Knowledge, Attitude and Practice of Dental Students Towards Indirect Dental Restoration

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ABSTRACT:

Introduction: Indirect restorations are those that cannot be fabricated inside the mouth and instead must be fabricated outside of the mouth before being placed on the affected tooth**. Aim:** Aim of the present study is to evaluate the knowledge, attitude and practice of dental students towards indirect dental restoration. **Materials and methods:** A descriptive cross-sectional survey was conducted among 101 dental students to assess their knowledge and attitude toward indirect dental restoration. Self-administered questionnaire of close ended questions was prepared and it was distributed among dental students through the online survey google forms. The responses were collected,tabulated in excel sheet and analysed using SPSS software. Chi square test was used to compare year of study and knowledge on indirect restoration with statistical significance of $p<0.05$. **Result:** 69.31% of the dental students were aware about the indirect dental restoration 30.69% were not aware with the chi square P value of 0.001. 69.31% were aware of the procedures done in indirect dental restorations and the remaining 30.69% were not aware with the chi square P value of 0.001. 16.83% of the dental students prefer direct restoration, 17.82% prefer indirect restoration and 65.35% choose both types based on the case with the chi square P value of 0.001.

Conclusion: Within the limitations of this study majority of the dental students are knowledgeable and aware about the indirect dental restorations.

Keywords: Awareness,alloys,dental students, Eco friendly, Knowledge, indirect restoration.

INTRODUCTION:

Dental restorations, also known as dental fillings or simply fillings, are procedures that are used to restore the function, integrity, and morphology of missing tooth structure caused by caries or external trauma, as well as to substitute that structure with dental implants. Different restoration methods are designed to repair different levels of damage. They are direct and indirect dental restorations. Direct restorations are those that can be entirely fabricated and completed inside the

mouth and do not require the use of a dental laboratory. Indirect restorations are those that cannot be fabricated inside the mouth and instead must be fabricated outside of the mouth before being placed on the affected tooth. Some examples include crowns, bridges, dental implants, inlays, onlays, and veneers.

Intracoronal restorations involve the inlay, which Mc-Ghee defines as a restoration that is made in the mouth from gold, porcelain, or another material and then cemented into a tooth's prepared cavity (Sajjanhar and Mishra, 2019).

Onlay is a partly intracoronal and extracoronal restoration which by definition caps all of the cusps of a posterior tooth and can be designed to help strengthen a tooth that has been weakened by caries or previous restorative experiences.(Sajjanhar and Mishra, 2019). Veneers were still the preferred choice for the restoration of anterior teeth, which is in accordance with the UK study(Brunton *et al.*, 2019).

The previous studies had focussed on why change in use of indirect resto- rations is occurring, an analysis of the apparent legitimacy of the changes and their predictions for the future (Christensen, 2012). Many direct versus indirect restorations are done in the previous studies showing that indirect restoration over the direct is the best and preferable restoration (Opdam, Frankenberger and Magne, 2016)

In the study by Azeem RA et al,. (Azeem and Sureshbabu, 2018) clinical performance of direct versus indirect composite restoration in posterior teeth had been done. In the study conducted by Scheibenbogen-Fuchsbrunner A et al., (Scheibenbogen-Fuchsbrunner *et al.*, 1999) the prospective, long-term clinical trial assessed direct and indirect composite restorations for clinical acceptability as posterior restoratives in single and multi surface carious teeth, which included a 2-year survey. Our team has extensive knowledge and research experience that has translate into high quality publications(Narendran *et al.*, 2020; Reddy *et al.*, 2020; Teja and Ramesh, 2020; Bhavikatti *et al.*, 2021; Chakraborty *et al.*, 2021; Karobari *et al.*, 2021; Muthukrishnan, 2021a, 2021b; PradeepKumar *et al.*, 2021; Sawant *et al.*, 2021),(Romera *et al.*, 2018; Ezhilarasan, 2020; Raj R, D and S, 2020; Rohit Singh and Ezhilarasan, 2020),(Priyadharsini *et al.*, 2018; Vijayashree Priyadharsini, 2019; Gudipaneni *et al.*, 2020; Uma Maheswari, Nivedhitha and Ramani, 2020; Chaturvedula *et al.*, 2021),(Kanniah *et al.*, 2020). (Devi and Gnanavel, 2014; Needhidasan, Samuel and Chidambaram, 2014; Gupta, Ariga and Deogade, 2018; Saravanan *et al.*, 2018; Krishnaswamy *et al.*, 2020)

In the present study the aim is to evaluate the knowledge, attitude and practice of dental students towards indirect dental restoration.

