

## **Prevalence of root caries among geriatric patients visiting a private dental hospital in Chennai**

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### **ABSTRACT:**

Root surface caries is considered to be a common disease among older adults worldwide. It is also the major cause for tooth loss among the elderly individuals. However root caries is a preventable disease. The present study was done to assess the prevalence of root caries among Geriatric population in Chennai. A retrospective evaluation was conducted to analyze the subjects who presented with the root caries between June 2019- March 2021 who visited a private dental hospital in Chennai. A total of 939 patients were found to be diagnosed with root caries. The collected data was subjected for data analysis.

The more half of the geriatric population were found to have root caries. The prevalence was more among males. These results of the study will add new vistas for future studies on root caries.

### **INTRODUCTION:**

Root caries is the major cause of tooth loss in older adults [1] Nearly half of older people have root caries. It is mostly seen in cases where there is severe periodontal attachment loss exposing the tooth surface to the oral environment which leads to the initiation of root caries. It appears as a white or discolored soft irregular and progressive lesion which occurs at or apical to the cement-enamel junction. The shape of root caries is oval or round, demarcated from the surrounded non carious tooth. Root caries progress rapidly and may join adjoining root caries lesions.[2]

There are various etiological and risk factors associated with root caries among the geriatric population. Risks are described in a number of levels, from socioeconomic status to salivary flow to presence of dentures. Etiological factors are gingival recession due to periodontitis or with age. Radiation therapy, abfraction, xerostomia, recurrent caries, abrasion, removable partial denture or overdenture, erosion, malocclusion of teeth which had tipped and increases food lodgement, diabetes, and disability, physical and psychological factors which decreases cleansing efficiency, diminished manual dexterity, and so on [3] Risk factors are chronic medical conditions, radiation treatment for head/neck cancer, physical limitations, poor oral hygiene, changes in diet habit, previously root caries experience, cognitive defects due to mental illness, depression, Alzheimer's disease, dementia, Sjogren's syndrome, and so on. Many risk factors can compromise an older adult's systemic health such as sociodemographic variables, nutrition/diet, and weakened immune system. These factors are strongly determined by individual genetic background. [4]

Since improved Medical sciences in the present days have increased the life expectancy of the recent population, the geriatric population lives a better quality of life than the previous ages. Therefore primary care for the oral health of the geriatric population should be maintained for better health. [5] In the Indian population, due to lack of proper nutrition, there is an increased incidence of bone resorption leading to gingival recession leading to root caries. For a long healthy life, people need to keep their teeth vital for a longer time span.

Our team has extensive knowledge and research experience that has translate into high quality publications[6–14],[15],[16],[17,18],[19],[20],[21–25]  
[21–25]

Hence, there is an immediate need to curb the etiological factors causing root caries; Oral health policies and preventive measures are needed focusing on the special needs of this neglected and socioeconomically deprived population to improve their oral health-related quality of life. With this background in mind, the current study aims to assess the prevalence of root caries in the geriatric population visiting a private dental hospital in Chennai.

**MATERIALS AND METHODS:**

**Study designs and Study setting**

The present study was conducted based on the records of the geriatric patients in a private dental Hospital in Chennai, India. The retrospective study was carried out with the help of digital case records of patients who reported to the hospital. Thus the data of these patients represent the same geographic location and also have similar ethnicity. Ethical and regulatory clearance to conduct this study was obtained from the scientific review board of the hospital.

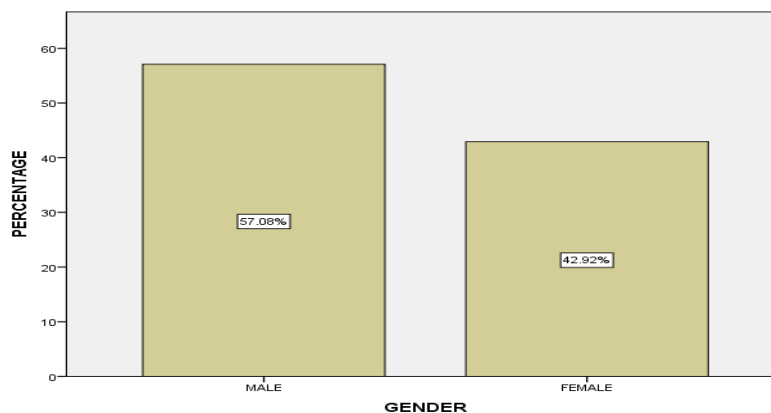
**Sampling:**

Data of 939 geriatric patients was reviewed. All patients with root caries in the given duration of time period were included in the study. Only relevant data was included. Cross verification of data was done by presence of additional reviewers and by photographic evaluation. Incomplete data collection was excluded from the study.

