DOI: 10.7860/JCDR/2019/42076.13153

Original Article

Dentistry Section

Vital Pulpal Therapy in Primary Teeth: A General and Paediatric Dentists' Perspective

ULLAL ANAND NAYAK[1], OTHMAN WALI[2], AFNAN SALEH S ALJOHANI[3], ROFYDAH MOHAMMAD A ALFOZAN[4], MASHAEL HASSAN A BAGADOOD[5], ASHWAQ TARIQ MAQBOOL[6], ELAF YOUSSEF NAWAWI[7]

ABSTRACT

Introduction: Management of pulpally involved primary teeth has recently gained importance inspite of the barriers faced by general dentists such as limited exposure to paediatric dentistry, skill and chair-side time. The advancements in technological and material sciences necessitate a practicing dentist to update themselves to deliver comprehensive dental care in most effective way.

Aim: The study was aimed to assess and compare the perspective of pulpal treatment of primary teeth among general and paediatric dentists of Saudi Arabia.

Materials and Methods: Close-ended, multiple-choice questionnaire evaluating their preferences towards pulp therapy in primary teeth was designed as part of a survey and mailed to 100 general dentists and 50 paediatric dentists across Kingdom of Saudi Arabia.

Descriptive statistics followed by χ^2-test was applied to test of variables in the questionnaire to determine their association.

Results: Paediatric dentists (68%) performed pulpal treatment in primary teeth more frequently under rubber dam isolation than general dentists (47%) (p=0.025). Traditional indirect pulp capping was preferred to Indirect Pulp Treatment (IPT) by both groups under local anaesthesia. Caries detector dye was used to facilitate precise caries removal more frequently by Paediatric dentists than general dentists (p=0.001). Pulpotomy was preferred over IPT by both groups when there was a probability of pulp exposure following complete caries excavation. Pulpectomy was infrequently performed. Zinc oxide eugenol was the material preferred for obturation in both groups. Paediatric dentists preferred stainless steel crown whereas General dentists preferred glass ionomer restoration after pulp therapy (p=0.004). There was no significant difference between follow-up schedule followed by general and paediatric dentists even though most dentists recalled their patients immediately and after 3 months follow-up.

Conclusion: The survey helps in refining the approaches of dentists towards pulp therapy in primary teeth and ascertains whether they are according to recent trends.

Keywords: Pulp capping, Pulpectomy, Pulpotomy

INTRODUCTION

It has been observed that primary teeth are lost prematurely despite the advancements in the way we see and treat dental caries [1]. A clinician would be in dilemma at times with respect to the diagnosis and treatment options for deep carious lesion which is in close proximity to the pulp of primary teeth. The anatomical, physiological and pathological differences in dentin-pulp complexes between primary and permanent teeth further complicate the treatment choice [2].

The newly advocated procedure of IPT of step-wise caries excavation is gaining popularity among certain clinicians as it is more conservative when compared to traditional Indirect Pulp Capping (IPC) and this being a step-wise caries excavation procedure, either delays or avoids pulp exposure [3]. In this procedure, carious dentin is partially removed and a biocompatible material is placed on it and the cavity is sealed. This arrests the caries process and causes dentin sclerosis, induces tertiary dentin formation, and thereby remineralizing the remaining carious dentin [4].

Clinicians may perform the vital pulp therapy of their choice in case of a deep carious lesion with a probable pulp exposure. Their decision depends on their knowledge and training undertaken related to the procedure [5] and their level of experience and skill to perform it in a child [6]. As there is no consensus on the treatment planning of a deep carious lesion in primary teeth among dentists, the present survey was aimed to assess and compare the perspective of general and paediatric dentists' of Saudi Arabia with regard to vital pulp therapy in primary teeth.

