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S. Selvapriya¹

Dr. Akshay Khandelwal^{2*}

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¹Saveetha Dental college and Hospitals , Saveetha Institute of Medical and Technical sciences(SIMATS), Saveetha University, Chennai-77,India.

²Senior lecturer, Department of conservative dentistry and endodontics, Saveetha dental college and Hospitals, Saveetha Institute of Medical and Technical sciences(SIMATS), Saveetha University, Chennai-77,India.



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S. Selvapriya¹, Dr. Akshay Khandelwal^{2*}

¹Saveetha Dental college and Hospitals , Saveetha Institute of Medical and Technical sciences(SIMATS), Saveetha University, Chennai-77,India.

²Senior lecturer, Department of conservative dentistry and endodontics, Saveetha dental college and Hospitals, Saveetha Institute of Medical and Technical sciences(SIMATS), Saveetha University, Chennai-77,India.

*Corresponding Author

Email: 151901054.sdc@saveetha.com¹, Akshayk.sdc@saveetha.com²

ABSTRACT

Introduction: Infections of the root canal space and their sequelae may be extremely painful and potentially dangerous, yet they may not always necessarily be. Many general dental practitioners find management of the inflamed pulp challenging in their routine dental practice. First step within the mortal endodontic methods of treatment is positioning of devitalizing medicine. The devitalizing agents can compose formaldehyde, cresol, paraformaldehyde or some arsenic compounds. Thus, this study aims to analyze knowledge, attitude and practice of final year and internship students regarding the use of devitalizing agents in their respective practice.

Materials And Method: A total of 100 practicing final year and internship students were randomly chosen. The questionnaire was about the general information of the different aspects of devitalizing agents. The collected data was subjected to SPSS. Descriptive statistics was drawn with respective percentages to have a comparative overview.

Result: The response rate was 99% of which effective and complete replies were 100%. 73% of the students observed post operative pain. 55% respondents used paraformaldehyde containing paste. 38% of the students were not aware of the complications of devitalizing agents P value is 0.352; DF: 3; p value: 0.615 ie (p > 0.05). Hence the association was not statistically significant.

Conclusion: We concluded that final year and internship students do use pulp devitalizing agents despite possessing knowledge related to the complications.

Keywords: Devitalizing agent, Endodontic treatment, Knowledge, Infection, Practice, dental students

INTRODUCTION

The inflammatory reaction is first initiated by bacterial antigens interacting with the local immune system . As long as the carious lesion has not entered the pulp, the pulpal inflammation is likely to be reversible.(1). Chronic, asymptomatic inflammatory lesions around the apex of a tooth with necrotic dental pulp or an insufficient passageway treatment can develop unnoticed by the patient, and remain so for years(2). The course of disease is modulated by both the virulence of the microbiota established in the root canal space and the capacity of the immune system to curb the infection(3,4). Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage(5). However, its intensity, nature, type, duration, and progress differ with the degree of pathology. Amongst the pain off hand reported by a majority of the population, one in all the frequent is dental pain with higher intensity as akin to other forms of pain in account. Etiological rationale for dental pain stands mostly for endodontic, periodontal or a combination(6). Inflammation of the dental pulp has been viewed as a tightly regulated sequence of vascular and cellular events mediated by molecular factors. Pulpitis is usually caused by an infection of the pulp space by commensal oral microorganisms(7)(8). The foremost common route of entry for the microorganisms is tooth decay. Other potential pathways for pulpal microbial infection include trauma, dental cracks, exposed dentinal tubules or the apical foramen. Cells in human dental pulp that express TLR contribute to trigger immune responses to microorganisms and their by-products. This group includes odontoblasts, endothelial cells further as macrophages and dendritic cells(9).

