Nat. Volatiles & Essent. Oils, 2021; 8(5): 8644-8656

Knowledge, Perception & Attitude Regarding Tooth Carving Among Dental Students

[1]M. Rishikesan, [2]Dr. Reshma Poothakulath Krishnan, [3]Dr. Sandhya Sundar

[1]Saveetha Dental college and hospital, Saveetha Institute of Medical and Technical Science (SIMATS) Saveetha University, Chennai-600077, Mail id: 152001066.sdc@saveetha.com
[2]Senior lecturer, Department of oral pathology, Saveetha Dental college and hospital, Saveetha Institute of Medical and Technical Science (SIMATS), Saveetha University, Chennai-600077
Mail id: reshmapk.sdc@saveetha.com
[3]Senior lecturer, Department of oral pathology, Saveetha Dental college and hospital , Saveetha Institute of Medical and Technical Science (SIMATS), Saveetha University, Chennai- 600077
Mail id: sandhyas.sdc@saveetha.com

Abstract

Background: Teaching dental anatomy includes observation and analysis of natural teeth and carving wax models to accurately reproduce the morphology of teeth. Tooth carving through wax blocks is a required preclinical exercise for undergraduate and postgraduate understudies to perform as indicated by the dental educational plan in India. Knowing tooth morphology is important in various fields of dentistry. **Aim:** To assess the knowledge, perception and attitude of dental students towards the tooth carving sessions. **Materials and Method:** A total of 98 subjects were contacted of which 80 responded. The knowledge of tooth carving in clinical practice was evaluated through 10 multiple choice questionnaires. Questions ranged from the queries of clinicians interested in tooth carving and their recommendations regarding tooth carving. The collected data is transferred to excel sheet and results were obtained through SPSS software version 23. The statistical tests were applied including proportions and chi-square tests for significance. **Result:** A total of 80 dental students were included in this survey. Among them, 78.4% of respondent students believe that the tooth carving exercise can be continued in the undergraduate dental curriculum.62.50% of participants believed carving has influenced better knowledge of tooth anatomy. 77.50% of them felt that carving of roots was a difficult part. 46.25% of them participants felt tooth carving helpful in restorative dentistry and 53.75% thoughts it was not necessary. 65% of them respondents agreed carving improved their clinical skills.
Conclusion: The results indicated that most of the dental students valued what they learned through tooth carving and their use of knowledge in their practice.

Keywords: Tooth morphology, dental education, tooth carving.

Introduction:-

Dental anatomy is a basic subject of dental education, one of the foundation courses in the preclinical dental curriculum. Basis of tooth anatomy and morphology of each individual tooth and the relationship between teeth within the arch and between arches of both primary and permanent dentition(1). Knowledge of dental anatomy or tooth morphology is essential for the practice of any branch of dentistry. Undergraduate dental health students must ought to gain proper theoretical knowledge, and cognitive and psychomotor skills for forming and analysing the shape, function, and aesthetics of each human tooth(2).

Thinking about the majority of the universities in India with postgraduate teaching, the faculty is additionally associated with research work which likewise requires quality opportunity and time to be committed(3). Several teaching strategies have been used to improve preclinical dental undergraduate students' psychomotor skills using the dental anatomy module. However, the most widespread technique for teaching teeth anatomy and morphology which is used by many dental faculties worldwide is the use of wax blocks in dental carving(4).The goal of the preclinical dental curriculum is to provide students with well rounded and balanced preclinical exposure to give them the basic knowledge and skill(5).

Tooth carving through wax blocks is a required preclinical exercise for undergraduate and postgraduate understudies to perform as indicated by the dental educational plan in India(6). Tooth carving is important in dentistry because without it, a dentist's job would not be possible. It is a study that enables the dentist to gain knowledge about a tooth's form(7). Knowing tooth morphology is important in various fields of dentistry. In most dental schools, students carve various materials to reproduce a given reference model of teeth in various sizes(8). Students must know the common traits of each tooth, the difference between the maxillary and mandibular teeth(9). It requires huge preparation time and manpower to show the first year college undergraduate students as they enter new into the course with no past information on dentistry at the school level.

The student's perception of their education is a valuable source of information for curriculum planners and tooth carving exercise should include the recommendation of dental students, educators and dental clinicians(10). Thus the study aim is to assess the knowledge, perception and attitude of tooth carving among the dental students. Our team has extensive knowledge and research experience that has translated into high quality publications (11-30).

Methods and Materials:-

A cross sectional study was conducted in a private Dental college among the dental students within the 17-19 years age group . A questionnaire was prepared with 10 questions which were to assess the students' knowledge and their awareness on tooth carving. This questionnaire was formulated in Google Forms and was circulated through social media to the participants. The participation of the subjects was kept voluntary and nobody was not obligated to fill the form. The questionnaire was validated and later distributed to the participants. Questions were answered with "yes" or "no" or by marking the correct responses. The collected data is transferred to excel sheet and results were obtained through SPSS software version 23. The statistical tests were applied including proportions and chi-square tests for significance. p-value <0.05 was considered as significant.