MATERIALS AND METHOD:

Study Design: A cross sectional study was conducted through an online survey from among 101 dental students.

Study Subjects: A simple random sampling was used to select the participants .

Ethical Considerations: Returning the filled questionnaire was considered as implicit consent with no need for signing a written consent. Ethical approval for the study was obtained from the Institutional Review Board(IRB).

Study Method: Self Administered questionnaire of 15 closed ended questions was prepared and it was distributed among dental students through online survey forms "GOOGLE FORMS". The collected data were checked regularly for clarity,competence, consistency, accuracy and validity. Demographic details were also included in the questionnaire.

Statistical Analysis: Data was analysed with SPSS version (23.0). Descriptive analysis as number and percent were calculated to summarise qualitative data. Chi Square test was used to compare years of study and the knowledge towards indirect dental restoration. The confidence level was 95% and of statistical significance $p<0.05$. Finally, the result was presented by using bar charts and frequency tables.

RESULT AND DISCUSSION:

The results were collected and the data were analysed. A total of 101 students completed the survey questionnaire. Among 101 participants, 45 were male and 56 were females. 69.31% of the dental students were aware about the indirect dental restoration 30.69% were not aware(Figure 1). 69.31% were aware of the procedures done in indirect dental restorations and the remaining 30.69% were not aware. 16.83% of the dental students prefer direct restoration, 17.82% prefer indirect restoration and 65.35% choose both types based on the case(Figure 2). 69.31% know that indirect restoration cannot be fabricated inside the mouth whereas the remaining 30.69% do not know. 79.21% are aware of the onlay and inlay used in the indirect dental restoration, 20.79% are not aware of it. 69.31% think inlay can work for a longer area including the cusps, whereas the 30.69% think onlay. 89.11% responses are both composite and porcelain for the material used for inlay(Figure 3). When asked whether the inlays are better than fillings 59.41% responded yes , 40.59% responded no. 65.35% responded that onlays are better than crowns. 90.10% thought that the indirect restoration provided aesthetic benefit also whereas the remaining 9.90% thought that it doesn't provide any aesthetic benefit(Figure 4). 59.41% of the students had done an indirect restoration. 44.55% of the patients of the dental students had felt pain during indirect dental restoration.

From the graph the majority of the dental students(66 participants) prefer both direct and indirect restoration based on the case. However the difference is statistically significant (Chi-square value-19.323, p value-0.013 (<0.05) hence significant) (Figure 5). Majority of the interns(15 participants) respond that inlays are better than fillings than the other year students. However the difference is statistically insignificant (Chi-square value-3.127, p value-0.537 (>0.05) hence insignificant) (Figure 6). Majority of the students from both 1st and 2nd year(15 participants each) say that onlay is better than a crown. However the difference is statistically insignificant (Chi-square value-3.248 , p value-0.517 (>0.05) hence insignificant) (Figure 7).

Spots and leaks at the boundaries of indirect cosmetic restorations are popular in clinical practice, and choosing a particular restorative material should be done with caution. The choice of a material with sufficient biological and mechanical properties, as well as the desired aesthetic considerations, determines the success of a restoration(Cornacchia *et al.*, 2010). Many alternative indirect placement restorations seem to have less marginal leakage in the early years after placement, regardless of content (porcelain or composite) (Manhart *et al.*, 2000). According to a study conducted by Lasfargues et al, the failures are not due to the content, but rather to the implementation and observance of operating stages (Dhoum, 2018). The ability to consistently provide strong bond strengths to both enamel and dentin, as well as the excellent physical properties of these restorations, have cemented their place in restorative dentistry.(Dietschi *et al.*, 1995)

The present study only included 100 dental students and it is not done on a varied population. Less sample size is the major limitation of the study. In future an extensive study with a large sample size and varied population would analyze the knowledge, attitude and perception of dental students towards indirect dental restoration.

