warrants that Paediatric Dentistry should be emphasized and inculcated as a separate subject in under graduate dental curriculum. There is also a need to establish post graduate residency program in the subject of Paediatric Dentistry to emphasize the importance of specialty based practice in our country. Continuing dental education courses and workshops in Paediatric Dentistry should be conducted to improve the decision making and clinical practices of both the teaching dentists and the private practitioners involved in treatment of paediatric patients.

CONCLUSIONS

It was seen in our study that majority of general dental practitioners routinely carried out pulpotomy in deciduous teeth. Majority of the dentists in both groups were seen to make inadequate decisions in most areas related to the clinical procedure of pulpotomy. Only a small proportion of participants reported frequent use of radiographs and rubber dam in both the groups. These clinical practices fall far below the standard of care, which are recommended and considered mandatory when carrying out such procedures.

The authors declare that there is no conflict of interest regarding the publication of this paper.

AUTHOR'S CONTRIBUTION

MML: conceived and wrote the study manuscript, FRK: data analysis and reviewed the manuscript, MAL: data collection and supervision, MR: critical appraisal and supervision

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