Results:

A total of 80 dental students were included in this survey. 41.3% of female and 59.7% of male participants were 18 years old, all of them are first year undergraduate students in private dental colleges. 78.8% of them like tooth carving and 37.5% do not have the knowledge of tooth anatomy. 51.2% said that tooth carving should not be taught in first years. 62.50% of participants believed carving has influenced better knowledge of tooth anatomy. 77.50% of them felt that carving of roots was a difficult part . 46.25%

of them participants felt tooth carving helpful in restorative dentistry and 53.75% thoughts it was not necessary. 65% of them respondents agreed carving improved their clinical skills.

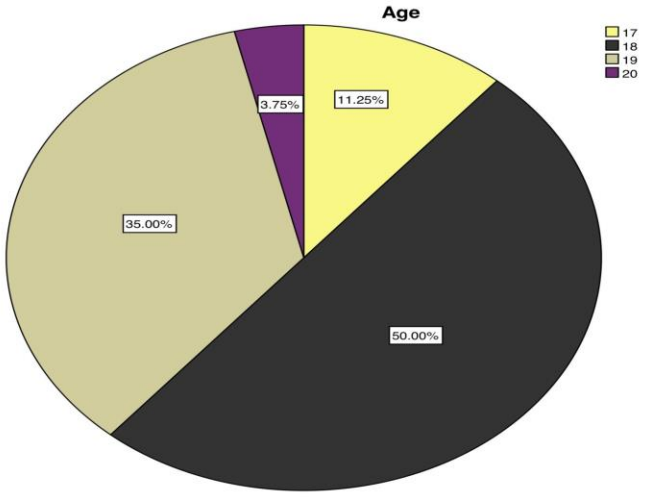

Figure 1 represents the age distribution of participants in this survey. Yellow colour represents age 17, Black colour represents age 18, sandal colour represents age 19 and Purple colour represents age 20. 11.25% were age 17 participants, 50% were age 18 participants, 35% were age 19 participants and 3.75% were age 20 participants. Majority of the participants are 18 year olds.

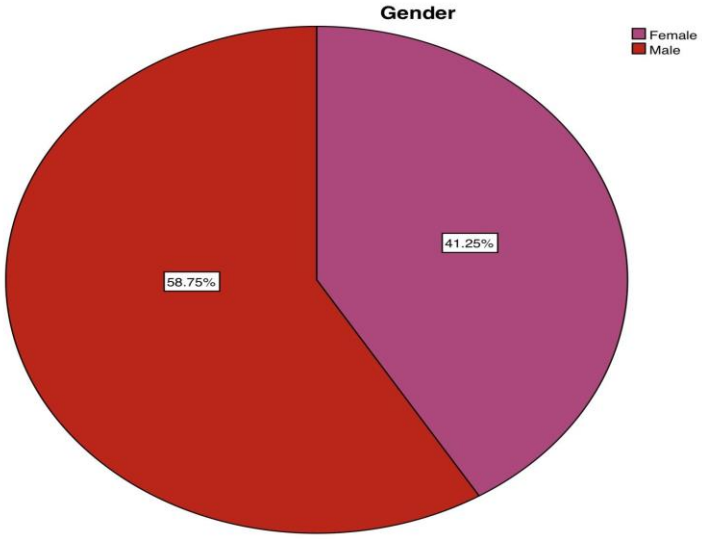

Figure 2: The pie chart represents the percentage of gender. Red colours represent Male, Pink colour represents female. 58.75% were male participants, 41.75% were female participants. Majority of the participants are males

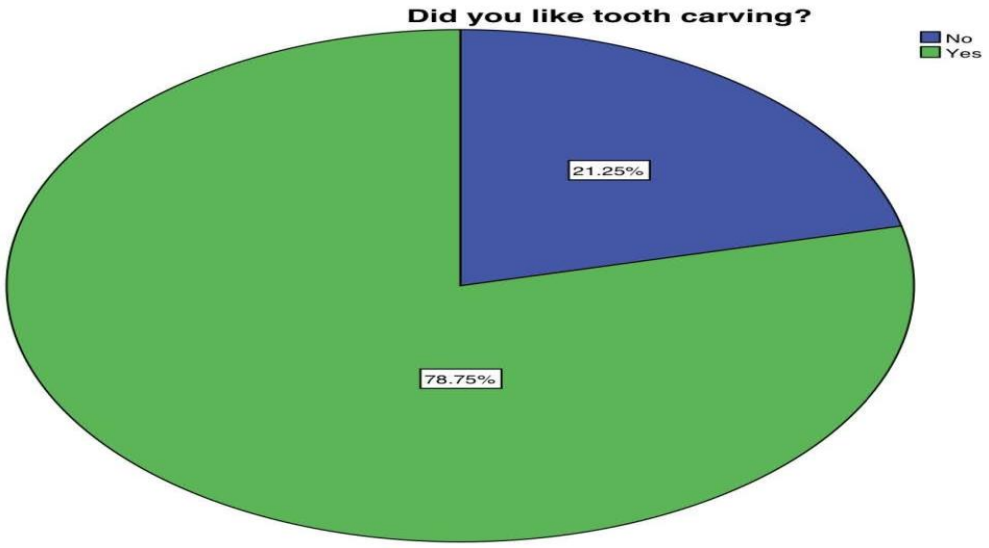

Figure 3: The pie chart represents the percentage of tooth carving like. green colour denotes yes and blue colour denotes no. 78.75% of the participants liked the tooth carving and 21.25% of the participants disliked the tooth carving.