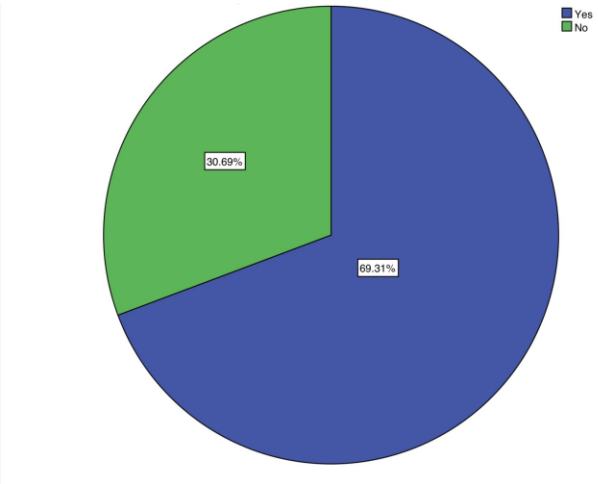

Figure 1: Pie Chart showing responses of the question, “Are you aware of the term indirect dental restoration?” 69.31% of the participants were aware (blue), 30.69% were not aware (green).

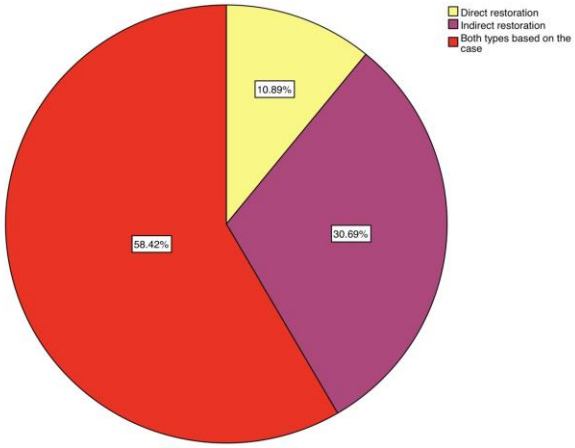

Figure 2: Pie Chart showing responses of the question, "What type of restoration do you prefer to your patients?" 10.89% of the dental students preferred direct restoration (yellow) , 30.69% preferred indirect restoration (magenta) and 58.42% preferred both types based on the type of case (red).

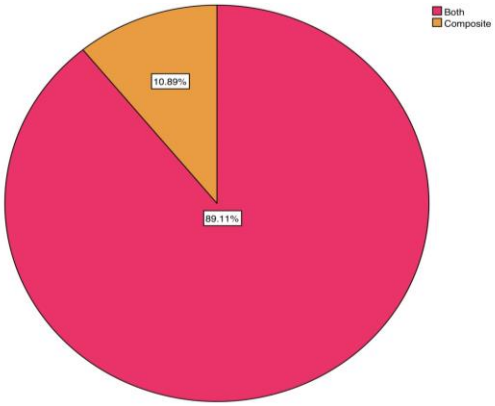

Figure 3: Pie Chart showing responses of the question, "The material used for inlay is?" 89.11% of the dental students responded both porcelain and composite (pink) and 10.89% responded as composite (orange).

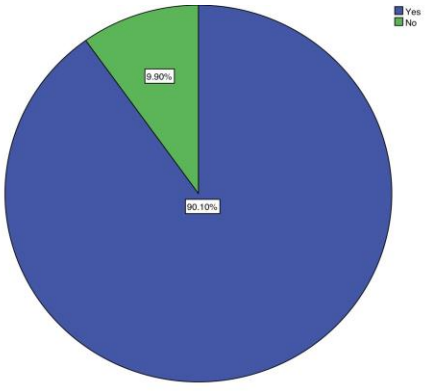

Figure 4: Pie Chart showing responses of the question, "Does indirect restoration provide aesthetic benefit also?" 90.10% of the dental students responded yes (blue) and 9.90% responded no (green).