Pulpal inflammation as the sequel of dental caries figures a significant component of endodontic diseases(10). Many general dental practitioners find management of the inflamed pulp challenging in their routine dental practice(11). First step within the mortal endodontic methods of treatment is positioning of devitalizing medicine. The devitalizing agents can compose formaldehyde, cresol, paraformaldehyde or some arsenic

compounds. These agents may be harmful to the patients mostly because of their highly toxic, allergic, carcinogenic and mutagenic/genotoxic properties(10,12). Toxic devitalizing agents like arsenic trioxide and paraformaldehyde were commonly employed in the past to devitalize inflamed pulps when effective anesthesia could not be obtained. Among these two substances a very important role played paraformaldehyde can penetrate through dentin and is gradually released as formaldehyde. Formaldehyde released through dentin contains a destructive effect on periodontal and bone tissues(13). With the arrival of knowledge being available at fingertips in today's era thanks to the accessibility of knowledge on the internet and online databases, it's very easy for clinicians to keep themselves updated with these concepts. Thus, it will be hypothesized that general dental practitioners are benefitting to update their knowledge with current technology in hand. There's no more article reported literature available, which speaks about the behavior of general dental students in respect to devitalizing agents considering the hypothesis aforementioned. Our team has extensive knowledge and research experience that has translate into high quality publications(14–22),(23–28),(29–33) Thus, this study aims to analyze knowledge, attitude and practice of final year undergraduate and internship students regarding the use of devitalizing agents in their respective practice.

MATERIALS AND METHOD

An online survey was conducted with a self structured questionnaire with a sample size of hundred participants comprising the final year and internship students. The questionnaire consists of questions that help in collecting socio-economic data, questions that help in provoking awareness among the final year undergraduate and internship students and questionnaires also related to the awareness of devital agents. The questionnaire was validated in the standard manner. Measures such as selection of participants randomly, placing restrictions over the participant population and age groups are taken to minimise the bias occurring in sampling. The questionnaire was circulated using the online platform “ google form” and the link was circulated through social media to the respondents. The responses were recorded and with the collected responses descriptive analysis such as the chi-square test was performed and the results of the analysis test carried out was represented in the form of a pie chart.

RESULTS

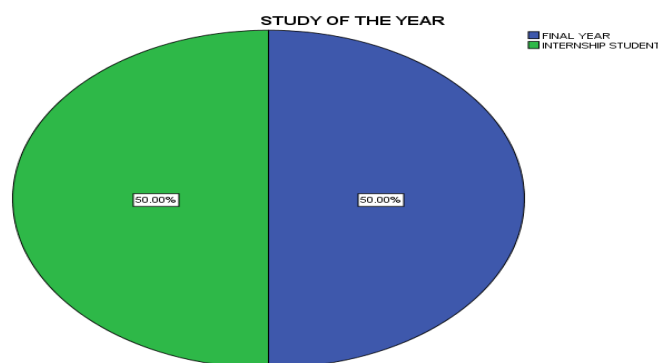


Figure 1: Pie chart representing the distribution of participants based on study of year, where 50% of the study participants (blue) final year students and 50% of the study participants (green) internship students.

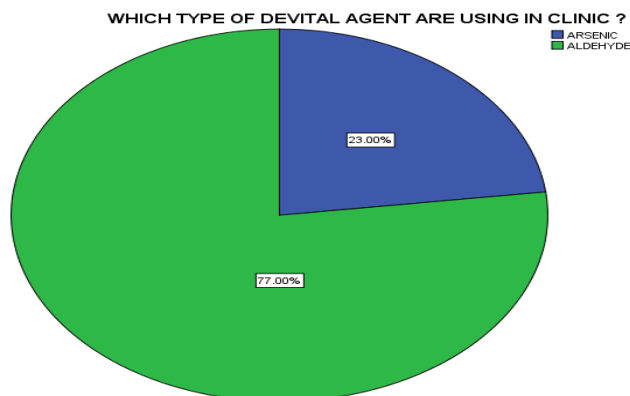


Figure 2: The pie graph represents responses to the question on what type of devital agents are used in clinics among the respondents, 23% (blue) arsenic and 77% (green) aldehyde.

WHAT TYPES OF DEVITALIZING AGENTS USED BY GENERAL DENTAL PRACTITIONERS ?