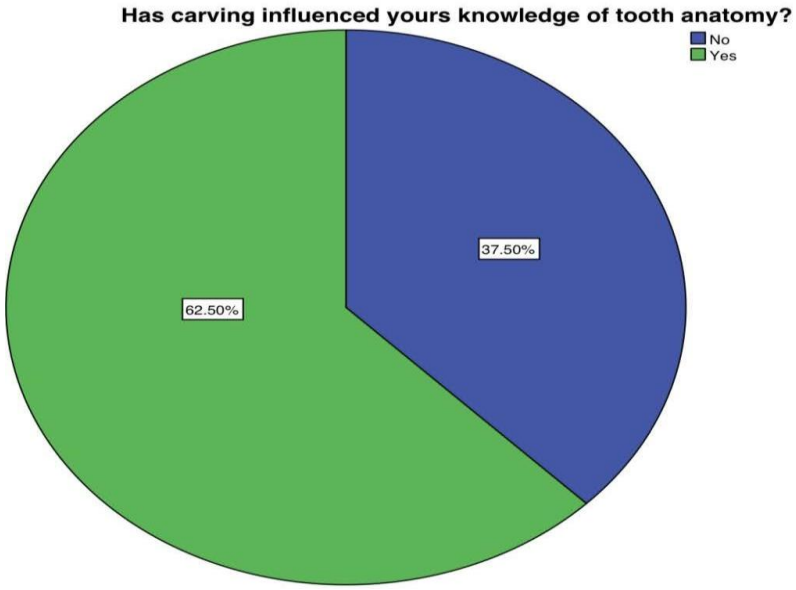

Figure 4: The pie chart represents the percentage of carving that has influenced your knowledge of tooth carving. Green colour denotes yes, Blue colour denotes no. 62.50% of the participants agreed that carving has influenced your knowledge of tooth carving and 37.50% of the participants disagreed.

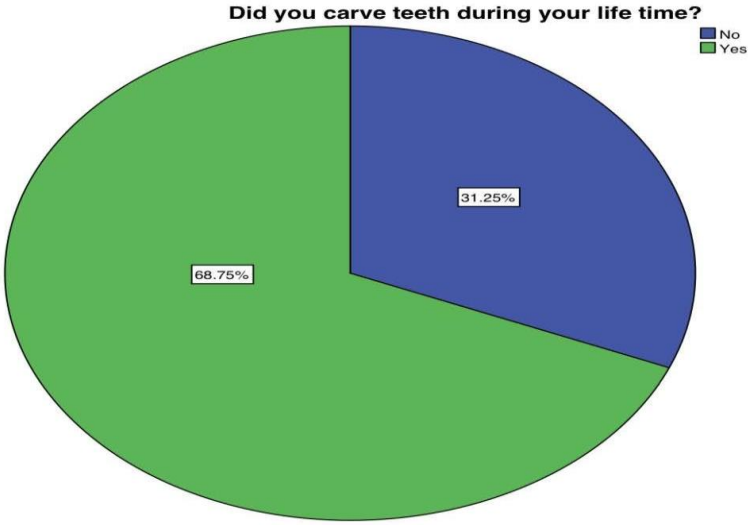

Figure 5: The pie chart represents the percentage of carve teeth during your lifetime. Green colour denotes yes and Blue colour denotes no. 65% of the participants agreed that carving has influenced your knowledge of tooth carving and 35% of the participants disagreed.

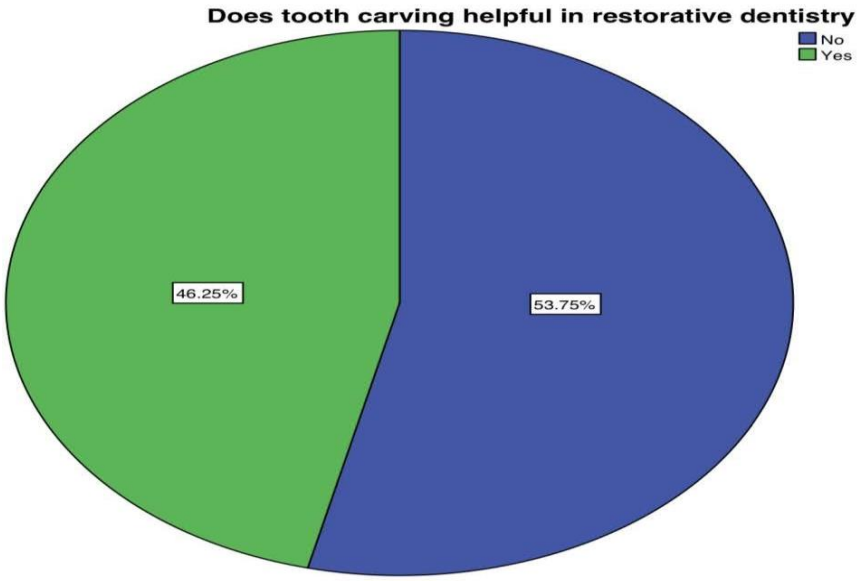

Figure 6: The pie chart represents the percentage of tooth carving helpful in restorative dentistry. green colour denotes yes and blue colour denotes no. 46.25% of the participants agreed that carving is helpful in restorative dentistry and 53.75% of the participants disagreed.