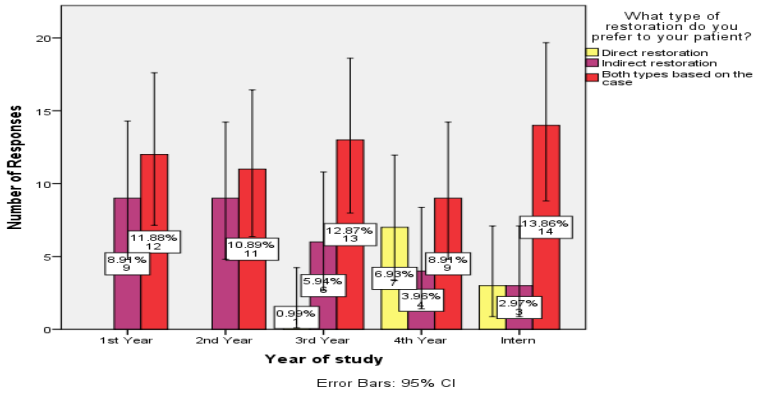

Figure 5: Bar graph showing the association between year of study and the type of restoration preferred by the students to their patients. X-axis represents the year of study and Y-axis represents the number of participants of which red colour indicates both types of restoration based on the case, purple colour indicates indirect restoration and yellow colour indicates direct restoration. Out of 101 participants, 11.88% from 1st year, 10.89% from 2nd year, 12.87% from 3rd year, 8.91% from 4th year and 13.86% from intern responded both direct and indirect restorations.However the difference is statistically significant (Chi-square value-19.323, p value-0.013 (<0.05) hence significant). Majority of the interns(14 participants) responded to both direct and indirect restoration.

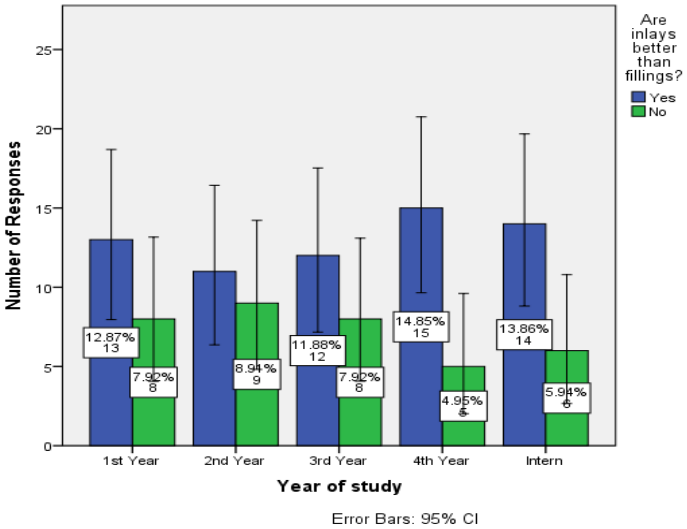

Figure 6: Bar graph showing the association between year of study and response to the question if inlays are better than fillings . X-axis represents the year of study and Y-axis represents the number of participants of which green colour indicates no and blue colour indicates yes. 12.87% from 1st year, 10.7% from 2nd year, 11.88% from 3rd year, 14.85% from 4rth year and 13.86% from intern responded yes. However the difference is statistically not significant (Chi-square value-3.127, p

value-0.690 (>0.05) hence not significant).Majority of the 4th year(15 participants) respond that inlays are better than fillings than the other year students.

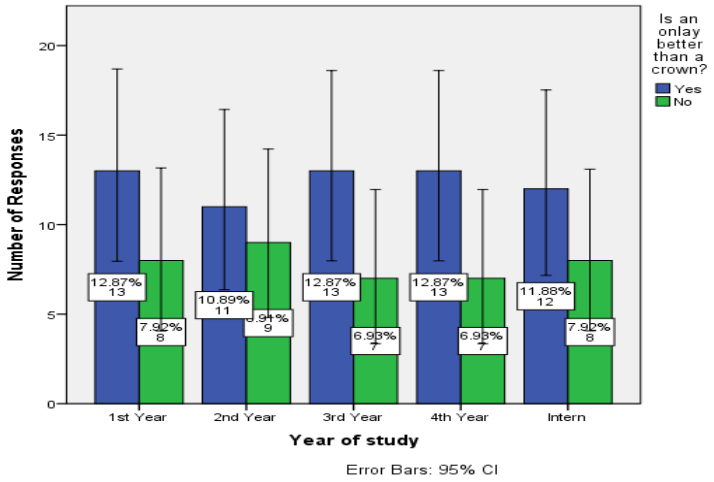

Figure 7: Bar graph showing the association between year of study and response to the question if onlay is better than crown. X-axis represents the year of study and Y-axis represents the number of participants of which green colour indicates no and blue colour indicates yes. 12.87% from 1st year, 10.89% from 2nd year, 12.87% from 3rd year, 12.87% from 4rth year and 11.88% from intern responded yes. However the difference is statistically not significant (Chi-square value-3.248 , p value-0.965(>0.05) hence not significant). Majority of the students from 1st, 3rd and 4rth year(13 participants each) say that onlay is better than a crown.