MATERIALS AND METHODS

A cross-sectional survey was planned for a period of three months using close-ended, multiple-choice questionnaire directed to evaluate the perspective of general and paediatric dentists of Saudi Arabia towards pulp therapy in primary teeth. The questionnaire was adopted from the study done by Nayak UA et al., which consisted of a total of 19 questions [6]. The questionnaire was re-validated and its construct, face, and content validities were carried out with the help of 5 randomly-selected dentists with vast clinical and teaching experience. The difficulty in understanding each question, its interpretation, and its correctness was critically analysed. The modifications were accordingly, carried out and the proforma was finalised. The ethical clearance was obtained from the institutional ethical committee of Ibn Sina National College for Medical Studies, Jeddah (IHEC Ref no: H-23-30042018). Anticipating the knowledge among the Paediatric dentists to be at least 50% more than the general dentists with a 95% confidence level at 80% power and a ratio of 1:2 for Paediatric dentists to general dentist, accounting for a 20% non-response rate, a minimum of 40 paediatric dentists and 80 general dentist needed to be included in the present study.

The questionnaire containing multiple choice questions was then mailed to general dentists and paediatric dentists across Kingdom of Saudi Arabia. They were asked to make the best choice from the options available. The participating dentists' consent was obtained after assuring that their identity would be kept strictly confidential. The study was planned from 1st September 2018 to 30th November 2018, till the desired sample size of 100 general dentists and 50 paediatric dentists was obtained.

STATISTICAL ANALYSIS

The responses were received, entered on Microsoft Excel (Microsoft, Redmond, WA, USA) and analysed using IBM SPSS version 20. Descriptive statistics followed by χ^2-test was applied to test of variables in the questionnaire to determine their association.

RESULTS

The work profile of the general and paediatric dentists is shown in [Table/Fig-1]. It describes their distribution based on their experience and frequency of treating child patients in their dental clinic. Fifty paediatric dentists and 100 general dentists were enrolled for the study.

Work profile of dentists		
	Number (%)	
General dentists	100 (66.7%)	
Paediatric dentists	50 (33.3%)	
Experience of dentists		
	General dentists N (%)	Paediatric dentists N (%)
0-5 years	63 (63%)	07 (14%)
5-10 years	31 (31%)	18 (36%)
10-20 years	04 (4%)	19 (38%)
>20 years	02 (2%)	06 (12%)
Frequency of treating child patient in general practice		
	General dentists N (%)	Paediatric dentists N (%)
1-12 per week	88 (88%)	12 (24%)
13-24 per week	09 (9%)	24 (48%)
>25 per week	03 (3%)	14 (28%)

[Table/Fig-1]: Work profile and experience of general dentist and paediatric dentists.

[Table/Fig-2] suggests that 62% of general dentists and 78% of paediatric dentists did not plan treatment of deep carious teeth just based on radiographs. The comparison was statistically non-significant (p=0.064). Regarding the choice of procedure performed in case of deep carious lesion with probability of pulpal exposure, most of them preferred pulpotomy followed by IPC. The least preferred procedure by paediatric dentists was direct pulp capping (4%) and by general dentists was pulpectomy (7%). However, the comparison was statistically non-significant (p=0.493).

The Paediatric dentists (68%) used rubber dam isolation more frequently when compared to the general dentists (47%) during pulp therapy in primary teeth and this comparison was statistically significant (p=0.025) [Table/Fig-3]. However, 32% of Paediatric dentists and 53% of general dentist did not practice rubber dam isolation during pulp therapy in children.

[Table/Fig-4] shows that while performing indirect pulp capping in primary teeth, both the general dentists (65%) and paediatric dentists (56%) preferred using local anaesthesia for pain control in all cases but the comparison was not statistically significant. Paediatric dentists (62%) preferred using caries detector dye to facilitate caries removal as a part of IPC significantly more frequently than general dentists (34%) (p=0.001).

Both general dentists (39%) and paediatric dentists (36%) gave more emphasis on clinical signs and symptoms along with radiographic appearance, followed by lesion depth and dentin quality as their order of preference regarding determinants of IPT. The comparison was statistically non-significant (p=0.107).

Most of the general dentists (43%) and paediatric dentists (64%) practised indirect pulp therapy as a one-visit procedure. Only 22% of general dentists and 14% of paediatric dentists recalled their patients for second visit and re-entered the area to evaluate the remaining carious dentin. However, there were no significant differences between them with regard to the method followed and the number of visits deployed for the procedure (p=0.053).