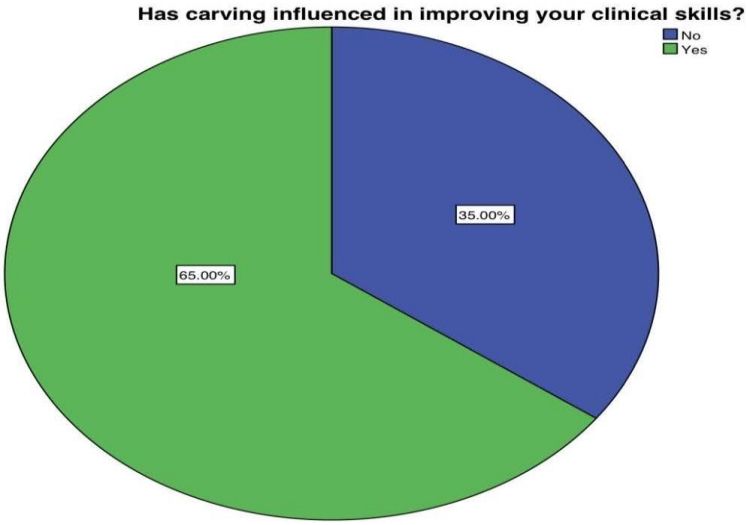

Figure 7: The pie chart represents the percentage of carving influenced in improving your clinical. green colour denotes yes and blue colour denotes no. 65% of the participants agreed that the tooth carving influenced their clinical skills and 35% of them disagreed that the influence of tooth carving in improving the clinical skills.

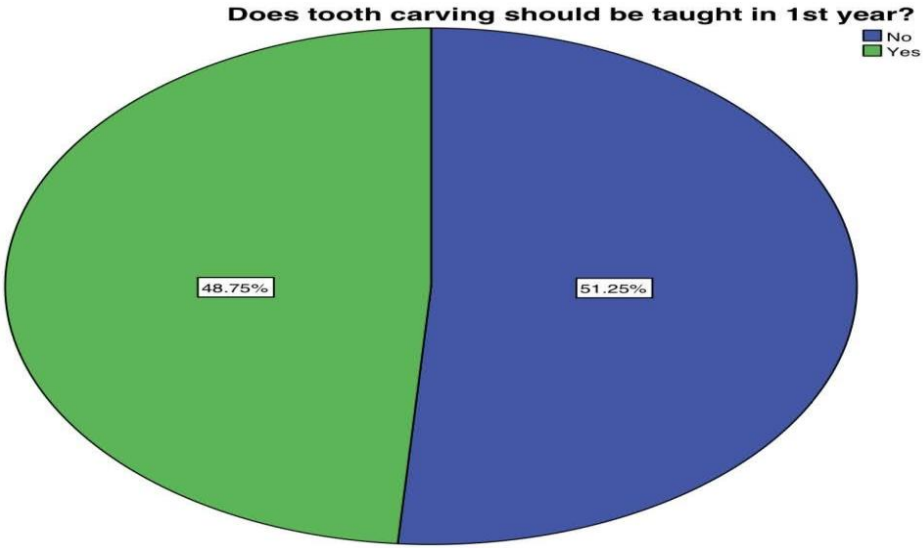

Figure 8: The pie chart represents the percentage of tooth carving that should be taught in 1st year. green colour denotes yes and blue colour denotes no. 48.75% of the participants agreed that carving should be taught in 1st year of dental course and 51.25% of the participants disagreed.

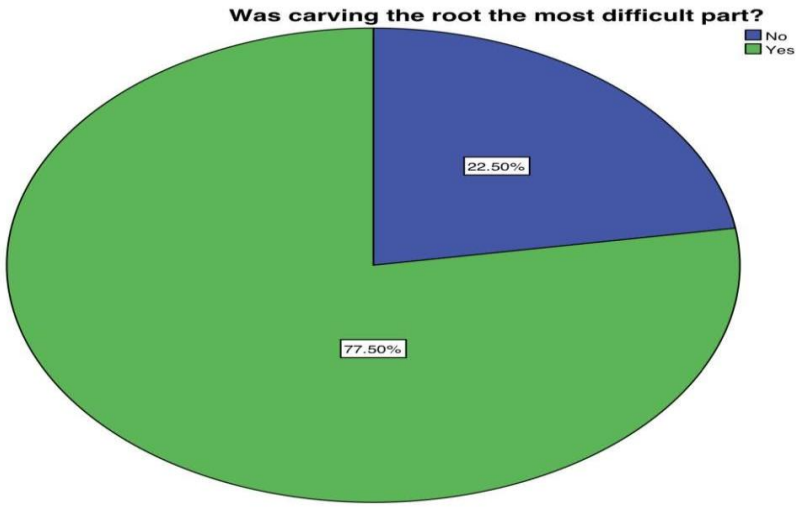

Figure 9: The pie chart represents the percentage of carving the tooth is the most difficult part. green colour denotes yes and blue colour denotes no. 77.5% of the participants agreed that carving the root is the most difficult part and 22.50% of the participants disagreed.