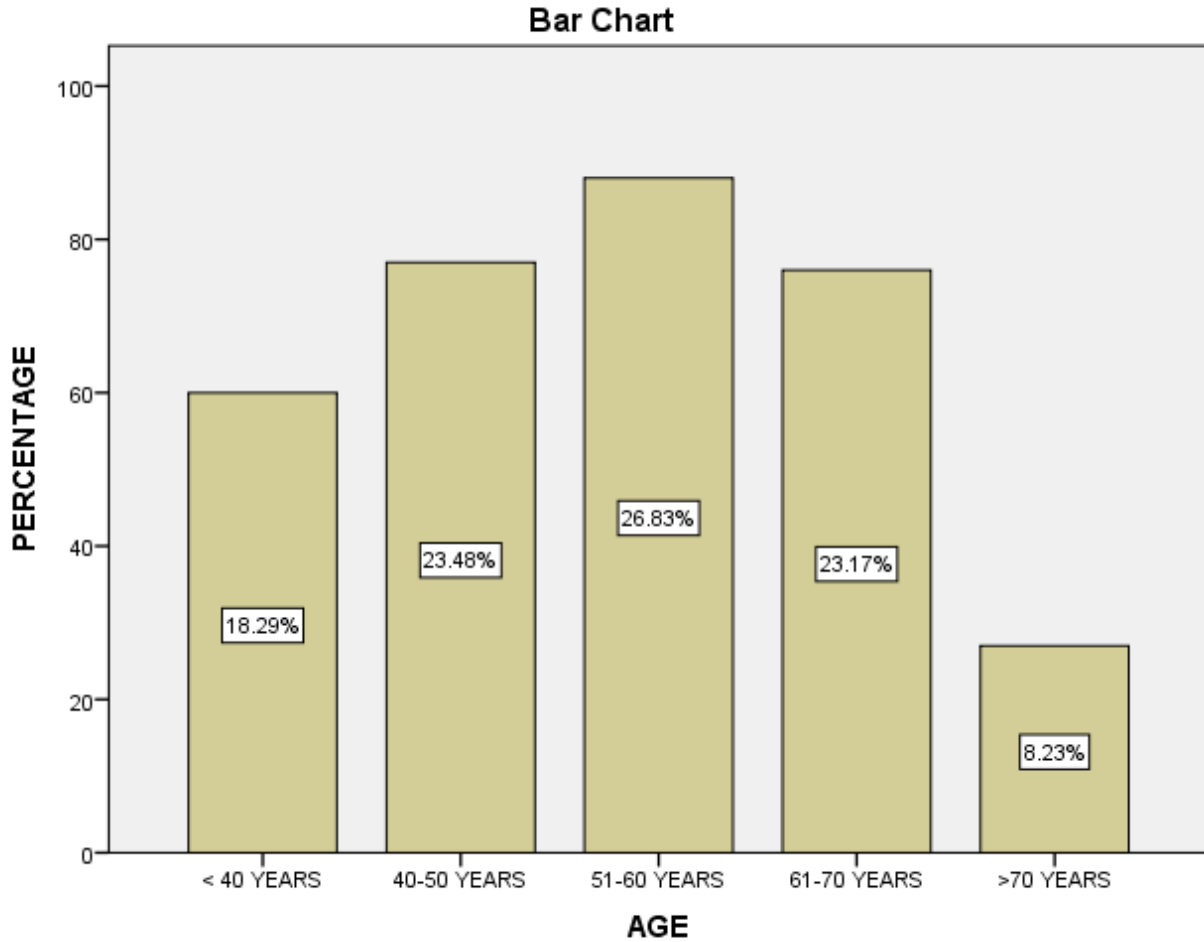
**Data collection**

A single calibrated examiner evaluated the digital case records of patients who reported to Saveetha Dental College from June 2019 to March 2021. For the present study, inclusion criteria was data of patients with root caries. Data obtained were age, gender, root caries, teeth no; All obtained data were tabulated into Microsoft excel documents. Statistical analysis The collected data was tabulated and analysed with Statistical Package for Social Sciences for Windows, version 20.0 (SPSS Inc., Vancouver style) and results were obtained. Categorical variables were expressed in frequency and percentage. Chi square test was used to test association between categorical variables. Chi square tests were carried out using age, gender and as independent variables and dependent variables. The statistical analysis was done by Pearson Chi square test. P value < 0.05 was considered statistically significant.

