Original Article

Knowledge, attitude, and practice regarding standardized treatment protocol for pulp therapy in deciduous dentition among general dental practitioners of Vadodara, Gujarat, India

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ABSTRACT

Introduction: Dental caries is the most prevailing disease not only affecting permanent dentition, but also involving deciduous dentition. Deciduous teeth are considered a best space maintainer and preserve arch integrity for eruption of succedaneous permanent teeth. General dental practitioners (GDPs) seem to be less interventionist in their investigation and treatment planning and many times, the treatment done remains incomplete either due to the lack of knowledge of the dentist or due to noncooperation of the child and/or parents. **Purpose:** The aim of this study was to assess the knowledge, attitude, and practice among GDPs of Vadodara city regarding standardized treatment protocol (STP) for pulp therapy in deciduous dentition. **Materials and Methods:** This questionnaire-based, cross-sectional study was conducted to assess the knowledge, attitude, and practice regarding standardized treatment options available for pulp therapy in deciduous dentition. The distribution of the self-made questionnaire pro forma was done in person to all the GDPs after obtaining their prior appointments. The GDPs were grouped on the basis of qualification and total clinical experience in years. The questionnaire consisted of 11 questions. The data were collected, and descriptive statistical analysis was performed. The Chi-square test was used to assess the knowledge, attitude, and practice among different groups of GDPs. **Results:** A statistically significant difference was observed in knowledge regarding STP for pulp therapy in deciduous dentition among both the groups, which is based on the qualification and on the year of clinical experience. **Conclusion:** Qualification and years of clinical practice among GDPs affect the knowledge and treatment regarding pulp therapy in deciduous dentition. Most of the GDPs lack knowledge about the STP for pulp therapy in deciduous dentition.

KEYWORDS: Deciduous dentition, general dental practitioners, pulp therapy, standardized treatment protocol

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Introduction

Deciduous teeth are considered as the best space maintainer. Considering in the Indian scenario, the prevalence of dental caries in deciduous dentition is increasing day by day worldwide and is considered an alarming situation. The management of carious deciduous teeth may vary based on the vitality of the pulp, presence or absence of any periapical pathology, restorable ability, and the duration time for normal tooth exfoliation. This makes pulp therapy in deciduous teeth critical because it also maintains the space for erupting succedaneous teeth in the dental arch. The dentist's main objective is to maintain the pulpal vitality of deciduous tooth and/or young permanent tooth which is affected by either caries or traumatic injury.[1]

Deciduous teeth have the complex morphology of the root canal system, so proper cleansing with mechanical instrumentation and irrigation may be difficult. Pulp therapy medicaments and the obturation technique for deciduous teeth are different than those of permanent teeth. It has been observed that the general dental practitioners (GDPs) and pedodontists differ in their treatment recommendations in pulp therapy for child patient,[2] and GDPs are less interventionist in their treatment planning.[3]

Many times, the treatment remains incomplete either due to the lack of knowledge on the part of GDPs regarding pulp therapy in deciduous teeth or due to lack of co-operation on the part of the child which increases the number of unnecessary extractions of deciduous teeth. It is, therefore, important that GDPs must recognize their crucial role regarding the pulp therapy and familiarize themselves with the suitable pulp medicaments, with proper final restoration in deciduous teeth and the knowledge of when to refer to a specialist.

As the dental care setup for general practice remains similar, investigations should be aimed whether qualification and year of experiences hold similar views for the care of the carious deciduous dentition. Togoo *et al*.[1] stated that most of the GDPs in Saudi Arabia were regularly performing pulp therapy in primary teeth and therefore also need regular updates on pulp therapy. Patil *et al*.[4] concluded that dentists of other specialty, general dentists (GDs), and pediatric dentists (PDs) vary in their pediatric endodontic treatment recommendations.