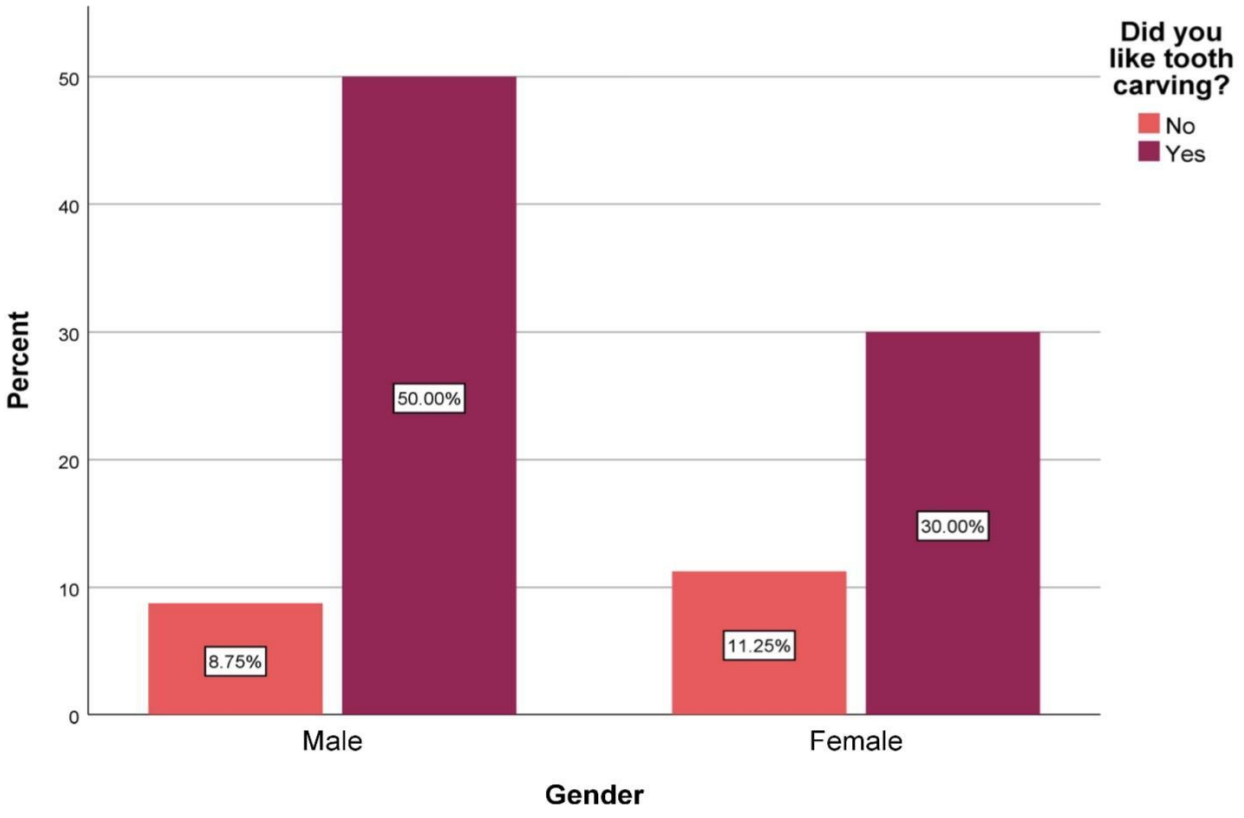

Figure 10: Bar graph showing the association between genders and the likes and dislikes of participants of Tooth Carving. X axis represents gender and Y axis represents percentage of responses. Blue denotes

No, green denotes Yes. Males liked carving when compared to females. This difference is statistically not significant (Pearson chi square test; p value of 0.173 (>0.05)- Not significant)