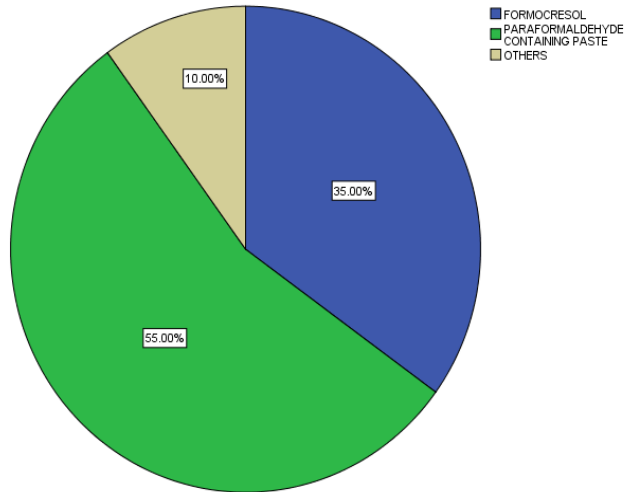


Figure 3: The pie graph represents responses to the question on what types of devitalizing agents used by general dental practitioners among the respondents, 35% (blue) formocresol, 55% (green) paraformaldehyde containing paste, 10% (yellow) others.

WHICH IS TOXIC DEVITALIZING AGENT ?

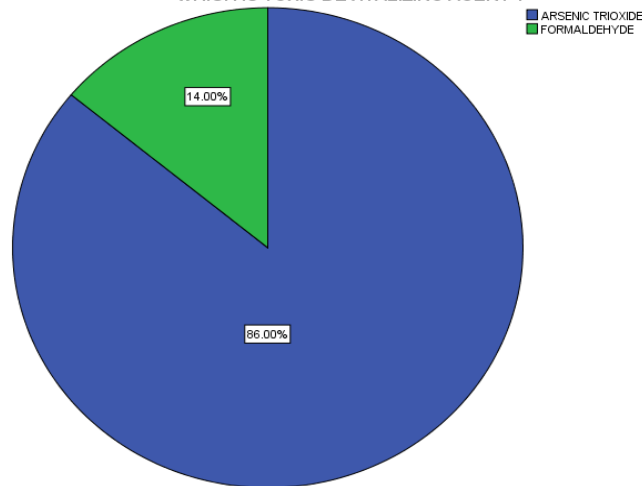


Figure 4: The pie graph represents responses to the question on which is the toxic devitalizing agent among the respondents, 86% (blue) arsenic trioxide and 14% (green) formaldehyde.

WHICH AGENT CAN PLAY ROLE AS DISINFECTANTS AND CAN DEVITALIZE INFLAMED PULPS WHEN LOCAL ANESTHESIA IS INEFFECTIVE ?

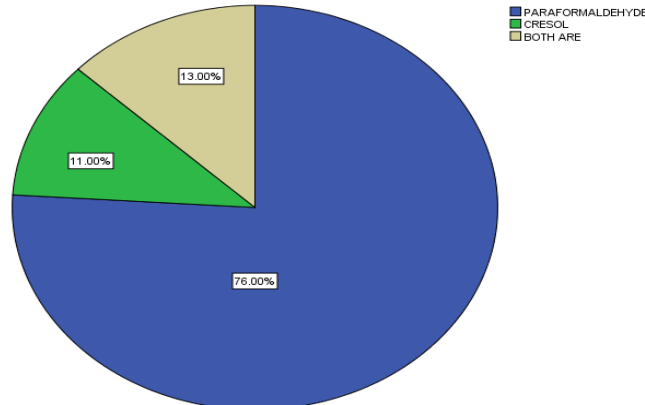


Figure 5: The pie graph represents responses to the question on which agent can play role as disinfectants and can devitalize inflamed pulps when local anesthesia is ineffective among the respondents, 76% (blue) paraformaldehyde, 11%(green) cresol and 13%(yellow) both are.

