JOURNAL OF COMPLEMENTARY MEDICINE RESEARCH, 2020
VOL 11, NO. 4
10.5455/jcmr.2020.11.04.16

REVIEW ARTICLE

Open Access

Preference of Root Canal Obturation Materials for Pulpectomy Procedures by Students in A Private Dental Institution - A Retrospective Study

Aniruddh Menon[1], Mebin George Mathew[2*], Jayanth Kumar Vadivel[3]

[1]Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-77
Email: 151501006.sdc@saveetha.com

[2]Senior Lecturer, Department of Pediatric and Preventive Dentistry, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-77
Email: mebingeorgem.sdc@saveetha.com

[3]Reader, Department of Oral Medicine and Radiology, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-77
Email: jayanthkumar@saveetha.com

ABSTRACT

The present study aims to evaluate the choice and preference of the oobturating materials for pulpectomy of primary teeth in patients at Saveetha Dental college. Retrospective data of 2438 patients was obtained and segregated. Retrospective data of 2438 patients was obtained and segregated who visited between June 2019 to April 2020. After obtaining the data it was statistically analyzed using SPSS software by IBM Version 20. Out of the materials analysed in this study, Metapex (96.4%) was the most commonly used followed by Zinc Oxide Eugenol (1.8%) then Endoflas(1.5%) and the least used was Vitalex (0.16%). Metapex was the most widely used obturation material in Undergraduate and Postgraduate sections whereas Vitapex was used only in the Postgraduate Section. Metapex was most commonly used in anteriors. Whereas Endoflas, zinc oxide Eugenol and vitapex were most commonly used in posteriors (p=0.002). Males had undergone a greater number of pulpectomy procedures in comparison to females and there was a statistically significant association between the gender of the patient and the obturating material (p value =0.02). A statistically significant association was obtained between the choice of obturating material and age,gender of the patient and the tooth number (using Chi square Test). Within the limits of the present study it is observed that the most common type of obturating material that is used is Metapex. Further studies are to be done to formulate a clear and distinct clinical practice guideline for pulpectomy procedure.Further awareness programmes that should be conducted to bring out better clinical outcomes and help the society holistically.

ARTICLE HISTORY

Received October 04, 2020
Accepted November 19, 2020
Published December 09, 2020

KEYWORDS

primary, pulpectomy, metapex, endoflas, vitapex

INTRODUCTION

There are various situations [1–3] arising in children that require intervention by practitioners [4,5], With the recent advent of time, there have been various trends in the occurrence of caries in pediatric patients[6] and various approaches towards the same[7–9].The best space maintainer in primary dentition is a natural tooth which after getting infected is treated and retained for but

* Contact: Mebin George Mathew, *Senior Lecturer, Department of Pediatric and Preventive Dentistry, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-77*
mebingeorgem.sdc@saveetha.com