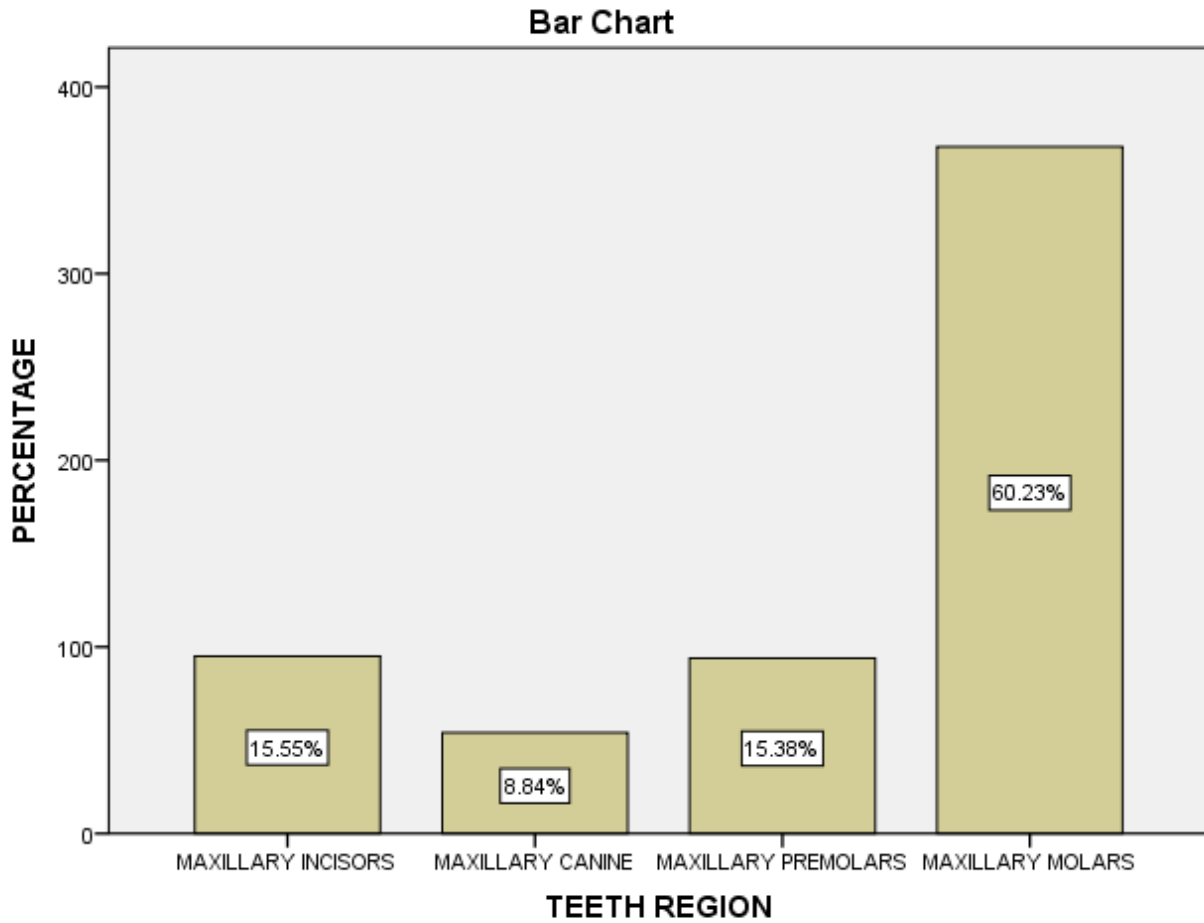
**RESULTS:**



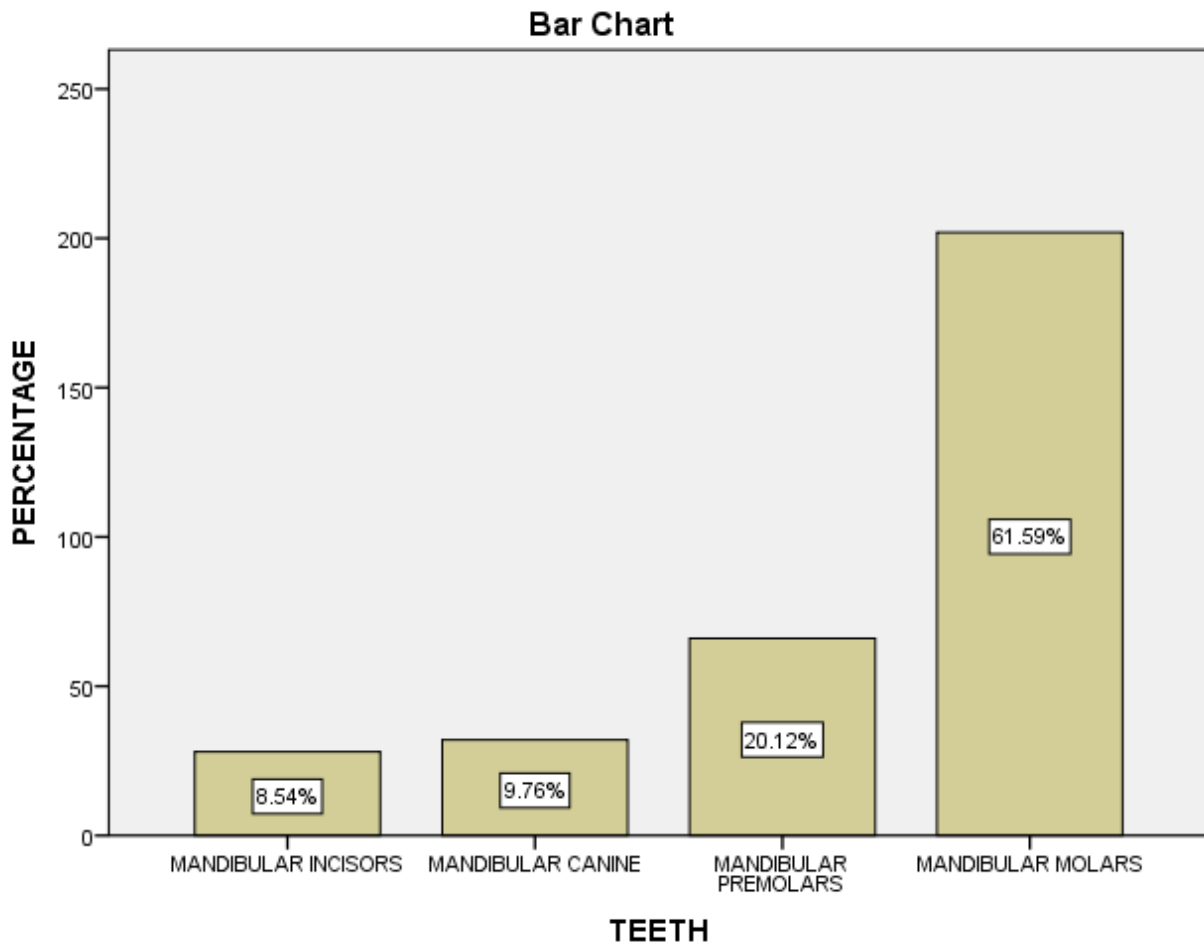
**Figure 1** represents the frequency distribution of root caries based on gender. X-axis shows the root caries based on gender while Y-axis shows the percentage distribution of patients with root caries among males and females. Root caries was found to be high among males (57.0%) compared to females (42.9%).



**Figure 2** represents the distribution of root caries based on age . X-axis shows the different age groups while Y-axis shows the percentage of patients with root caries. High percentage of patients belonging to 51-60 years were found to have high prevalence of root caries (26.8%); followed by 40-50 years (23.4%).



**Figure 3** represents the distribution of root caries among different maxillary teeth . X-axis shows the teeth in maxillary arch, while Y-axis shows the percentage of patients with root caries. Root caries was found to be more among maxillary molars (60.2%).



**Figure 4** represents the distribution of root caries in the Mandibular arch . X-axis shows the teeth region while Y-axis shows the percentage distribution of patients with root caries. Higher number of patients reported with root caries in relation to Mandibular posterior teeth region (61.5%).