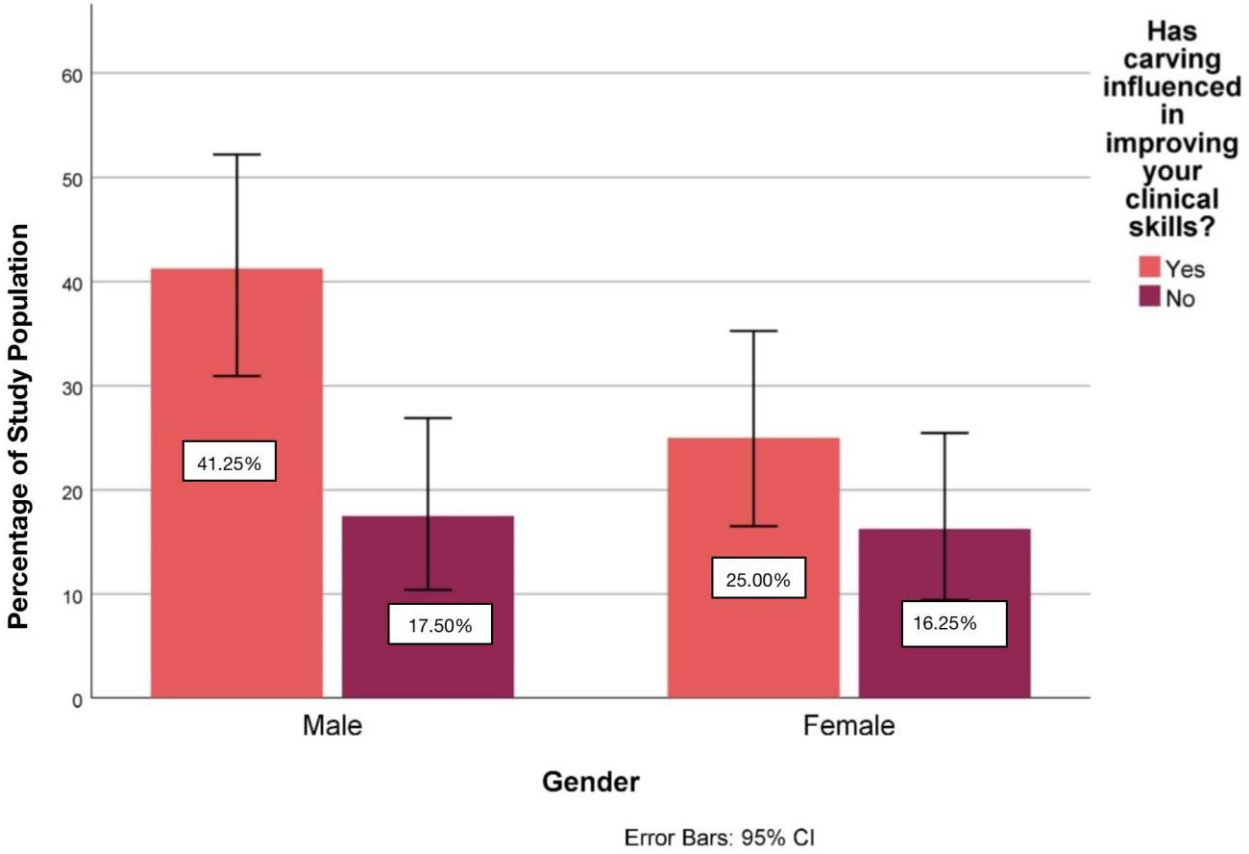

Figure 11: Bar graph showing the association between genders and the influence of tooth carving on participants. X axis represents gender and Y axis represents percentage of responses. Blue denotes No, green denotes Yes. Males agreed that tooth carving has influence in developing the knowledge about tooth anatomy when compared to females. This difference is statistically not significant (Pearson chi square test; p value of 0.017(<0.05)- Significant)

Discussion:-

The practice of dentistry requires knowledge of tooth morphology, physiology and occlusion. Knowledge of the form of particular teeth and the skill to reproduce them are essential for all workers in the field(31). Various studies suggest that tooth carving is a dreadful exercise and mechanical science but our study suggests that tooth carving is one of the most interesting exercises and most of the students imply that it is necessary and helpful for them in the upcoming years (32). Although many anatomists have advocated using a multifaceted approach in teaching anatomy modules. E-learning modalities like blended learning through learning management systems can provide the much-needed multi-modal approach of teaching dental anatomy(33).

In this study 65% students perceived that dental carving will be helpful in their clinical practice and about 35% students had no idea whether dental carving will be helpful in their clinical practice. Similar findings were reported in a previous study by some scientists, where 62.3% of survey respondents agreed that carving influenced their knowledge of tooth anatomy(34). The findings of our study reveal that the majority of male and female students perceived that having a collection of 32 natural teeth in the department will help more in better understanding of tooth carving. Some of the educators believe that the tooth anatomy can be learned by collecting and studying intact extracted teeth and tooth carving may not be necessary but it is not always possible to delineate the abnormal tooth without knowing what is normal and that can be learnt only through carving exercises(31,35).

According to some research, the majority of the scholars during their study agreed that tooth carving should be taught within the first undergraduate years. Regarding the usefulness of the teaching methodology used, 71.4% of the participants agreed that it helped improve their skills and knowledge, because it encouraged self-directed learning and experimenting. In this study 51.25% of students suggested that tooth carving should not be taught in their first undergraduate years. By comparing these results, other research has more positive output than this research. From that we can come to a conclusion that other researchers may have come to various outputs on the same topic. It was also found from a study that carving helps the dental student to develop psychomotor skills for restoring the teeth to proper form and function(36).

This study has less sample size and for especially for adolescents, but this research can be done on a wide scale with a larger sample size and with different age groups and populations due to the fact that this study was only conducted among dental practitioners, so that the awareness of tooth carving can be easily spread throughout the public.

Conclusion:-

The survey suggests that overall knowledge & perception about tooth carving was good among dental students. Most of the respondents believed that this exercise is an effective method for learning tooth anatomy and should be continued in the undergraduate dental syllabus. Further it stresses upon the need to adopt newer methods of tooth carving along with innovative carver design to make further use of it in dental education.