functional and aesthetic needs [10]. Root canal therapy was advocated as early as 1932, as a method for retaining primary teeth which would otherwise be lost [11]. Pulpectomy procedure is one which may be performed on deciduous teeth when the coronal aspect of the pulpal tissue and the tissue entering the pulp canals are vital but show clinical signs of hyperemia or if signs of necrosis or suppurations are seen in the canals. It is not advised to maintain or retain unattended infected primary teeth in the oral cavity.They may be opened for drainage of the affected tissue and often happen to remain asymptomatic for an unknown period. However, they remain a source of secondary infection and must be treated or removed. Endodontic therapy is especially complicated due to the complex nature of the primary root canal morphology. The root canals of the first primary molar are quite often too small that they remain enigmatic to even the smallest barbed broaches. If the canal cannot be properly cleansed of necrotic material, sterilized, and adequately filled, endodontic therapy is more likely to fail. Deciduous teeth that have undergone pulp necrosis of polymicrobial nature with mainly anaerobic microorganisms present deeply within the dentin and in cementum around the periapical region. These bacteria within the fins and isthmus can persist even after biomechanical preparation of the root canal and thorough debridement with antimicrobial irrigating agents and intracanal dressing.The outcome of the endodontic treatment in deciduous teeth is majorly dependent on achieving an adequate level of disinfection within the root canals. Mechanical instrumentation on its own is incapable of obtaining such disinfection, considering the root resorption process and the complex anatomy of the root canal system. There are various methods to ensure proper biomechanical preparations which have been tested in time [12–14]. With all the ideal requirements during biomechanical preparation, an ideal obturation can be achieved [15–17].The obturating material should be biocompatible owing to the presence of succedaneous teeth and thus should also eliminate residual pathogens from the complex canal anatomy. The material that is used should inactivate toxic products of such pathogens, adding to which they should also prevent reinfection of the canal to create a favorable and healthy environment for the healing process to occur [18]. The application of formaldehyde in endodontic treatment with Gysis triopaste, is based on the concept of fixation of the pulpal tissue and sterilising it thus making it possible to perform the therapeutic processes. However, iin 1904 it was Buckley who had used formaldehyde to treat necrosis of the pulp by the introduction of a formula containing 40% formaldehyde tricresol and glycerine.

After Buckley's use of formaldehyde, pulp tissue removal was performed by root canal instrumentation and filled with resorbable paste. Zinc oxide eugenol is one of the most commonly preferred and used obturating materials; however, it has its own set of drawbacks such as, delayed resorption if the material is extruded beyond the apex and certain concerns of toxicity. To overcome these noxious effects, various obturating materials combinations including calcium hydroxide and iodoform combinations (Metapex, Vitapex), endoflas and herbal derivatives have been brought into practice with promising prospective results that can be used as a replacement to traditional ZOE. Previously we have focused our research on various invitro and invivo studies [19–34] We have currently shifted our focus to this retrospective analysis. The aim of the present study is to see the Prevalence of usage of different Obturation Materials for pulpectomy by residents in a college setting.

MATERIALS AND METHODS

The present retrospective study involved a total of 2438 patients that underwent single visit pulpectomy procedures. The Obturating materials studied included Metapex, zinc oxide eugenol, vitapex , endoflas. The study was performed in a university setting at Saveetha Dental College and Hospitals. Thus the data obtained from the patients is of the same geographic location and ethnicity. The ethical approval for collection of retrospective data from the dental patient management archives was obtained from the Institutional Ethics Board. (IRB Approval No: SIHEC/2020/DIASDATA/0619-0320)The period of the study was between 1st June 2019 to 1st April 2020. Once the data was collected the same was verified by using photographs by two external reviewers who were blinded on the hypothesis from the present study. This was done to eliminate the chances of sampling bias. Before the commencement of the study a clear well defined inclusion criteria was defined. The inclusion criteria included that:

- Patient has been treated by a resident of Saveetha Dental College, either an undergraduate or postgraduate student.
- Should have undergone single visit pulpectomy
- Should have been within the age group of 1-12 years. Patients were segregated into three age groups; Group 1- 1 - 4 years ; Group 2- 5 to 8 years; Group 3- 9-12 years.

Out of the study population that was chosen for the study there was no segregation process, as this would result in sampling bias. The data segregation was done according to various parameters such as

speciality of clinic in which patient was treated, age of the patient, gender of the patient etc.

The data that was then tabulated was reviewed by an external reviewer and screened for internal validity of the study. The data was then exported to SPSS Software by IBM Version 20 for Statistical Analysis. Descriptive statistics was performed followed by Correlation tests to see any kind of correlation or Association between the different variables taken in the present study.Descriptive statistics and Chi square test was used to determine the correlation between the variables where P value of less that 0.05 which is considered to be statistically significant when seen with a confidence interval of 95%.