Literature search shows scarcity of information regarding the knowledge and attitude of GDPs toward the standardized treatment protocol (STP) to be followed for endodontic therapy for deciduous teeth, which can be incorporated into daily practice; hence, the need of this study is to assess the knowledge, attitude, and practice management in GDPs of Vadodara city regarding STP for pulp therapies in deciduous dentition.

Materials and Methods

The cross-sectional questionnaire survey was conducted to assess GDPs' knowledge, attitude, and practice toward STP for pulp therapies in deciduous teeth in Vadodara city. The ethical approval was taken from the institutional review board committee [SVI/ON/DENT/RP/1503] at the department of pedodontics and preventive dentistry in a dental institution. Two hundred and seventy-nine practitioners practicing in Vadodara city, other than those having a MDS degree in the field of paedodontics and preventive dentistry and registered in the Indian Dental Association database, Vadodara branch, Gujarat, were selected for this study. Those who refused to give informed written consent and who did not fill the questionnaire completely were excluded from the study. A total of 221 GDPs who gave the consent and filled the questionnaire completely were enrolled for the analysis.

The self-prepared questionnaire contained demographic information of participants such as gender, qualification, and year of practice and 11 questions assessing the knowledge, attitude, and practice regarding STP for pulp therapy in deciduous teeth. This self-prepared questionnaire was validated by a subject expert for content validity, which was confirmed by using Chi-square test (84.5%). After taking prior appointment either on phone or through E-mail, each GDP was contacted in person to fill the self-prepared questionnaire pro forma.

GDPs were divided into two main groups based on qualification and total clinical experience. The qualification group was further divided into graduate (BDS) and postgraduate groups (MDS), whereas the total clinical practice group was divided into three subgroups, i.e., (a) <10 years, (b) 10–25 years, and (c) more than 25 years of clinical experience. The collected data were then entered in Microsoft Excel sheet for descriptive statistical analysis.

Statistical analysis

Statistical analysis (Chi-square test) was done using SPSS software version 18.0 (SPSS Inc., IBM, Chicago, IL, USA) to assess the difference in knowledge, attitude, and practice management among the groups divided on the basis of qualification and total experience of clinical practice. The confidence interval was set at 95%.

Results

A total of 221 GDPs out of 279 had filled the pro forma completely, in which 47% were males and 53% were females. Among the GDPs, 71% had <10 years of experience, 24% had 10–25 years of experience, and 5% had >25 years of experience. Nearly 71% of the practitioners were dental graduate (BDS) and

29% were having a postgraduate degree other than pediatric dentistry [Figure 1].

There was a statistically significant difference in knowledge, attitude, and practice management regarding STP for pulp therapy in deciduous teeth when compared with years of clinical practice and qualification in GDPs. Knowledge regarding pulp therapy in deciduous dentition was found to be very poor, especially among the GDPs who were practicing >25 years. The knowledge of recently passed out GDPs was found to be improved due to inclusion and emphasis on the important relationship between deciduous dentition and general oral health. The GDPs were unaware of ideal treatment protocols in their practice and attitude of pulp therapy in deciduous teeth. The overall percentage distribution of the responses to the questions regarding pulp therapies in deciduous dentition is summarized in Tables 1 and 2.

Discussion

Deciduous tooth must be preserved intact until the permanent tooth erupts in the oral cavity to maintain the integrity of the arch form. Pulp therapy in deciduous teeth differs in the form of intracanal medicaments and the obturation technique used. The complex morphology of the root canal system in deciduous teeth makes it difficult to accomplish proper cleansing by endodontic instrumentation and irrigation of the root canals. This is achieved by careful cleaning and shaping of deciduous tooth root canal followed by the complete obturation with suitable obturation material. It has been observed that GDPs with more than 25 years of experience had difference in their treatment recommendations when compared to recently qualified GDPs; this result goes in accordance with the study done by McKnight-Hanes *et al*.[2]