CONCLUSION: Within the limits of the study, it is evident that most of the dental students have good knowledge about indirect dental restorations.

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REFERENCES:

1. Azeem, R. A. and Sureshbabu, N. M. (2018) 'Clinical performance of direct versus indirect composite restorations in posterior teeth: A systematic review', *Journal of conservative dentistry: JCD*, 21(1), pp. 2–9.
2. Bhavikatti, S. K. *et al.* (2021) 'Investigating the Antioxidant and Cytocompatibility of Mimusops elengi Linn Extract over Human Gingival Fibroblast Cells', *International*

journal of environmental research and public health, 18(13). doi: 10.3390/ijerph18137162.

3. Brunton, P. A. *et al.* (2019) 'Indirect Restorations and Fixed Prosthodontics: Materials and Techniques Used by General Dentists of New Zealand', *International journal of dentistry*, 2019. doi: 10.1155/2019/5210162.
4. Chakraborty, T. *et al.* (2021) 'A Review of Prolonged Post-COVID-19 Symptoms and Their Implications on Dental Management', *International journal of environmental research and public health*, 18(10). doi: 10.3390/ijerph18105131.
5. Chaturvedula, B. B. *et al.* (2021) 'Dens invaginatus: a review and orthodontic implications', *British dental journal*, 230(6), pp. 345–350.
6. Christensen, G. J. (2012) 'Indirect restoration use: a changing paradigm', *Journal of the American Dental Association* , 143(4), pp. 398–400.
7. Cornacchia, T. P. M. *et al.* (2010) '3D finite element analysis on esthetic indirect dental restorations under thermal and mechanical loading', *Medical & biological engineering & computing*, 48(11), pp. 1107–1113.
8. Devi, V. S. and Gnanavel, B. K. (2014) 'Properties of Concrete Manufactured Using Steel Slag', *Procedia Engineering*, 97, pp. 95–104.
9. Dhoum, S. (2018) 'Indirect Posterior Restoration: Composite Inlays', *Biomedical Journal of Scientific & Technical Research*. doi: 10.26717/bjstr.2018.05.0001147.
10. Dietschi, D. *et al.* (1995) 'Marginal adaptation and seal of direct and indirect Class II composite resin restorations: an in vitro evaluation', *Quintessence international* , 26(2), pp. 127–138.
11. Ezhilarasan, D. (2020) 'MicroRNA interplay between hepatic stellate cell quiescence and activation', *European journal of pharmacology*, 885, p. 173507.
12. Gudipaneni, R. K. *et al.* (2020) 'Measurement of the Maximum Occlusal Bite Force and its Relation to the Caries Spectrum of First Permanent Molars in Early Permanent Dentition', *The Journal of clinical pediatric dentistry*, 44(6), pp. 423–428.
13. Gupta, P., Ariga, P. and Deogade, S. C. (2018) 'Effect of Monopoly-coating Agent on the Surface Roughness of a Tissue Conditioner Subjected to Cleansing and Disinfection: A Contact Profilometric In vitro Study', *Contemporary clinical dentistry*, 9(Suppl 1), pp. S122–S126.
14. Kanniah, P. *et al.* (2020) 'Green synthesis of multifaceted silver nanoparticles using the flower extract of Aerva lanata and evaluation of its biological and environmental applications', *ChemistrySelect*, 5(7), pp. 2322–2331.
15. Karobari, M. I. *et al.* (2021) 'An In Vitro Stereomicroscopic Evaluation of Bioactivity between Neo MTA Plus, Pro Root MTA, BIODENTINE & Glass Ionomer Cement Using Dye Penetration Method', *Materials*, 14(12). doi: 10.3390/ma14123159.
16. Krishnaswamy, H. *et al.* (2020) 'Investigation of air conditioning temperature variation by modifying the structure of passenger car using computational fluid dynamics', *Thermal*

Science, pp. 495–498. doi: 10.2298/tsci190409397k.