When the complete caries excavation would lead to pulp exposure, both the general dentists (70%) and paediatric dentists (76%) preferred pulpotomy as the procedure of choice. 30% of general dentists and 24% of paediatric dentists were more conservative in their approach and preferred indirect pulp capping [Table/Fig-5]. However, their approach was similar with no statistically significant difference (p=0.440).

When there was a mechanical pulp exposure, pulpotomy was the preferred treatment option followed by direct pulp capping in both general dentists and paediatric dentists. Single visit pulpectomy was practised only by 6% of general dentists and 2% of paediatric dentists. Multiple visit pulpectomy was seldom practised (1% of general dentists). The comparison of their preferences was non-significant (p=0.126). A 31% of general dentists and 30% of paediatric dentists preferred performing pulpotomy rather than single visit pulpectomy when indicated and the comparison was not statistically significant (p=0.674).

[Table/Fig-6] suggests that Zinc Oxide Eugenol (ZnOE) was the preferred material for obturation of primary teeth as reported by general dentists (55%) and paediatric dentists (46%). Second option preferred was the combination of calcium hydroxide and iodoform, by 23% general dentists and 42% paediatric dentists. There was no statistically significant difference in the choice of obturating material between the groups. The general dentists (73%) and paediatric

Variables		General dentists n (%)	Paediatric dentists n (%)	Chi square value	p-value
Planning treatment just based on radiograph prior to caries excavation	Yes	38 (38%)	11 (22%)	3.880	0.064
	No	62 (62%)	39 (78%)		
Procedure often performed in case of deep carious lesion in a primary molar with probability of pulpal exposure	Indirect pulp capping	17 (17%)	8 (16%)	2.405	0.493
	Direct pulp capping	11 (11%)	2 (4%)		
	Pulpotomy	65 (65%)	35 (70%)		
	Pulpectomy	7 (7%)	5 (10%)		

[Table/Fig-2]: Dentists approach towards probable carious exposure of pulp in case of deep caries lesion.
*Significant at p<.05

Variables		General dentists n (%)	Paediatric dentists n (%)	χ^2-value	p-value
Frequency of rubber dam use during vital pulp therapy in primary teeth	Not at all	53 (53%)	16 (32%)	9.388	0.025
	Less than 50% cases	26 (26%)	24 (48%)		
	More than 50% cases	6 (6%)	5 (10%)		
	All cases	15 (15%)	5 (10%)		

[Table/Fig-3]: Frequency of rubber dam use during vital pulp therapy in primary teeth.
*Significant at p<.05

Variables		General dentists no. (%)	Paediatric dentists no. (%)	Chi square value	p-value
Frequency of local anaesthesia used	Always	65 (65%)	28 (56%)	2.347	0.309
	Sometimes	29 (29%)	21 (42%)		
	Rarely	6 (6%)	1 (2%)		
	Never	0	0		
Frequency of caries detector dye used	Always	11 (11%)	3 (6%)	16.566	0.001
	Sometimes	15 (15%)	16 (32%)		
	Rarely	8 (8%)	12 (24%)		
	Never	66 (66%)	19 (38%)		
Order of preference for determinants of IPT 1. Dentin quality 2. Lesion depth 3. Clinical signs and symptoms, along with radiographic appearance	1,2,3	17 (17%)	5 (10%)	6.105	0.107
	2,3,1	17 (17%)	17 (34%)		
	3,1,2	27 (27%)	10 (20%)		
	3,2,1	39 (39%)	18 (36%)		
Method followed and number of visit	1 visit procedure	43 (43%)	32 (64%)	5.880	0.053
	2 visit procedure without re-entry	35 (35%)	11 (22%)		
	2 visit procedure with re-entry	22 (22%)	7 (14%)		

[Table/Fig-4]: Practices followed during Indirect pulp capping procedure.
*Significant at p<.05