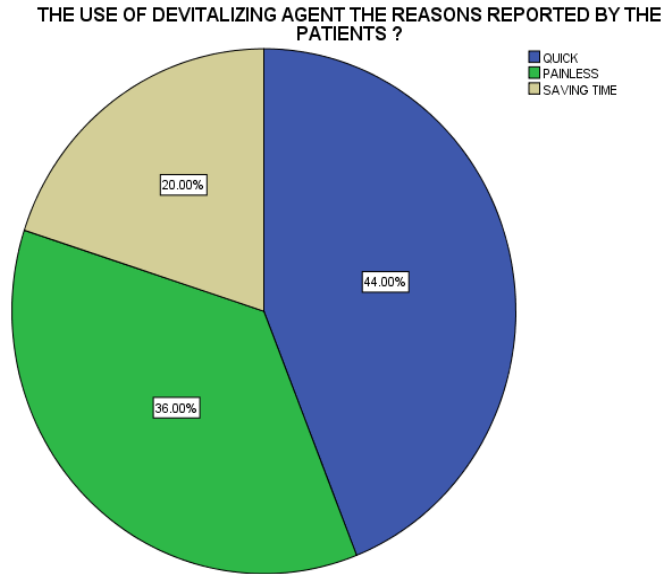


Figure 6: The pie graph represents responses to the question on the use of devitalizing agents, the reason reported by the patients among the respondents, 44% (blue) quick, 36% (green) painless and 20% (yellow) saving time.

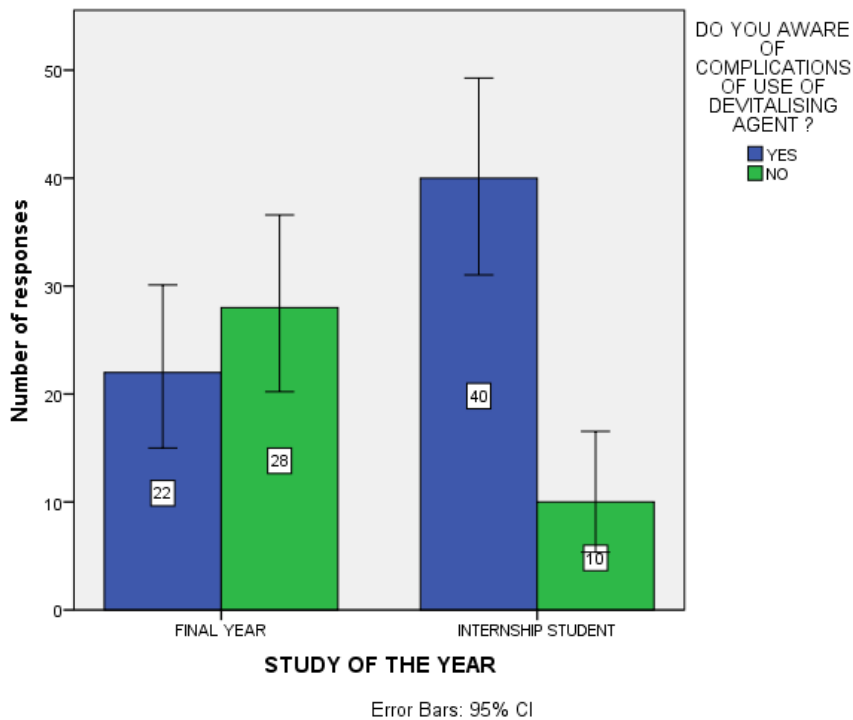


Figure 7: The bar chart represents association between the study of the year and question on awareness of complications of use of devitalising agents. X axis represents study of the year and Y axis represents the number of students who are aware of complications of devitalising agents. The blue colour bar represents the students who are aware of complications of use of devitalising agents and the green bar represents the students who are not aware. The chi square test was done and the association between the study of the year and number of students and the awareness of complications of devitalising agents. P value is 0.352; DF: 3; p value: 0.615 ie ($p > 0.05$). which is statistically not significant implying that internship students are more aware than final year students among the study population.