ACKNOWLEDGEMENT :

We thank Saveetha Dental College and Hospitals for providing us the support to conduct the Study.

CONFLICT OF INTEREST :

The author declares that there was no conflict of interest in the present study

SOURCE OF FUNDING :

The present study was supported by the following agencies

- Saveetha Dental College,

- Saveetha Institute of Medical and Technical Science,
- Saveetha University
- Balakrishna Nursery and Primary School, Kattupakkam

Reference:-

1. Siéssere S, Vitti M, de Sousa LG, Semprini M, Regalo SCH. Educational material of dental anatomy applied to study the morphology of permanent teeth. Braz Dent J. 2004;15(3):238–42.

2. Wang W, Bi X, Zhu Y, Li X. Reforming teaching methods by integrating dental theory with clinical practice for dental students [Internet]. Vol. 8, PeerJ. 2020. p. e8477. Available from: http://dx.doi.org/10.7717/peerj.8477

3. Singh R, Gupta N, Srivastava B. Preferred mode of teaching – For attitude, aptitude and effectiveness of dental students [Internet]. Vol. 65, Journal of the Anatomical Society of India. 2016. p. 48–50. Available from: http://dx.doi.org/10.1016/j.jasi.2016.08.003

4. Zhang M, Zhou J, Cheng F, Shi Z-M. [Comparison of two carving methods applied for triple-sized plaster tooth in dental anatomy teaching]. Shanghai Kou Qiang Yi Xue. 2006 Oct;15(5):551–4.

5. Beltrán-Aguilar ED, Barker LK, Canto MT, Dye BA, Gooch BF, Griffin SO, et al. Surveillance for dental caries, dental sealants, tooth retention, edentulism, and enamel fluorosis--United States, 1988-1994 and 1999-2002. MMWR Surveill Summ. 2005 Aug 26;54(3):1–43.

6. Shivappa AB. An Illustrated Atlas of Tooth Carving and Wax-Up Techniques [Internet]. 2020. Available from: http://dx.doi.org/10.1002/9781119573609

7. Anwar M, Bahria University Medical & Dental College, Alam BF, Zaidi SJA. Tooth Carving as a Teaching Modality in the Study of Tooth Morphology: Students' Perception and Performance [Internet]. Vol. 29, Journal of the Pakistan Dental Association. 2020. p. 249–53. Available from: http://dx.doi.org/10.25301/jpda.294.249

8. Romerowski J, Bresson G. Changing the teaching of dental anatomy to change the mental habits of dental practitioners. Int J Periodontics Restorative Dent. 1985;5(2):52–67.

9. Kraus BS, Ames MD, Clark GR. Effects of maternal rubella on dental crown development. Clin Pediatr . 1969 Apr;8(4):204–15.

10. Nance ET, Lanning SK, Gunsolley JC. Dental anatomy carving computer-assisted instruction program: an assessment of student performance and perceptions. J Dent Educ. 2009 Aug;73(8):972–9.

11. Princeton B, Santhakumar P, Prathap L. Awareness on Preventive Measures taken by Health Care Professionals Attending COVID-19 Patients among Dental Students. Eur J Dent. 2020 Dec;14(S 01):S105–9.

12. 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. Clin Oral Investig. 2020 Sep;24(9):3275–80.

13. Sridharan G, Ramani P, Patankar S, Vijayaraghavan R. Evaluation of salivary metabolomics in oral leukoplakia and oral squamous cell carcinoma. J Oral Pathol Med. 2019 Apr;48(4):299–306.

14. R H, Hannah R, Ramani P, Ramanathan A, Jancy MR, Gheena S, et al. CYP2 C9 polymorphism among patients with oral squamous cell carcinoma and its role in altering the metabolism of benzo[a]pyrene [Internet]. Vol. 130, Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2020. p. 306–12. Available from: http://dx.doi.org/10.1016/j.oooo.2020.06.021

15. Antony JVM, Ramani P, Ramasubramanian A, Sukumaran G. Particle size penetration rate and effects of smoke and smokeless tobacco products - An invitro analysis. Heliyon. 2021 Mar 1;7(3):e06455.

16. Sarode SC, Gondivkar S, Sarode GS, Gadbail A, Yuwanati M. Hybrid oral potentially malignant disorder: A neglected fact in oral submucous fibrosis. Oral Oncol. 2021 Jun 16;105390.

17. Hannah R, Ramani P, WM Tilakaratne, Sukumaran G, Ramasubramanian A, Krishnan RP. Author response for “Critical appraisal of different triggering pathways for the pathobiology of pemphigus vulgaris—A review” [Internet]. Wiley; 2021. Available from: https://publons.com/publon/47643844

18. Chandrasekar R, Chandrasekhar S, Sundari KKS, Ravi P. Development and validation of a formula for objective assessment of cervical vertebral bone age. Prog Orthod. 2020 Oct 12;21(1):38.

19. 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. Eur J Dent. 2018 Jan;12(1):67–70.