Variables		General dentists no. (%)	Paediatric dentists no. (%)	Chi-square value	p-value
Preference of IPC over pulpotomy	Yes	30 (30%)	12 (24%)	0.595	0.440
	No	70 (70%)	38 (76%)		
Preference of treatment in case of mechanical pulp exposure	Direct pulp capping	34 (34%)	10 (20%)	5.712	0.126
	Pulpotomy	59 (59%)	39 (78%)		
	Single visit pulpectomy	6 (6%)	1 (2%)		
	Multiple visit pulpectomy	1 (1%)	0 (0%)		
When indicated, preference of one-visit pulpectomy over pulpotomy	Always	29 (29%)	19 (38%)	1.534	0.674
	More than 50% of the cases	23 (23%)	10 (20%)		
	Less than 50% of the cases	17 (17%)	6 (12%)		
	Never	31 (31%)	15 (30%)		

[Table/Fig-5]: Preferences of vital pulpal procedures in cases of deep caries with probable pulpal exposure.
*Significant at p<.05. IPC: Indirect pulp capping

Variables		General dentists no. (%)	Paediatric dentists no. (%)	Chi-square value	p-value
Material of choice for root canal filling	ZOE	55 (55%)	23 (46%)	9.448	0.051
	Calcium hydroxide	21 (21%)	5 (10%)		
	Calcium hydroxide+iodoform	23 (23%)	21 (42%)		
	Other	1 (1%)	1 (2%)		
Whether choice of material for obturation depends on tooth diagnosis	Yes	27 (27%)	11 (22%)	0.441	0.556
	No	73 (73%)	39 (78%)		
Restoration of choice after pulpotomy or pulpectomy	GIC	54 (54%)	12 (24%)	13.323	0.004
	Reinforced GIC or Compomer	13 (13%)	11 (22%)		
	Composite resin	19 (19%)	12 (24%)		
	Full coverage restoration (SS crown)	14 (14%)	15 (30%)		
The timing of placement of SS crown, if it is chosen to be placed after pulpotomy or pulpectomy	Same appointment	37 (37%)	30 (60%)	8.334	0.016
	After 24 hours	22 (22%)	10 (20%)		
	After 7 days	41 (41%)	10 (20%)		
Timing of radiographic evaluation	Only immediate post-operatively	57 (57%)	32 (64%)	0.947	0.623
	Immediate post-operatively and after 3 months	40 (40%)	16 (32%)		
	Only if recalled next	3 (3%)	2 (4%)		
Opinion that pulp therapy being less frequently performed	Yes	44 (44%)	40 (40%)	0.218	0.727
	No	56 (56%)	60 (60%)		

[Table/Fig-6]: Preferences of dentists regarding Pulpectomy in primary teeth.
*Significant at p<.05

dentists (78%) believed that state of tooth or its diagnosis did not determine the choice of obturating material (p=0.556).

Stainless Steel crown (SS Crown) (30%) was the choice of restoration after pulpotomy or pulpectomy by Paediatric dentists followed by GIC (24%)/composite (24%) and Reinforced GIC (22%). GIC (54%) was the preferred choice by general dentists followed by composite resin (19%), SS crown (14%) and Reinforced GIC (13%). This difference in their choice of post-endodontic restoration was statistically

significant (p=0.004). A 60% of Paediatric dentists and 37% General dentists placed SS crown on the same appointment after pulpotomy or pulpectomy. A 41% of general dentists and 20% of paediatric dentists preferred to place SS crown after 7 days. This difference in timing of SS crown placement was statistically significant (p=0.016).

Most of general dentists (57%) and paediatric dentists (64%) practiced radiographic evaluation after pulp therapy at immediate post-operative period only. However, there was no statistical difference in their practice (p=0.623). Majority of the general dentists (56%) and paediatric dentists (60%) did not believe in the opinion that vital pulp therapy was less frequently performed in children but there was no statistical difference in their belief (p=0.727).

DISCUSSION

The primary objective of pulp therapy of primary teeth should be to maintain their integrity and health till they are shed and replaced [7]. Although, the history taking is more subjective and less reliable in children, the management of deep carious lesion in a child would depend upon the clinical signs/symptoms, radiographic picture and level of co-operation exhibited by the child during the treatment. In the present study majority of clinicians did not plan treatment of deep carious teeth just based on radiographs and they relied on clinical picture.