RESULTS AND DISCUSSION

A total of 2438 patients that underwent pulpectomy procedures were included as part of the study, 1421 of the patients (58.3%) were males and 1017 were females (41.7%). The patients in the present study were within the age group of 1-12 years with a mean age of 4.8 plus or minus 1.7 years. Majority of the patients were between the ages of 1-6 years (81.9%) and the remaining between 6-12 years (19.1%)

The teeth most frequently to have undergone pulpectomy were 74,75 (23.4%) and 84,85 (24.9%). (Table 1). A total of 2213 of the procedures were performed in the postgraduate clinic (90.8%), 224 (9.2%) in undergraduate clinics. The various materials that are included in the present study in their order of preference of being used as an obturating material were Metapex (96.4%), followed by Zinc Oxide Eugenol (1.8%), Endoflas(1.5%) and the least used was Vitalex (0.16%), (2351,45,38 and 4 respectively). Metapex was the most widely used obturation material in Undergraduate and Postgraduate sections whereas Vitapex was used only in the Postgraduate Section.[Graph 1] Metapex was most commonly used in anteriors. Whereas Endoflas, zinc oxide Eugenol and vitapex were most commonly used in posteriors (p=0.002) [Table 1]. The most widely used obturation material for all the age groups was metapex, vitapex (which are combinations with calcium hydroxide) and zinc oxide eugenol were not used in the age of 9-12 years, only used between 1-8 years. A statistically significant correlation was found between the age of the patient and the choice of obturating material (p value = 0.02) [Graph 2]. Males had undergone a greater number of pulpectomy procedures in comparison to females and there was a statistically significant association between the gender of the patient and the obturating material (p value =0.02) [Graph 3]

In the present study among the various obturation materials that are available the most commonly used obturation material is Metapex which is a combination of iodoform and Calcium Hydroxide [35] According to Rifkin et al [36] the ideal qualities of an obturation material includes resorbability, Antimicrobial property, anti inflammatory and non irritating to permanent tooth bud, Radiopaque, ease of insertion and ease of removal. In a study conducted by Brar GS et al [37] where they compared the resorption rates of Metapex, ZOE and Endoflas it was found that the most easiest material to undergo resorption was Metapex which is in line to the findings of the present study, this could be a potential reason for practitioners to choose this material over other materials. In a study conducted by Jeeva PP et al [38] where the cytotoxic property and the Antimicrobial property of Metapex, zinc oxide eugenol and hydroxyapatite was compared, the clear winner was Metapex. It is impossible for a single material to fulfill all the requirements that have been laid out by Ruskin but Metapex is the closest to perfection that can be achieved to the criteria, hence it is one of the most preferred obturating materials. In the present study it is observed that there is an association between the morphology of the tooth that is being treated and the obturating materials that are used. This can be attributed to the fact that the various obturating materials that were considered in the present study will have different flow properties [39] and hence adherence to the canal morphology would also be improved. In the present study it is observed that there is a statistically significant association between the type of obturating material that is sued and the age of the patient undergoing pulpectomy procedure, this can be attributed to the development of dentition [40] as the properties of resorption will vary between the obturating materials[41] that were considered in the present study. There is an association between the gender of the patient and the obturating material that is used for the pulpectomy procedure, this has been reported for the first time in literature and can be attributed to various reasons, such as differences in behaviour[42] between the two genders could have affected the handling of the material by the practitioner or can also be attributed to the difference in the pattern of time of dentition between the two genders[43]. When we compare the present with other parts of the world the following findings are derived. In a study conducted by Dunston et al [44] in the United States to see the preference of Material used there, it was observed that the most preferred materials are iodoform based which are in line to the findings of the current study. It is to be noted that even the study by Dunston et Al was done in a university setting and hence this also proves that the teaching practices for clinical practice for pulpectomy in India and the United States of America are in unison. However in a study conducted by Togoo RA et al [45]in Saudi

Arabia it is observed that the most preferred material is Zinc Oxide Eugenol. This can be attributed to the geographic location of the particular study and also be caused due to the teaching practices in those parts of the world.

The limitations of the present study include that it is a single centered study and there is a limited sample size as most of the patients have similar ethnicities as well.