**DISCUSSION:**

The present study show that root caries to be more frequently observed with advancing age , which was similar to study done by Hintao et al., [26]. Soni et al. considered the increasing prevalence of root decay with age may not be due to aging but might be a result of the general deterioration in oral health. [27] The reason for this increased prevalence of root caries among the geriatrics may also occur due to medications that are prescribed to the elderly which has caused impaired salivary flow, chemotherapy, radiation treatments. [3]

The prevalence of root caries was found to be 57.6% and high among males. The result of the present study is found to be in accordance with the study conducted by Chi et al. [28] the reason could be due to smoking and paan chewing among males. Another probable reason could be for males being more susceptible to root caries than females is that males are also found to be poor at maintaining oral hygiene.

Males are found to be associated with dry mouth more than females. The gingival recession exposes the root and makes it susceptible to decay and abrasion. However, according to a study conducted by Khan et al., females are more prone to caries than males, which is not in agreement with our study [29]

Another important finding of the study is that the teeth in maxillary arch was affected with root caries in the following order, first molars , then, followed by premolar and molar teeth. Similarly in the mandibular arch the sequence of affecting root caries is the same as that of the maxillary arch. The findings in the study conducted by Urquart et al. also reported similar sequence of root caries . [30]

The strength of this study was that the records of patients observed had no issue regarding declined participation from patients and in addition there was no issue regarding improper patient selection. The limitation of the study being a retrospective study, there was no possibility for direct interaction with the patients and the study relied only on the case sheets, clinical,radiographic photographs and the sample size was also limited and confined to only the South Indian population. However these findings of the study will add new vistas for future studies to add further evidences.

#### **CONCLUSION:**

Nearly half of the geriatric population was found to be affected with root caries of which males were more affected compared to females. Hence oral health programs should also target geriatric patients.

#### **AUTHORS CONTRIBUTION:**

Shruthi Manivannan : Literature search, data collection, analysis, manuscript drafting.

Dr. R.Pradeep Kumar: Data verification, manuscript drafting.

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#### **CONFLICT OF INTEREST:**

All the authors declare that there was no conflict of interest in present study.

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**REFERENCES:**

1. Root Caries: An Aging Problem [Internet]. Vol. 5, The Internet Journal of Dental Science. 2007. Available from: <http://dx.doi.org/10.5580/a32>
2. Katz RV. Clinical signs of root caries: measurement issues from an epidemiologic perspective. *J Dent Res.* 1990 May;69(5):1211–5.
3. Islas-Granillo H, Borges-Yañez SA, Medina-Solís CE, Casanova-Rosado AJ, Minaya-Sánchez M, Villalobos Rodelo JJ, et al. Socioeconomic, sociodemographic, and clinical variables associated with root caries in a group of persons age 60 years and older in Mexico [Internet]. Vol. 12, *Geriatrics & Gerontology International.* 2012. p. 271–6. Available from: <http://dx.doi.org/10.1111/j.1447-0594.2011.00764.x>
4. Anusavice KJ. Present and Future Approaches for the Control of Caries [Internet]. Vol. 69, *Journal of Dental Education.* 2005. p. 538–54. Available from: <http://dx.doi.org/10.1002/j.0022-0337.2005.69.5.tb03941.x>
5. Perdigon HT, Schneiderman E, Opperman LA. Oral health assessment of independent elders in Texas [Internet]. Vol. 39, *Special Care in Dentistry.* 2019. p. 515–23. Available from: <http://dx.doi.org/10.1111/scd.12409>
6. 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.
7. Samuel SR. Can 5-year-olds sensibly self-report the impact of developmental enamel defects on their quality of life? *Int J Paediatr Dent.* 2021 Mar;31(2):285–6.
8. Samuel SR, Kuduruthullah S, Khair AMB, Al Shayeb M, Elkaseh A, Varma SR, et al. Impact of pain, psychological-distress, SARS-CoV2 fear on adults' OHRQOL during COVID-19 pandemic. *Saudi J Biol Sci.* 2021 Jan;28(1):492–4.
9. Samuel SR, Kuduruthullah S, Khair AMB, Shayeb MA, Elkaseh A, Varma SR. Dental pain, parental SARS-CoV-2 fear and distress on quality of life of 2 to 6 year-old children during COVID-19. *Int J Paediatr Dent.* 2021 May;31(3):436–41.
10. Samuel SR, Acharya S, Rao JC. School Interventions-based Prevention of Early-Childhood Caries among 3-5-year-old children from very low socioeconomic status: Two-year randomized trial. *J Public Health Dent.* 2020 Jan;80(1):51–60.
11. Vikneshan M, Saravanakumar R, Mangaiyarkarasi R, Rajeshkumar S, Samuel SR, Suganya M, et al. Algal biomass as a source for novel oral nano-antimicrobial agent. *Saudi J Biol Sci.* 2020 Dec;27(12):3753–8.
12. Chellapa LR, Rajeshkumar S, Arumugham MI, Samuel SR. Biogenic Nanoselenium Synthesis and Evaluation of its antimicrobial, Antioxidant Activity and Toxicity. *Bioinspired Biomim Nanobiomaterials.* 2020 Jul 23;1–6.
13. Samuel SR, Mathew MG, Suresh SG, Varma SR, Elsubeihi ES, Arshad F, et al. Pediatric dental emergency management and parental treatment preferences during COVID-19 pandemic as compared to 2019. *Saudi J Biol Sci.* 2021 Apr;28(4):2591–7.
14. Barma MD, Muthupandiyani I, Samuel SR, Amaechi BT. Inhibition of *Streptococcus mutans*, antioxidant property and cytotoxicity of novel nano-zinc oxide varnish. *Arch Oral Biol.* 2021