Indirect pulp treatment is indicated for a deep carious lesion approximating the pulp without any signs or symptoms of pulp degeneration [8]. Indirect pulp capping has been shown to have a higher success rate than pulpotomy in long term studies [9,10]. It is recommended that direct pulp capping should be used with caution in primary teeth due to the increased risk of internal resorption and calcifications [8]. The Paediatric dentists in the present study thus, seldom performed direct pulp capping.

It has been reported that many paediatric dentists irrespective of their experience are neither using local anaesthesia nor caries detector dye while performing indirect pulp capping [6]. It is now confirmed that caries detector dye stains both carious as well as sound dentin, resulting in over-zealous dentin removal and wider cavities [11]. The excavation of infected carious dentin may be painless but vital tubular contents in affected dentin make its removal painful. The administration of local anaesthesia in such cases can significantly reduce this distinction [12]. Only an experienced professional would be able to differentiate the dentin quality during caries removal [13]. Therefore, the clinician can best decide this considering dentin quality, lesion depth, and clinical symptoms along with radiographic picture [14]. In the present study, most clinicians stressed more importance to clinical signs/symptoms and their radiographic appearance, followed by lesion depth and dentin quality as their order of preference regarding determinants of IPT.

It is proven beyond doubt that when proper isolation is achieved during pulpotomy procedure, its success improves drastically and paediatric dentists of the present study believed in this concept. But in routine clinical practice, the use of rubber dam in younger or uncooperative children may be difficult or they may/may not prefer it [15]. Some patients get a feeling of the procedure being performed outside of their mouth and hence tolerate treatment for longer time. However, it is recommended that dentists should calm the patient resistance and try to use a rubber dam wherever possible [16]. The motivation and attitudes of the practicing dentist toward rubber dams directly influences the attitudes of child toward acceptance of rubber dam placement [15], as believed by the paediatric dentists of the current study.

In contrast to traditional indirect pulp capping, IPT is more conservative and involves second visit during which re-entry to the lesion as well as its assessment is done [3], which was practiced by fewer clinicians of present study. Similar findings were reported by Nayak UA et al., [6]. Stepwise (two-step) caries excavation can result in fewer pulp exposures and lesser manifestations of pulpal disease when compared to complete caries excavation.

Although, indirect pulp therapy is preferable to a pulpotomy when the pulp is normal or has a diagnosis of reversible pulpitis and it does not delay its exfoliation time [10]. When there is a mechanical pulp exposure, pulpotomy should be the preferred treatment option especially when the exposure size is larger than pin-point. The healing ability of the pulp of primary teeth is best predicted by proper diagnosis of its inflammatory status, which in turn dictates the success rate of pulpotomy [17].

Single-sitting pulpectomy is reported to be electively chosen over pulpotomy by certain paediatric dentists in case of a vital tooth as it has relatively higher success rates [18]. However, in the present study, single-sitting pulpectomy was practiced by very few general as well as paediatric dentists which could be related to the lack of their exposure to the procedure during their training period and also preference of certain treatment options [19]. Multiple visit pulpectomy was seldom practiced (1% of general dentists). The preference of single or multiple visit pulpectomy should be made according to its clinical feasibility and biological outcomes. Single-visit pulpectomy if performed following appropriate aseptic precautions and in controlled conditions may result in a very high success rate especially for teeth with apical periodontitis. The number of appointments may not have any relevance and the procedural steps can be accomplished in one sitting with desirable long-term success. Hence, single-visit pulpectomy can be recommended for treatment of primary teeth with apical periodontitis [20].

Zinc Oxide Eugenol (ZnOE) when used as an obturating material in primary teeth has anti-inflammatory/analgesic properties and is radio-opaque. However, its resorption rate is slower, and alters the path of tooth eruption of permanent successor [21]. If it is in contact with periapical tissues, it can cause irritation and necrosis of cementum or bone. It is reported to have 93.3% success, which is lower than Metapex [22]. But, overfilling and voids were more commonly seen in teeth filled with Metapex. Calcium hydroxide and iodoform combination has shown higher long term success and has excellent antibacterial effect; it is radiopaque and easy to use as it is available as premixed paste in a convenient syringe. However, when the pulpal inflammation is extensive to cause non-vital tooth, the use of combinations of minocycline, metronidazole and ciprofloxacin is preferred as it is more effective [23].