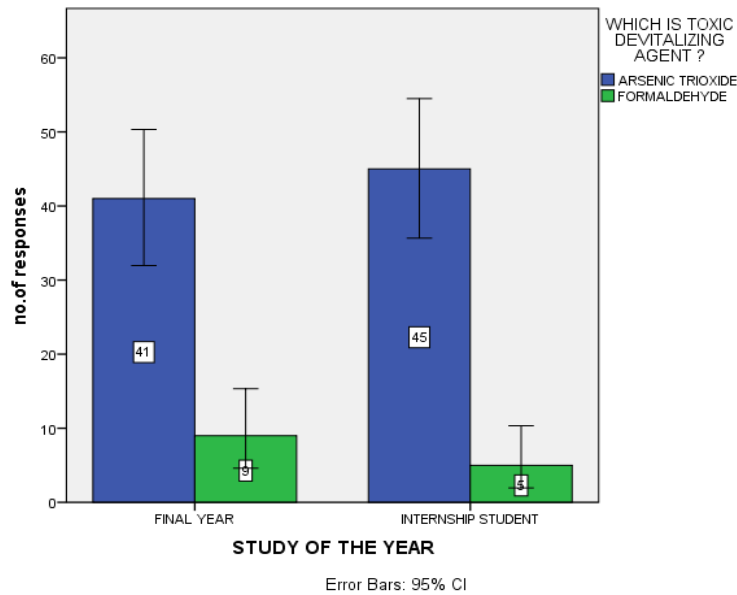


Figure 8: The bar chart represents association between the study of the year and the question on which are toxic devitalizing agents. X axis represents study of the year and Y axis represents the number of students which are toxic devitalising agents. The blue colour bar represents the arsenic of toxic devitalising agents and the green bar represents the formaldehyde of devitalising agents. The chi square test was done and the association between the study of the year and number of students and which is toxic devitalising agents. P value is 0.025; DF: 3; p value: 0.615 ie ($p < 0.05$). Hence statistically not significant implying that internship students are more likely to respond that arsenic is a more toxic devitalising agent than final year students among the study population.

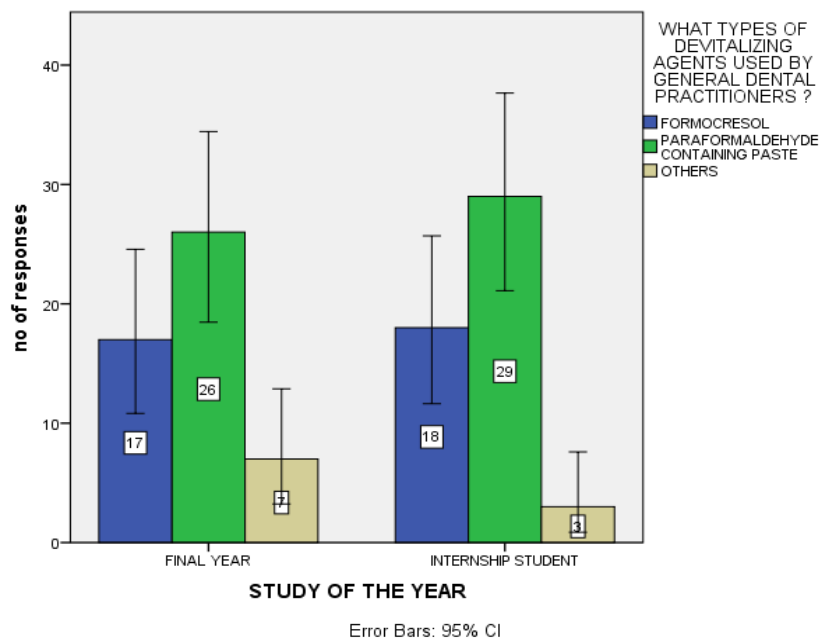


Figure 9: The bar chart represents association between the study of the year and question on what type of devitalizing agents used by general dental practitioners. X axis represents study of the year and Y axis represents the number of students of what type of devitalizing agents used by general practitioners. The blue colour bar represents the arsenic of toxic devitalising agents and green bar represents the formaldehyde of devitalising agents. The chi square test was done and the association between the study of the year and number of students and which is toxic devitalising agents. P value is 0.122; DF: 3; p value: 0.615 ie ($p > 0.05$). Hence statistically not significant implying that internship students are more likely to respond that arsenic is a more toxic devitalising agent than final year students among the study population