CONCLUSION

Within the limits of the present study it is observed that the most common type of obturating material that is used is Metapex. Further studies are to be done to formulate a clear and distinct clinical practice guideline for pulpectomy.

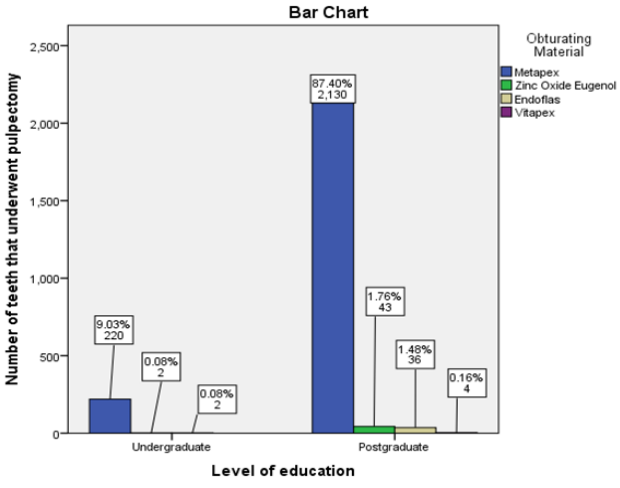
REFERENCES

1. Packiri S, Gurunathan D, Selvarasu K. Management of paediatric oral ranula: a systematic review. J Clin Diagn Res. 2017;11(9):ZE06.
2. Christabel SL, Linda Christabel S. Prevalence of Type of Frenal Attachment and Morphology of Frenum in Children, Chennai, Tamil Nadu [Internet]. Vol. 6, World Journal of Dentistry. 2015. p. 203–7. Available from: http://dx.doi.org/10.5005/jp-journals-10015-1343
3. Gurunathan D, Shanmugaavel A. Dental neglect among children in Chennai [Internet]. Vol. 34, Journal of Indian Society of Pedodontics and Preventive Dentistry. 2016. p. 364. Available from: http://dx.doi.org/10.4103/0970-4388.191420
4. Ravikumar D, Jeevanandan G, Subramanian EMG. Evaluation of knowledge among general dentists in treatment of traumatic injuries in primary teeth: A cross-sectional questionnaire study [Internet]. Vol. 11, European Journal of Dentistry. 2017. p. 232–7. Available from: http://dx.doi.org/10.4103/ejd.ejd_357_16
5. Govindaraju L, Jeevanandan G, Subramanian EMG. Knowledge and practice of rotary instrumentation in primary teeth among indian dentists: A questionnaire survey [Internet]. Vol. 9, Journal of International Oral Health. 2017. p. 45. Available from: http://dx.doi.org/10.4103/jioh.jioh_4_17
6. Subramanyam D, Gurunathan D, Gaayathri R, Vishnu Priya V. Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries [Internet]. Vol. 12, European Journal of Dentistry. 2018. p. 067–70. Available from: http://dx.doi.org/10.4103/ejd.ejd_266_17
7. Somasundaram S. Fluoride Content of Bottled Drinking Water in Chennai, Tamilnadu [Internet]. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 2015. Available from: http://dx.doi.org/10.7860/jcdr/2015/14691.6594
8. Fluoride, Fluoridated Toothpaste Efficacy And Its Safety In Children - Review [Internet]. Vol. 10, International Journal of Pharmaceutical Research. 2018. Available from: http://dx.doi.org/10.31838/ijpr/2018.10.04.017
9. Govindaraju L. Effectiveness of Chewable Tooth Brush in Children-A Prospective Clinical Study [Internet]. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 2017. Available from: http://dx.doi.org/10.7860/jcdr/2017/24238.9528
10. Asokan S, Sooriaprakas C, Raghu V, Bairavi R. Volumetric Analysis of Root Canal Fillings in Primary Teeth Using Spiral Computed Tomography: An In Vitro Study. J Dent Child. 2012;79(2):46–8.
11. Mortazavi M, Mesbahi M. Comparison of zinc oxide and eugenol, and Vitapex for root canal treatment of necrotic primary teeth. Int J Paediatr Dent. 2004 Nov;14(6):417–24.
12. Jeevanandan G. Kedo-S Paediatric Rotary Files for Root Canal Preparation in Primary Teeth – Case Report [Internet]. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 2017. Available from: http://dx.doi.org/10.7860/jcdr/2017/25856.9508
13. Jeevanandan G, Govindaraju L. Clinical comparison of Kedo-S paediatric rotary files vs manual instrumentation for root canal preparation in primary molars: a double blinded randomised clinical trial [Internet]. Vol. 19, European Archives of Paediatric Dentistry. 2018. p. 273–8. Available from: http://dx.doi.org/10.1007/s40368-018-0356-6
14. Nair M, Jeevanandan G, Vignesh R, Subramanian EMG. Comparative evaluation of post-operative pain after pulpectomy with k-files, kedo-s files and mtwo files in deciduous molars -a randomized clinical trial [Internet]. Vol. 21, Brazilian Dental Science. 2018. p. 411. Available from: http://dx.doi.org/10.14295/bds.2018.v21i4.1617
15. Govindaraju L, Jeevanandan G, Subramanian EMG. Comparison of quality of obturation and instrumentation time using hand files and two rotary file systems in primary molars: A single-blinded randomized controlled trial