SSC should be routinely indicated post-pulpotomy or pulpectomy as it is durable, protects the brittle crown, improves the coronal seal and improves the success of vital pulp therapy. The most common reasons reported in literature for not preferring stainless steel crowns in children were related to their prolonged chair-side time, patient cooperation, the required skill of the dentist and the cost [24]. A randomised control trial found no difference in survival rate for teeth restored with preformed metal crowns versus direct intra-coronal restorations such as light cured glass ionomer/composite restoration [25].

Most dentists practiced radiographic evaluation after pulp therapy at immediate post-operative period only. However, it is recommended that the long-term follow-up is practiced to ensure success of procedure of pulp and/or the restoration done and also to ensure that there are no undesirable effects on the surrounding oral tissues [26].

LIMITATION AND FUTURE RECOMMENDATION

The cross-sectional studies have the limitations that they are suggestive of the relevant facts for the said time period. However, further studies at regular intervals with comparisons regarding newer treatment modalities are warranted.

CONCLUSION

In the present study, most of the paediatric dentist prefered the placement of SSC after plupotomy or pulpectomy whereas general dentist prefered GIC restoration. The Correct time for placement of SSC was after seven days for most of the general dentist but paediatric dentist prefered placement of the crowns in the same appoinment.

REFERENCES

[1] Al-Shahrani N, Al-Amri A, Hegazi F, Al-Rowis K, Al-Madani A, Hassan KS. The prevalence of premature loss of primary teeth and its impact on malocclusion in the Eastern Province of Saudi Arabia. Acta Odontol Scand. 2015;73(7):544-49.
[2] Ranly DM, Garcia-Godoy F. Current and potential pulp therapies for primary and young permanent teeth. J Dent. 2000;28(3):153-61.
[3] Bjørndal L. Indirect pulp therapy and stepwise excavation. Paediatr Dent. 2008;30(3):225-29.
[4] Thompson V, Craig RG, Curro FA, Green WS, Ship JA. Treatment of deep carious lesions by complete excavation or partial removal: a critical review. J Am Dent Assoc. 2008;139:705-12.
[5] Chaollai AN, Monteiro J, Duggal MS. The teaching of management of the pulp in primary molars in Europe: a preliminary investigation in Ireland and the UK. Eur Arch Paediatr Dent. 2009;10(2):98-103.
[6] Nayak UA, Wadhwa S, Kashyap N, Prajapati D, Mahuli AV, Sharma R. Knowledge and practice of, and attitudes toward, pulp therapy in deciduous teeth among paediatric dentists in India. J Investig Clin Dent. 2018;9:e12284.
[7] American Academy of Paediatric Dentistry. Pulp therapy for primary and immature permanent teeth. Reference Manual. 2014;40(6):343-51.
[8] Fuks AB. Pulp therapy for the primary dentition. In: Pinkham JR, Casamassimo PS, Fields HW Jr., McTigue DJ, Nowak A, eds. Paediatric Dentistry: Infancy Through Adolescence. 5th ed. St. Louis, Mo.: Elsevier Saunders Co.; 2013:331-51.
[9] Falster CA, Araújo FB, Straffon LH, Nör JE. Indirect pulp treatment: in vivo outcomes of an adhesive resin system vs calcium hydroxide for protection of the dentin-pulp complex. Paediatr Dent. 2002;24(3):241-48.
[10] Coll JA. Indirect pulp capping and primary teeth: Is the primary tooth pulpotomy out of date? Paediatr Dent. 2008;30(3):230-36.
[11] Banerjee A, Kidd EA, Watson TF. In vitro validation of carious dentin removed using different excavation criteria. Am J Dent. 2003;16(4):228-30.
[12] Massler M. Treatment of profound caries to prevent pulpal damage. J Pedod. 1977;2(2):99-105.