From the present study it is evident (figure 1) that out of 100 participants 50% of the final year students and 50% of the internship students. (figure 2) depicts what type of devital agents are used in clinics 23% of the students responded to arsenic and 77% of the students responded to aldehyde. (figure 3) depicts what type of devitalizing agents used by general dental practitioners 35% of the students responded to formocresol, 55% of the students responded to paraformaldehyde containing paste and 10% of the students responded to others. (figure 4) depicts a toxic devitalizing agent 86% of the students responded to arsenic trioxide and 14% of the students responded to formaldehyde. (figure 5) depicts which agent can play role as disinfectants and can devitalize inflamed pulps when local anesthesia is ineffective 76% of the students responded to paraformaldehyde, 11% of the students responded to cresol and 13% of the students responded to both are. (figure 6) depicts the use of devitalizing agents, the reasons reported by the patients 44% of the students responded too quickly, 36% of the students responded painlessly and 20% of the students responded to saving time. (figure 7) depicts that association between the study of the year and the question on which are toxic devitalizing agents. In that internship students are more aware than final year students among the study population. (figure 8) depicts that association between the study of the year and questions on which are toxic devitalizing agents. In that internship students are more likely to respond that arsenic is a more toxic devitalising agent than final year students among the study population. (figure 9) depicts that association between the study of the year and the question on what type of devitalizing agents used by general dental practitioners. Paraformaldehyde containing paste is the most commonly used among final year and internship students.

DISCUSSION

When we compared to other articles the respondents using devitalising agents in practice increased, in spite of maximum having knowledge associated with the present complications. The utilization of aldehyde containing agents was more within the present study than other studies where they used the recently available devitalizing agents like arsenic based compounds. This might be rationalized on the premise of dental education sought by the practitioners. Although, majority of practitioners belong to the practice group of 1-5 years, the identical could have confounding factors with relevancy their education pursued till establishment of practice. The elimination of the same wasn't possible within the aegis of the study. The explanations reported by the practitioners to be used of agents as fore-stated is perhaps because of the actual fact that these agents seem to be quick and painless in action, eliminating the requirement of administration of anesthesia thus saving time and maximising patient cooperation. For pediatric patients, reasons to be used by such agents were the issue they face in managing behavior of a toddler in administering anaesthesia. This projects the utilization of devitalizing agents overruled the importance of anaesthesia in endodontic treatment. In the present study showed that the type of devitalizing agents used by general dental practitioners 35% of the students responded to formocresol, 55% of the students responded to paraformaldehyde containing paste and 10% of the students responded to others. In a similar article we found that performed by out 100 practicing general dentists in that 36% of the participants responded to formocresol as a devitalising agent and 56% of the participants responded to paraformaldehyde containing pastes(34). In our study complication following the use of devitalising agents 73% of the students responded to post operative pain , 19% of the students responded to swelling and 8% of the students responded to gingival necrosis. When we compared to the study performed by out of 48 general dentists 68.75% of the practitioners did not observe any postoperative complication, 14.58% of the practitioners was noted post operative pain and 8.33% of the practitioners responded that complication were in swelling and gingival necrosis(34).

CONCLUSION

From the result, we concluded that final year and internship students do use pulp devitalizing agents despite possessing knowledge related to the complications. This needs to establish better understanding of the topic by practitioners within the region through their involvement in continuing dental education schemes of the title. However, it's also recommended that an analogous study be meted out considering a bigger sample and covering major areas which could represent national knowledge, attitude and practice of general dental practitioners regarding the utilization of devitalizing agents.

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Conflict Of Interest

All the authors declare no conflict of interest in the study.