20. Jeevanandan G, Thomas E. Volumetric analysis of hand, reciprocating and rotary instrumentation techniques in primary molars using spiral computed tomography: An in vitro comparative study. Eur J Dent. 2018 Jan;12(1):21–6.

21. Ponnulakshmi R, Shyamaladevi B, Vijayalakshmi P, Selvaraj J. In silico and in vivo analysis to identify the antidiabetic activity of beta sitosterol in adipose tissue of high fat diet and sucrose induced type-2 diabetic experimental rats. Toxicol Mech Methods. 2019 May;29(4):276–90.

22. Sundaram R, Nandhakumar E, Haseena Banu H. Hesperidin, a citrus flavonoid ameliorates hyperglycemia by regulating key enzymes of carbohydrate metabolism in streptozotocin-induced diabetic rats. Toxicol Mech Methods. 2019 Nov;29(9):644–53.

23. Alsawalha M, Rao CV, Al-Subaie AM, Haque SKM, Veeraraghavan VP, Surapaneni KM. Novel mathematical modelling of Saudi Arabian natural diatomite clay. Mater Res Express. 2019 Sep 4;6(10):105531.

24. Yu J, Li M, Zhan D, Shi C, Fang L, Ban C, et al. Inhibitory effects of triterpenoid betulin on inflammatory mediators inducible nitric oxide synthase, cyclooxygenase-2, tumor necrosis factor-alpha, interleukin-6, and proliferating cell nuclear antigen in 1, 2-dimethylhydrazine-induced rat colon carcinogenesis. Pharmacogn Mag. 2020;16(72):836.

25. Shree KH, Hema Shree K, Ramani P, Herald Sherlin, Sukumaran G, Jeyaraj G, et al. Saliva as a Diagnostic Tool in Oral Squamous Cell Carcinoma – a Systematic Review with Meta Analysis [Internet]. Vol. 25, Pathology & Oncology Research. 2019. p. 447–53. Available from: http://dx.doi.org/10.1007/s12253-019-00588-2

26. Zafar A, Sherlin HJ, Jayaraj G, Ramani P, Don KR, Santhanam A. Diagnostic utility of touch imprint cytology for intraoperative assessment of surgical margins and sentinel lymph nodes in oral squamous cell carcinoma patients using four different cytological stains. Diagn Cytopathol. 2020 Feb;48(2):101–10.

27. Karunagaran M, Murali P, Palaniappan V, Sivapathasundharam B. Expression and distribution pattern of podoplanin in oral submucous fibrosis with varying degrees of dysplasia – an immunohistochemical study [Internet]. Vol. 42, Journal of Histotechnology. 2019. p. 80–6. Available from: http://dx.doi.org/10.1080/01478885.2019.1594543

28. Sarode SC, Gondivkar S, Gadbail A, Sarode GS, Yuwanati M. Oral submucous fibrosis and heterogeneity in outcome measures: a critical viewpoint. Future Oncol. 2021 Jun;17(17):2123–6.

29. Raj Preeth D, Saravanan S, Shairam M, Selvakumar N, Selestin Raja I, Dhanasekaran A, et al. Bioactive Zinc(II) complex incorporated PCL/gelatin electrospun nanofiber enhanced bone tissue regeneration. Eur J Pharm Sci. 2021 May 1;160:105768.

30. Prithiviraj N, Yang GE, Thangavelu L, Yan J. Anticancer Compounds From Starfish Regenerating Tissues and Their Antioxidant Properties on Human Oral Epidermoid Carcinoma KB Cells. In: PANCREAS. LIPPINCOTT WILLIAMS & WILKINS TWO COMMERCE SQ, 2001 MARKET ST, PHILADELPHIA …; 2020. p. 155–6.

31. Rantanen AV. A study of variation in tooth carvings. Scand J Dent Res. 1970;78(1):28–33.

32. Sivapathasundharam B. Tooth carving [Internet]. Vol. 19, Indian Journal of Dental Research. 2008. p. 181. Available from: http://dx.doi.org/10.4103/0970-9290.42946

33. Ariana A, Amin M, Pakneshan S, Dolan-Evans E, Lam AK. Integration of Traditional and E-Learning Methods to Improve Learning Outcomes for Dental Students in Histopathology [Internet]. Vol. 80, Journal of Dental Education. 2016. p. 1140–8. Available from: http://dx.doi.org/10.1002/j.0022-0337.2016.80.9.tb06196.x

34. Fonseca A, Guimarães VB da S, Rodrigues-Junior SA, Fonseca AAR, de Azevedo RA, Corrêa MB, et al. Effect of Dental Course Cycle on Anatomical Knowledge and Dental Carving Ability of Dental

Students. Anat Sci Educ [Internet]. 2021 Mar 30; Available from: http://dx.doi.org/10.1002/ase.2078

35. Okeson J, Buckman J. Curricular guidelines for teaching dental anatomy. J Dent Educ. 1981 Aug;45(8):540–2.

36. Obrez A, Briggs C, Buckman J, Goldstein L, Lamb C, Knight WG. Teaching clinically relevant dental anatomy in the dental curriculum: description and assessment of an innovative module. J Dent Educ. 2011 Jun;75(6):797–804.