[13] Alaçam T. Evaluation of a tactile hardness test in indirect pulp capping. Int Endod J. 1985;18(4):274-76.
[14] Stark MM, Nicholson RJ, Soelberg KB. Direct and indirect pulp capping. Dent Clin North Am. 1976;20:341-49.
[15] Feierabend SA, Matt J, Klaiber B. A comparison of conventional and new rubber dam systems in dental practice. Operative Dent. 2011;36(3):243-50.
[16] Pol S, Katge F, Krishna V, Balgi P, Pradhan D. Effect of rubber dam on objective and subjective parameters of stress during dental treatment of children. Indian J Oral Health Res. 2018;4(1):16-20.
[17] Camp JH. Diagnosis dilemmas in vital pulp therapy: treatment for the toothache is changing, especially in young, immature teeth. Review. Paediatr Dent. 2008;30(3):197-205.
[18] Su Y, Wang C, Ye L. Healing rate and post-obturation pain of single-versus multiple-visit endodontic treatment for infected root canals: a systematic review. J Endod. 2011;37(2):125-32.
[19] Primosch RE, Glomb TA, Jerrell RG. Primary tooth pulp therapy as taught in predoctoral paediatric dental programs in the United States. Paediatr Dent. 1997;19:118-22.
[20] Bharuka SB, Mandroli PS. Single-versus two-visit pulpectomy treatment in primary teeth with apical periodontitis: A double-blind, parallel group, randomized controlled trial. J Indian Soc Pedod Prev Dent. 2016;34(4):383-90.
[21] Khairwa A, Bhat M, Sharma R, Satish V, Maganur P, Goyal AK. Clinical and radiographic evaluation of zinc oxide with aloe vera as an obturating material in pulpectomy: an in vivo study. J Indian Soc Pedod Prev Dent. 2014;32(1):33-38.
[22] Huth KC, Paschos E, Hajek-Al-Khatar N, Hollweck R, Crispin A, Hickel R, et al. Effectiveness of 4 pulpotomy techniques-randomized controlled trial. J Dent Res. 2005;84(12):1144-48.
[23] Pinky C, Shashibhushan KK, Subbareddy VV. Endodontic treatment of necrosed primary teeth using two different combinations of antibacterial drugs: an in vivo study. J Indian Soc Pedod Prev Dent. 2011;29(2):121-27.
[24] Threlfall AG, Pilkington L, Milsom KM, Blinkhorn AS, Tickle M. General dental practitioners' views on the use of stainless steel crowns to restore primary molars. Br Dent J. 2005;199(7):453-55.
[25] Attari N, Roberts JF. Restoration of primary teeth with crowns: a systematic review of the literature. Eur Arch Paediatr Dent. 2006;1(2):58-62.
[26] Moskovitz M, Yahav D, Tickotsky N, Holan G. Long-term follow up of root canal treated primary molars. Int J Paediatr Dent. 2010;20:207-13.

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Preventive Dental Sciences, Ibn Sina National College for Medical Studies, Jeddah, Mecca, Saudi Arabia.
2. Vice-Dean, Faculty of Dentistry, Department of Oral Basic and Clinical Sciences, Ibn Sina National College for Medical Studies, Jeddah, Mecca, Saudi Arabia.
3. Intern, Department of Dentistry Program, Ibn Sina National College for Medical Studies, Jeddah, Mecca, Saudi Arabia.
4. Intern, Department of Dentistry Program, Ibn Sina National College for Medical Studies, Jeddah, Mecca, Saudi Arabia.
5. Intern, Department of Dentistry Program, Ibn Sina National College for Medical Studies, Jeddah, Mecca, Saudi Arabia.
6. Intern, Department of Dentistry Program, Ibn Sina National College for Medical Studies, Jeddah, Mecca, Saudi Arabia.
7. Department of Dentistry Program, Ibn Sina National College for Medical Studies, Jeddah, Mecca, Saudi Arabia.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Ullal Anand Nayak,
Al Mahjer Street, Jeddah, Mecca, Saudi Arabia.
E-mail: dranandnayak@yahoo.co.in

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **May 23, 2019**
Date of Peer Review: **Jul 02, 2019**
Date of Acceptance: **Aug 16, 2019**
Date of Publishing: **Sep 01, 2019**