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REFERENCE

1. Price WA. Dental Infections, Oral and Systemic. 1923.
2. Fulford MR, Stankiewicz NR. Infection Control in Primary Dental Care. Springer; 2019. 130 p.
3. Medina-Palacios SE, Vitales-Noyola M, López-González E, González-Amaro AM, Méndez-González V, Pozos-Guillén A. Root canal microorganisms and their antibiotic susceptibility in patients with persistent endodontic infections, with and without clinical symptoms. *Odontology* [Internet]. 2021 Jan 2; Available from: <http://dx.doi.org/10.1007/s10266-020-00580-2>
4. Haapasalo M, Endal U, Zandi H, Coil JM. Eradication of endodontic infection by instrumentation and irrigation solutions [Internet]. Vol. 10, *Endodontic Topics*. 2005. p. 77–102. Available from: <http://dx.doi.org/10.1111/j.1601-1546.2005.00135.x>
5. Li BY, Gong QM. [Research progress in clinical prognosis of apical overfilling of root canal obturation]. *Zhonghua Kou Qiang Yi Xue Za Zhi*. 2021 Feb 9;56(2):210–5.
6. Nascimento GG, Rabello DGD, Corazza BJM, Gomes APM, Silva EG, Martinho FC. Comparison of the effectiveness of single- and multiple-sessions disinfection protocols against endotoxins in root canal infections: systematic review and meta-analysis. *Sci Rep*. 2021 Jan 13;11(1):1226.
7. Ricucci D, Siqueira JF Jr, Rôças IN. Pulp response to periodontal disease: novel observations help clarify the processes of tissue breakdown and infection. *J Endod* [Internet]. 2021 Feb 18; Available from: <http://dx.doi.org/10.1016/j.joen.2021.02.005>
8. Infection with Decay-Causing Bacteria Linked to Age of Child [Internet]. Vol. 18, *Australian Endodontic Newsletter*. 2010. p. 16–16. Available from: <http://dx.doi.org/10.1111/j.1747-4477.1992.tb00335.x>
9. Georgiou AC, Crielaard W, Ouwerling P, McLean W, Lappin DF, van der Waal SV. The influence of apical periodontitis on the concentration of inflammatory mediators in peripheral blood plasma and the metagenomic profiling of endodontic infections: Study design and protocol. *Contemp Clin Trials Commun*. 2021 Mar;21:100686.
10. Al-Hadlaq SMS. Immunohistochemical Assessment of Pulpal Inflammation: A Report Submitted in Partial Fulfillment ... for the Degree of Master of Science (Endodontics) .. 1998. 170 p.
11. Corbella S, Taschieri S, Tsesis I, Del Fabbro M. Postextraction Implant in Sites With Endodontic Infection as an Alternative to Endodontic Retreatment: A Review of Literature [Internet]. Vol. 39, *Journal of Oral Implantology*. 2013. p. 399–405. Available from: <http://dx.doi.org/10.1563/aaid-joi-d-11-00229>
12. Saunders RD. Reinforcement of Devital Teeth with Posts: A Thesis Submitted in Partial Fulfillment ... Prosthodontics .. 1987. 116 p.
13. Patel B. Infection Control in the Endodontic Office [Internet]. *Endodontic Diagnosis, Pathology, and Treatment Planning*. 2015. p. 87–101. Available from: http://dx.doi.org/10.1007/978-3-319-15591-3_7
14. Duraisamy R, Krishnan CS, Ramasubramanian H, Sampathkumar J, Mariappan S, Navarasampatti Sivaprakasam A. Compatibility of Nonoriginal Abutments With Implants: Evaluation of Microgap at the Implant-Abutment Interface, With Original and Nonoriginal Abutments. *Implant Dent*. 2019 Jun;28(3):289–95.
15. Anbu RT, Suresh V, Gounder R, Kannan A. Comparison of the Efficacy of Three Different Bone Regeneration Materials: An Animal Study. *Eur J Dent*. 2019 Feb;13(1):22–8.
16. Sekar D, Mani P, Biruntha M, Sivagurunathan P, Karthigeyan M. Dissecting the functional role of microRNA 21 in osteosarcoma. *Cancer Gene Ther*. 2019 Jul;26(7-8):179–82.
17. Sekar D. Circular RNA: a new biomarker for different types of hypertension. *Hypertens Res*. 2019 Nov;42(11):1824–5.
18. Bai L, Li J, Panagal M, M B, Sekar D. Methylation dependent microRNA 1285-5p and sterol carrier proteins 2 in type 2 diabetes mellitus. *Artif Cells Nanomed Biotechnol*. 2019 Dec;47(1):3417–22.
19. Sivasamy R, Venugopal P, Mosquera E. Synthesis of Gd₂O₃/CdO composite by sol-gel method: Structural, morphological, optical, electrochemical and magnetic studies. *Vacuum*. 2020 May 1;175:109255.
20. Sekar D, Nallaswamy D, Lakshmanan G. Decoding the functional role of long noncoding RNAs (lncRNAs) in hypertension progression. *Hypertens Res*. 2020 Jul;43(7):724–5.