[Internet]. Vol. 11, European Journal of Dentistry. 2017. p. 376–9. Available from: http://dx.doi.org/10.4103/ejd.ejd_345_16

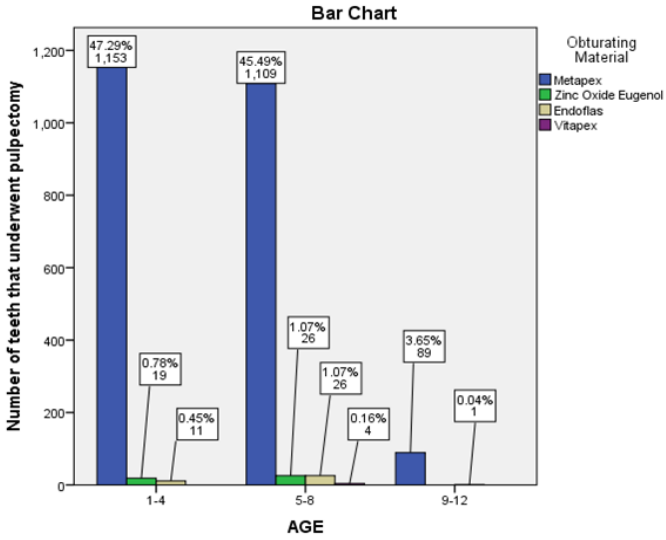
16. Govindaraju L. Clinical Evaluation of Quality of Obturation and Instrumentation Time using Two Modified Rotary File Systems with Manual Instrumentation in Primary Teeth [Internet]. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 2017. Available from: http://dx.doi.org/10.7860/jcdr/2017/30069.10602
17. Panchal V, Jeevanandan G, Subramanian EMG. Comparison of instrumentation time and obturation quality between hand K-file, H-files, and rotary Kedo-S in root canal treatment of primary teeth: A randomized controlled trial [Internet]. Vol. 37, Journal of Indian Society of Pedodontics and Preventive Dentistry. 2019. p. 75. Available from: http://dx.doi.org/10.4103/jisppd.jisppd_72_18
18. Pinky C, Shashibhushan KK, Subbareddy VV, Others. 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.
19. Robert R, Justin Raj C, Krishnan S, Jerome Das S. Growth, theoretical and optical studies on potassium dihydrogen phosphate (KDP) single crystals by modified Sankaranarayanan–Ramasamy (mSR) method [Internet]. Vol. 405, Physica B: Condensed Matter. 2010. p. 20–4. Available from: http://dx.doi.org/10.1016/j.physb.2009.08.015
20. Sahu D, Kannan GM, Vijayaraghavan R. Size-dependent effect of zinc oxide on toxicity and inflammatory potential of human monocytes. J Toxicol Environ Health A. 2014;77(4):177–91.
21. Suresh P, Marimuthu K, Ranganathan S, Rajmohan T. Optimization of machining parameters in turning of Al-SiC-Gr hybrid metal matrix composites using grey-fuzzy algorithm [Internet]. Vol. 24, Transactions of Nonferrous Metals Society of China. 2014. p. 2805–14. Available from: http://dx.doi.org/10.1016/s1003-6326(14)63412-9
22. DeSouza SI, Rashmi MR, Vasanthi AP, Joseph SM, Rodrigues R. Mobile phones: the next step towards healthcare delivery in rural India? PLoS One. 2014 Aug 18;9(8):e104895.
23. Sekhar CH, Narayanan V, Baig MF. Role of antimicrobials in third molar surgery: prospective, double blind,randomized, placebo-controlled clinical study. Br J Oral Maxillofac Surg. 2001 Apr;39(2):134–7.