17. Manhart, J. *et al.* (2000) 'Three-year clinical evaluation of direct and indirect composite restorations in posterior teeth', *The Journal of prosthetic dentistry*, 84(3), pp. 289–296.
18. Muthukrishnan, L. (2021a) 'Imminent antimicrobial bioink deploying cellulose, alginate, EPS and synthetic polymers for 3D bioprinting of tissue constructs', *Carbohydrate polymers*, 260, p. 117774.
19. Muthukrishnan, L. (2021b) 'Nanotechnology for cleaner leather production: a review', *Environmental chemistry letters*, 19(3), pp. 2527–2549.
20. Narendran, K. *et al.* (2020) 'Synthesis, characterization, free radical scavenging and cytotoxic activities of phenylvilangin, a substituted dimer of embelin', *Indian Journal of Pharmaceutical Sciences*, 82(5). doi: 10.36468/pharmaceutical-sciences.720.
21. Needhidasan, S., Samuel, M. and Chidambaram, R. (2014) 'Electronic waste - an emerging threat to the environment of urban India', *Journal of environmental health science & engineering*, 12(1), p. 36.
22. Opdam, N. J. M., Frankenberger, R. and Magne, P. (2016) 'From 'Direct Versus Indirect' Toward an Integrated Restorative Concept in the Posterior Dentition', *Operative dentistry*, 41(S7), pp. S27–S34.
23. PradeepKumar, A. R. *et al.* (2021) 'Diagnosis of Vertical Root Fractures by Cone-beam Computed Tomography in Root-filled Teeth with Confirmation by Direct Visualization: A Systematic Review and Meta-Analysis', *Journal of endodontia*, 47(8), pp. 1198–1214.
24. Priyadharsini, J. V. *et al.* (2018) 'In silico analysis of virulence genes in an emerging dental pathogen A. baumannii and related species', *Archives of Oral Biology*, pp. 93–98. doi: 10.1016/j.archoralbio.2018.07.001.
25. Raj R, K., D, E. and S, R. (2020) 'β-Sitosterol-assisted silver nanoparticles activates Nrf2 and triggers mitochondrial apoptosis via oxidative stress in human hepatocellular cancer cell line', *Journal of biomedical materials research. Part A*, 108(9), pp. 1899–1908.
26. Reddy, P. *et al.* (2020) 'Dental Caries Profile and Associated Risk Factors Among Adolescent School Children in an Urban South-Indian City', *Oral health & preventive dentistry*, 18(1), pp. 379–386.
27. Rohit Singh, T. and Ezhilarasan, D. (2020) 'Ethanolic Extract of Lagerstroemia Speciosa (L.) Pers., Induces Apoptosis and Cell Cycle Arrest in HepG2 Cells', *Nutrition and cancer*, 72(1), pp. 146–156.
28. Romera, A. *et al.* (2018) 'Bevacizumab biosimilar BEVZ92 versus reference bevacizumab in combination with FOLFOX or FOLFIRI as first-line treatment for metastatic colorectal cancer: a multicentre, open-label, randomised controlled trial', *The lancet. Gastroenterology & hepatology*, 3(12), pp. 845–855.
29. Sajjanhar, I. and Mishra, P. (2019) 'Direct versus indirect restoration: A review', *IP Indian Journal of Conservative and Endodontics*, 4(3), pp. 75–78.
30. Saravanan, M. *et al.* (2018) 'Synthesis of silver nanoparticles from Phenerochaete

chrysosporium (MTCC-787) and their antibacterial activity against human pathogenic bacteria', *Microbial pathogenesis*, 117, pp. 68–72.

31. Sawant, K. *et al.* (2021) 'Dentinal Microcracks after Root Canal Instrumentation Using Instruments Manufactured with Different NiTi Alloys and the SAF System: A Systematic Review', *NATO Advanced Science Institutes series E: Applied sciences*, 11(11), p. 4984.
32. Scheibenbogen-Fuchsbrunner, A. *et al.* (1999) 'Two-year clinical evaluation of direct and indirect composite restorations in posterior teeth', *The Journal of prosthetic dentistry*, 82(4), pp. 391–397.
33. Teja, K. V. and Ramesh, S. (2020) 'Is a filled lateral canal - A sign of superiority?', *Journal of dental sciences*, 15(4), pp. 562–563.
34. Uma Maheswari, T. N., Nivedhitha, M. S. and Ramani, P. (2020) 'Expression profile of salivary micro RNA-21 and 31 in oral potentially malignant disorders', *Brazilian oral research*, 34, p. e002.
35. Vijayashree Priyadharsini, J. (2019) 'In silico validation of the non-antibiotic drugs acetaminophen and ibuprofen as antibacterial agents against red complex pathogens', *Journal of periodontology*, 90(12), pp. 1441–1448.