21. Preethi KA, Lakshmanan G, Sekar D. Antagomir technology in the treatment of different types of cancer. *Epigenomics*. 2021 Apr;13(7):481–4.
22. Preethi KA, Sekar D. Dietary microRNAs: Current status and perspective in food science. *J Food Biochem*. 2021 Jul;45(7):e13827.
23. Bakshi HA, Mishra V, Satija S, Mehta M, Hakkim FL, Kesharwani P, et al. Dynamics of Prolyl Hydroxylases Levels During Disease Progression in Experimental Colitis. *Inflammation*. 2019 Dec;42(6):2032–6.
24. Ezhilarasan D. Dapsone-induced hepatic complications: it's time to think beyond methemoglobinemia. *Drug Chem Toxicol*. 2021 May;44(3):330–3.
25. Thakur RS, Devaraj E. Lagerstroemia speciosa(L.) Pers. triggers oxidative stress mediated apoptosis via intrinsic mitochondrial pathway inHepG2cells [Internet]. Vol. 35, *Environmental Toxicology*. 2020. p. 1225–33. Available from: <http://dx.doi.org/10.1002/tox.22987>
26. Ezhilarasan D, Shebi S, Thomas J, Chandrasekaran N, Mukherjee A. Gracilaria foliifera (Forssk.) Børgesen ethanolic extract triggers apoptosis via activation of p53 expression in HepG2 cells [Internet]. Vol. 15, *Pharmacognosy Magazine*. 2019. p. 259. Available from: http://dx.doi.org/10.4103/pm.pm_379_18
27. P. K, M. P, Samuel Rajendran R, Annadurai G, Rajeshkumar S. Characterization and toxicology evaluation of zirconium oxide nanoparticles on the embryonic development of zebrafish, Danio rerio [Internet]. Vol. 42, *Drug and Chemical Toxicology*. 2019. p. 104–11. Available from: <http://dx.doi.org/10.1080/01480545.2018.1523186>
28. Balusamy SR, Perumalsamy H, Veerappan K, Huq MA, Rajeshkumar S, Lakshmi T, et al. Citral Induced Apoptosis through Modulation of Key Genes Involved in Fatty Acid Biosynthesis in Human Prostate Cancer Cells: In Silico and In Vitro Study. *Biomed Res Int*. 2020 Mar 18;2020:6040727.
29. Arvind P TR, Jain RK. Skeletally anchored forsus fatigue resistant device for correction of Class II malocclusions-A systematic review and meta-analysis. *Orthod Craniofac Res*. 2021 Feb;24(1):52–61.
30. Venugopal A, Vaid N, Bowman SJ. Outstanding, yet redundant? After all, you may be another Choluteca Bridge! *Semin Orthod*. 2021 Mar 1;27(1):53–6.
31. Ramadurai N, Gurunathan D, Samuel AV, Subramanian E, Rodrigues SJL. Effectiveness of 2% Articaine as an anesthetic agent in children: randomized controlled trial. *Clin Oral Investig*. 2019 Sep;23(9):3543–50.
32. Varghese SS, Ramesh A, Veeraiyan DN. Blended Module-Based Teaching in Biostatistics and Research Methodology: A Retrospective Study with Postgraduate Dental Students. *J Dent Educ*. 2019 Apr;83(4):445–50.
33. Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial [Internet]. Vol. 24, *Clinical Oral Investigations*. 2020. p. 3275–80. Available from: <http://dx.doi.org/10.1007/s00784-020-03204-9>
34. Walimbe H, Kontham U, Bijle MNA, Wani V, Nankar M, Muchandi S. Knowledge, Attitude and Practice of Devitalizing Agents: A Survey of General Dental Practitioners. *J Int Oral Health*. 2015 Aug;7(8):86–8.