24. Chellaswamy C, Ramesh R. Parameter extraction of solar cell models based on adaptive differential evolution algorithm [Internet]. Vol. 97, Renewable Energy. 2016. p. 823–37. Available from: http://dx.doi.org/10.1016/j.renene.2016.06.024
25. Danda AK, Muthusekhar MR, Narayanan V, Baig MF, Siddareddi A. Open versus closed treatment of unilateral subcondylar and condylar neck fractures: a prospective, randomized clinical study. J Oral Maxillofac Surg. 2010 Jun;68(6):1238–41.
26. Samuel MS, Bhattacharya J, Raj S, Santhanam N, Singh H, Pradeep Singh ND. Efficient removal of Chromium(VI) from aqueous solution using chitosan grafted graphene oxide (CS-GO) nanocomposite. Int J Biol Macromol. 2019 Jan;121:285–92.
27. Lakshmanan A, Bhaskar RS, Thomas PC, Satheesh Kumar R, Siva Kumar V, Jose MT. A red phosphor for nUV LED based on (Y,Gd)BO3:Eu3 [Internet]. Vol. 64, Materials Letters. 2010. p. 1809–12. Available from: http://dx.doi.org/10.1016/j.matlet.2010.05.034
28. Venu H, Subramani L, Dhana Raju V. Emission reduction in a DI diesel engine using exhaust gas recirculation (EGR) of palm biodiesel blended with TiO2 nano additives [Internet]. Vol. 140, Renewable Energy. 2019. p. 245–63. Available from: http://dx.doi.org/10.1016/j.renene.2019.03.078
29. Manimaran G, Pradeep kumar M, Venkatasamy R. Influence of cryogenic cooling on surface grinding of stainless steel 316 [Internet]. Vol. 59, Cryogenics. 2014. p. 76–83. Available from: http://dx.doi.org/10.1016/j.cryogenics.2013.11.005
30. Neelakantan P, Varughese AA, Sharma S, Subbarao CV, Zehnder M, De-Deus G. Continuous chelation irrigation improves the adhesion of epoxy resin-based root canal sealer to root dentine. Int Endod J. 2012 Dec;45(12):1097–102.
31. Babu MN, Naresh Babu M, Muthukrishnan N. Investigation on Surface Roughness in Abrasive Water-Jet Machining by the Response Surface Method [Internet]. Vol. 29, Materials and Manufacturing Processes. 2014. p. 1422–8. Available from: http://dx.doi.org/10.1080/10426914.2014.952020
32. Panda S, Doraiswamy J, Malaiappan S, Varghese SS, Del Fabbro M. Additive effect of