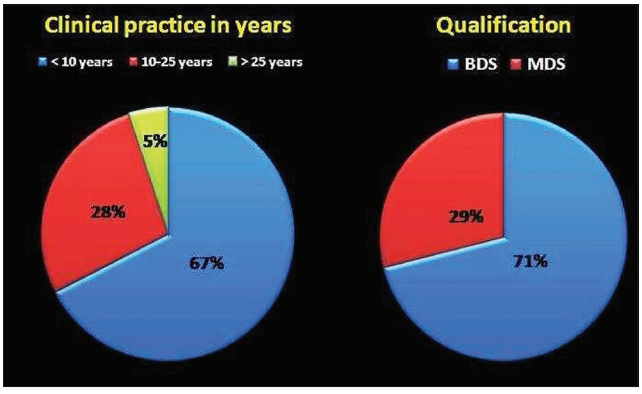

Figure 1: Distribution of sample according to qualification and years of practice

This study investigated the status of pediatric endodontic practice among GDPs working in private dental offices in Vadodara city. The result of this study demonstrated that practice performed by GDPs was often deviated from well-acknowledged pediatric endodontic guidelines given by the American Academy of Paediatric Dentistry (AAPD).[5]

Pulp therapy is a more preferred treatment option over the extraction for deciduous teeth. In this study, 86.6% of BDS and 93.8% of MDS practitioners preferred to perform pulp therapy over extraction as first line of treatment for pulpally exposed deciduous teeth. This suggests that the success to incorporate this treatment into the regular practice lies in proper knowledge and better conceptions present in the dental community.[6]

The MDS practitioners and GDPs who had <10 years of experience were using the rubber dam application for pulp therapy. Nearly 74.7% of MDS and 67.4% of GDPs practitioners who had <10 years of experience favored to used rubber dam as isolation in contrary to 0.6% of GDPs who had more than 25 years of experience. The main reason among practicing dental surgeons for the lack of use of rubber dam was insufficient knowledge and training. Shashirekha *et al*. stated that the time saved by operating in a clean field with good visibility may compensate for the time spent in applying the rubber dam.[7]

Pulpotomy and pulpectomy are the two main endodontic procedures in deciduous teeth. Nearly 50.7% of GDPs who have <10 years of experience and 47.5% of GDPs who have >25 years of experience had chosen direct pulp capping as the first line of therapy. Tuna and Olmez suggested that when a pinpoint mechanical exposure of the pulp is encountered during cavity preparation or following a traumatic injury, a biocompatible radiopaque base such as mineral trioxide aggregate (MTA) should be given as a capping agent.[8]

Materials used for dental pulp fixation during a pulpotomy procedure in deciduous teeth vary from fixation of pulp tissue to regeneration. Majority of all the participants have chosen formocresol as a material of choice for fixation of pulp tissue in pulpotomy procedure irrespective of their qualification and year

Table 1: Knowledge of primary tooth pulp therapy by the general dental practitioners

Questions	BDS (%)	MDS (%)	<10 years (%)	10-25 years (%)	>25 years (%)
Opted for pulp therapy in deciduous dentition	75.2	92.2	83.9	82	18.2
Use of rubber dam for performing pulp therapy in deciduous dentition	24.9	74.7	67.4	27.6	5.0
Use of local antibiotic paste in infected deciduous root canals	29.0	71.0	49.8	49.2	1
Prefer to treat by pediatric dentist	85	15	85.2	14.2	0.6

Table 2: Attitude and practice of pulp therapy in primary teeth by the general dental practitioners