autologous platelet concentrates in treatment of intrabony defects: a systematic review and meta-analysis. J Investig Clin Dent. 2016 Feb;7(1):13–26.
33. Adalarasan R, Santhanakumar M, Rajmohan M. Optimization of laser cutting parameters for Al6061/SiCp/Al2O3 composite using grey based response surface methodology (GRSM) [Internet]. Vol. 73, Measurement. 2015. p. 596–606. Available from: http://dx.doi.org/10.1016/j.measurement.2015.06.003
34. Rajeshkumar S, Kumar SV, Ramaiah A, Agarwal H, Lakshmi T, Roopan SM. Biosynthesis of zinc oxide nanoparticles usingMangifera indica leaves and evaluation of their antioxidant and cytotoxic properties in lung cancer (A549) cells. Enzyme Microb Technol. 2018 Oct;117:91–5.
35. Gupta S, Das G. Clinical and radiographic evaluation of zinc oxide eugenol and metapex in root canal treatment of primary teeth. J Indian Soc Pedod Prev Dent. 2011 Jul 1;29(3):222.
36. Rifkin A. A simple, effective, safe technique for the root canal treatment of abscessed primary teeth. ASDC J Dent Child. 1980;47(6):435.
37. Brar GS, Bajaj N, Bhola M, Brar JK. Clinical evaluation of root resorption and its correlation with obturation quality in pulpectomized deciduous teeth with different obturating materials: An In vivo study. Contemp Clin Dent. 2019;10(2):243.
38. Jeeva PP, Retnakumari N. In-vitro comparision of cytotoxicity and anti-microbial activity of three pulpectomy medicaments--Zinc oxide euginol, metapex and chitra HAP--Fill. J Med Dent Sci. 2014;13(2):40–7.
39. Babashahi E, Kartalaie MM, Basir L, Rakhshan V. Volumetric Assessment of Root Canal Obturation Using 3% Nano-Chitosan versus Zinc Oxide Eugenol (ZOE) and Iodoform-Calcium Hydroxide (Metapex), in Primary Root Canals Shaped with Rotary versus Manual Methods: A Preliminary In-Vitro Spiral CT Study. Frontiers in dentistry. 2019;16(1):45.
40. Hernández M, Espasa E, Boj J. Eruption chronology of the permanent dentition in Spanish children. J Clin Pediatr Dent. 2008;32(4):347–50.
41. Sunitha B, Kiran KP, Puppala R, Kethineni B, Dandotikar DR, Others. Resorption of extruded obturating material in primary teeth. Indian Journal of Mednodent and Allied Sciences. 2014;2(1):64–7.
42. Liddell A, Locker D. Gender and age differences in attitudes to dental pain and dental control. Community Dent Oral Epidemiol. 1997 Aug;25(4):314–8.
43. Wedl JS, Schoder V, Blake FAS, Schmelzle R, Friedrich RE. Eruption times of permanent teeth in teenage boys and girls in Izmir (Turkey). J Clin Forensic Med. 2004 Dec 1;11(6):299–302.
44. Dunston B, Coll JA. A Survey of Primary Tooth Pulp Therapy as Taught in US Dental Schools and Practiced by Diplomates of the American Board of Pediatric Dentistry. Pediatr Dent. 2008;30(1):42–8.
45. Togoo RA, Nasim VS, Zakirulla M, Yaseen SM. Knowledge and Practice of Pulp Therapy in Deciduous Teeth among General Dental Practitioners in Saudi Arabia. Ann Med Health Sci Res. 2012;2(2):119–23.



Graph 1: Graph shows association between level of education and type of obturation material that is used. X axis represents the level of education and Y axis represents the number of teeth that underwent pulpectomy procedures. Metapex is expressed in blue,Zinc Oxide Eugenol in green, Endoflas in brown and

Vitapex in Purple. Most commonly used material among undergraduates and postgraduates was Metapex. However there was no Statistically Significant association obtained using Chi Square Test, (Value=2.404, df=2, p=0.5)

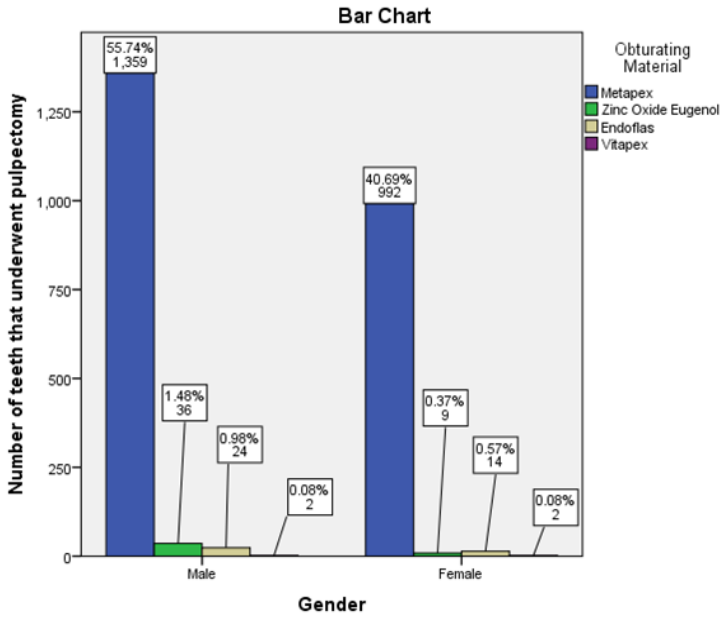


Graph 2: Bar Graph shows association between age group of the patient and the type of obturation material that is used .X axis depicts the age of the patient and Y axis depicts the number of teeth that underwent pulpectomy. The most commonly used in all age groups is Metapex (blue) and Vitapex (purple) is used only in the 5-8 years age group. There is an increased usage of Endoflas (beige) and Zinc Oxide Eugenol (green) in the 5-8 years age group .Zinc Oxide Eugenol is used more commonly than Endoflas in 1-4 years age group.Zinc Oxide Eugenol is not used in the 9-12 years age group.Statistically significant correlation using Chi Square Test (Value=14.216, df=6, p=0.02).P<0.05 which infers that there was a statistical significance in the usage of obturation material according to the age group.

Table 1: Table shows association between the obturation material and the tooth in which the procedure is done. The most commonly used obturation material among all the teeth is Metapex. Endoflas has only been used in maxillary and mandibular primary molars. Zinc Oxide Eugenol has been used more commonly in the mandibular arch than in the maxillary arch whereas the usage of Vitapex is more in the maxillary arch than the mandibular arch. (Chi Square Test, Value= 92.7,df=57,p=0.002) p<0.05 which infers statistically significant association between the tooth which undergoes pulpectomy procedure and the obturation material that is used.

		Obturating Material				Total
		Metapex	Zinc Oxide Eugenol	Endoflas	Vitapex	
Tooth Number	51	119	1	0	0	120
	52	138	0	0	0	138
	53	50	0	0	1	51
	54	190	2	0	0	192
	55	67	0	0	1	68
	61	122	2	0	0	124
	62	128	0	0	0	128
	63	58	0	0	0	58

	64	203	0	0	1	204
	65	93	1	1	0	95
	71	7	0	0	0	7
	72	12	0	0	0	12
	73	30	1	0	0	31
	74	261	8	9	0	278
	75	275	9	7	1	292
	81	8	0	0	0	8
	82	11	1	0	0	12
	83	31	1	0	0	32
	84	272	8	11	0	291
	85	276	11	10	0	297
Total		2351	45	38	4	2438



Graph 3: Bar graph shows the association between the material used for obturation and the gender of the patient. X axis represents gender and Y axis represents the number of teeth that underwent pulpectomy. It was noted that Metapex (blue), Zinc Oxide Eugenol (green) and Endoflas (beige) are used more commonly in males than in females. There is no difference in the usage of Vitapex (Purple) among males and females. (Chi Square Test, Value=9.434,df=3,p=0.02) p<0.05 infers a statistically significant degree of association present between the usage of obturating material and the gender of the patient.