Questions	Option	Qualification		Clinical practice in years		
		BDS (%)	MDS (%)	<10 (%)	10-25 (%)	>25 (%)
First line of therapy after deciduous tooth pulp exposure	Pulp therapy	86.6	93.8	90.6	85.2	88.7
	Extraction	13.4	6.2	9.4	14.8	11.3
A 7-year-old child presents to your office with deep decay in the primary mandibular second molar. There was a history of transient pain on eating and drinking. Complete caries removal will result in pulp exposure. The line of treatment would be?	Indirect/direct pulp capping	47	43.7	45	50.7	47.5
	Pulpotomy	33.3	37.5	34.2	34.4	33
	Pulpectomy	19.7	18.8	20.8	14.8	19.5
Materials used for pulp fixation during a pulpotomy procedure	Formocresol	70.1	71.9	68.4	70.5	100
	Glutaraldehyde	14	7.8	12.8	13.1	0
Irrigating agent for the deciduous root canal	Sodium hypochlorite	36.8	32.8	35.1	36.1	45.5
	Hydrogen peroxide	13.3	7.8	10	13.1	27.3
	Normal saline	47.2	54.7	51	49.1	27.3
	Distilled water	2.5	4.7	4	1.6	0
Obturation material for pulpectomy	Zinc oxide eugenol	66.2	70.3	70.5	62.3	54.6
	Calcium hydroxide	29.9	26.6	26.8	31.1	45.5
	Gutta percha	3.8	3.1	2.7	6.5	0
Obturation technique	Spreader/plugger	56	53.2	52.3	54.2	100
	Lentulo spiral	18.4	14.1	17.5	19.7	0
	Pressure syringe	25.4	32.8	30.2	26.2	0
Final restoration of endodontically treated deciduous tooth	Amalgam	12.1	6.2	8.8	13.1	18.2
	Composite	18.5	6.3	12.7	16.4	36.4
	Glass ionomer cement/miracle mix	43.3	57.8	49.7	44.3	36.4
	Stainless steel crown	26.1	29.7	28.9	26.2	9.1

of experience. Almost 20.3% of MDS and 18.8% of the GDP practitioners of <10 years of experience preferred to use MTA as a pulpotomy agent. Shirvani and Asgary in their systematic review and meta-analysis based on the quality, homogeneity, and sufficient number of included randomized controlled trials (RCTs) stated that in deciduous molar, pulpotomy with MTA can produce a higher success rate in comparison with formocresol.[9] MTA was introduced as a pulpotomy agent over formocresol as there were many controversies regarding the usage of formocresol. Formocresol was supposed to be carcinogenic and genotoxic. Chandrashekhar and Shashidhar noted that it was highly unlikely that formocresol, when judiciously used, is genotoxic or immunotoxic or poses a cancer risk to children who undergo one or more formocresol pulpotomy procedures.[10]

The microbial flora of the infected root canal consists of both aerobic and anaerobes with predominantly the anaerobic bacteria, so the use of triple antibiotic paste is preferred. Triple antibiotic paste was preferred by 74.7% of MDS and 49.8% of GDP practitioners in <10 years of experience group. Sato *et al*. formulated the use of a combination of metronidazole and ciprofloxacin, which produced the effective destruction of all kinds of endodontic pathogens as treatment such as deep caries, necrosed pulp, and infected root canals of deciduous teeth.[11] According to Takushige *et al*., deciduous teeth with periapical lesions with or without physiologic root resorption were treated successfully by lesion sterilization and tissue repair endodontic therapy.[12]

It is well established that bacteria are the main etiological factors in the development of dentinal caries and its progression to pulpal and periapical diseases. In order to decrease the microbial population, chemical irrigants such as chlorhexidine and sodium hypochlorite are mainly used for ensuring minimal bacterial decontamination of root canals. The AAPD suggests 1% sodium hypochlorite solution as an irrigating solution to ensure the reduction in bacterial count.[13] In our study, only 32.8% of MDS and 36.8% of BDS practitioners opted for using sodium hypochlorite. However, 45.5% of practitioners with >25 years of experience favored the use of sodium hypochlorite for irrigation. Most of the GDPs, i.e., 54.7% of MDS and 51% of GDP practitioners in <10 years of experience group used normal saline as an irrigating solution. Moradi and Haghgoo concluded that solution of normal saline particles can be used as an alternative to nanosilver solution and sodium hypochlorite, but sodium hypochlorite showed the highest antimicrobial effectiveness against *Enterococcus faecalis* in their study.[14] After the root canals are completely dried, resorbable materials such as iodoform-based paste (KRI), zinc/oxide eugenol,[15] or a combination paste of calcium hydroxide and iodoform (Vitapex® and Endoflax®)[16] are used to fill the canals of deciduous teeth. Nearly 70% of MDS and 66.2% of BDS practitioners most frequently used zinc oxide eugenol (ZOE) as an obturation material for pulpectomy. Barja-Fidalgo *et al*. in their systematic review stated that there is no convincing evidence to support the superiority of any material over ZOE, and both ZOE

and iodoform pastes plus calcium hydroxide appear to be suitable as root canal fillings for deciduous teeth.[17]

The goal of pulpectomy is to achieve a good hermetic seal, which depends on various factors such as good biomechanical preparation, types of obturating material used, and achievement of minimum voids. The different obturation techniques to fill the deciduous root canal includes NaviTip, Jiffy tubes, Endodontic pressure syringe, Rotary lentulo spiral and hand-held, Conventional manual incremental, Past inject, Tuberculin syringe, Lateral condensation by amalgam pluggers and Disposable injection technique. However, Hiremath and Srivastava have recommended that endodontic pressure syringe produced the best results in terms of length of obturation and controlling paste extrusion from the apical foramen.[18]

Pulpectomy-treated tooth requires restoration, which seals the deciduous tooth from microleakage. The AAPD approves the use of stainless steel crown (SSC)/amalgam/composite/glass-ionomer cement (GIC). SSCs are the best choice for restoration with pulp therapy-treated deciduous teeth. Nearly 57.8% of MDS and 49.7% of GDP practitioners with <10 years of experience used GIC/Miracle Mix, and GDP practitioners with more than 25 years of experience preferred 36.4% composite. Very few GDPs recommended restoring deciduous teeth with SSCs when compared to Miracle Mix, composite, and amalgam. Only 29.75% of MDS and 26.1% of BDS practitioners used SSC final restoration after endodontic treatment. The relatively minimal usage of SSCs in deciduous teeth may be due to lack of practice among GDs.

The survey done by McKnight-Hanes quantified that GDs and PDs differ in their treatment recommendations. GDs frequently recommended restoring teeth with amalgam, whereas PDs more frequently recommended restoring deciduous teeth with SSCs.[2] Atieh found a nonsignificant difference in survival rate for teeth restored with preformed metal crowns (95%) versus resin modified glass ionomer/composite restoration (92.5%) in a 2-year RCT regarding restoration of deciduous teeth that had undergone a pulpotomy procedure.[19]

General practitioners did not seem to keep up with recently introduced techniques, but use more conventional methods. GDPs should know when to refer a child to a pediatric dentist. Moreover, GDPs should practice themselves with the various pulp medicaments and make a suitable final restoration.[20,21] The study done by Patil *et al*. concluded that the GDs and dentists of other specialty were regularly performing pulp therapy in deciduous teeth and should frequently update their knowledge about endodontic procedures in deciduous teeth.[4]

A survey designed specifically for pulp therapy in deciduous teeth is needed to understand the difference in recommendations for pulp treatment among GDPs. A more evidence-based approach to the teaching of pulp therapy may increase the use of choices in pulp therapy material in dental practice.

Conclusion

The qualification and years of clinical practice among GDPs affected the knowledge and treatment protocols regarding pulp therapy in deciduous dentition. Most of the GDPs other than specialty lacked knowledge about the STP for pulp therapy in deciduous dentition. Regarding the practice management, STPs were followed by other specialty and not GDPs. More informative, evidence-based approach and decision-making, treatment coaching should be given to GDPs regarding the importance of deciduous dentition.

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Conflicts of interest
There are no conflicts of interest.

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