- Jun;126:105132.
15. Muthukrishnan L. Nanotechnology for cleaner leather production: a review. *Environ Chem Lett.* 2021 Jun 1;19(3):2527–49.
  16. Muthukrishnan L. Multidrug resistant tuberculosis - Diagnostic challenges and its conquering by nanotechnology approach - An overview. *Chem Biol Interact.* 2021 Mar 1;337:109397.
  17. Sekar D, Auxilia PK. Letter to the Editor: H19 Promotes HCC Bone Metastasis by Reducing Osteoprotegerin Expression in a PPP1CA/p38MAPK- Dependent Manner and Sponging miR- 200b- 3p [Internet]. *Hepatology.* 2021. Available from: <http://dx.doi.org/10.1002/hep.31719>
  18. Gowhari Shabgah A, Amir A, Gardanova ZR, Olegovna Zekiy A, Thangavelu L, Ebrahimi Nik M, et al. Interleukin-25: New perspective and state-of-the-art in cancer prognosis and treatment approaches. *Cancer Med.* 2021 Aug;10(15):5191–202.
  19. Kamala K, Sivaperumal P, Paray BA, Al-Sadoon MK. Author response for “Identification of haloarchaea during fermentation of *Sardinella longiceps* for being the starter culture to accelerate fish sauce production” [Internet]. Wiley; 2021. Available from: <https://publons.com/publon/47375106>
  20. Ezhilarasan D, Lakshmi T, Subha M, Deepak Nallasamy V, Raghunandhakumar S. The ambiguous role of sirtuins in head and neck squamous cell carcinoma. *Oral Dis* [Internet]. 2021 Feb 11; Available from: <http://dx.doi.org/10.1111/odi.13798>
  21. 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.
  22. 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>
  23. J PC, Pradeep CJ, Marimuthu T, Krithika C, Devadoss P, Kumar SM. Prevalence and measurement of anterior loop of the mandibular canal using CBCT: A cross sectional study [Internet]. Vol. 20, *Clinical Implant Dentistry and Related Research.* 2018. p. 531–4. Available from: <http://dx.doi.org/10.1111/cid.12609>
  24. Wahab PUA, Abdul Wahab PU, Madhulaxmi M, Senthilnathan P, Muthusekhar MR, Vohra Y, et al. Scalpel Versus Diathermy in Wound Healing After Mucosal Incisions: A Split-Mouth Study [Internet]. Vol. 76, *Journal of Oral and Maxillofacial Surgery.* 2018. p. 1160–4. Available from: <http://dx.doi.org/10.1016/j.joms.2017.12.020>
  25. Kumar, S. (2022). A quest for sustainium (sustainability Premium): review of sustainable bonds. *Academy of Accounting and Financial Studies Journal*, Vol. 26, no.2, pp. 1-18
  26. Nandal, N., & Nandal, N. (2019). BSCQUAL: A Measuring Instrument of Service Quality for the B-Schools . *International Journal of Psychosocial Rehabilitation*, Vol. 23, Issue 04, 1574-1589
  27. Mudigonda SK, Murugan S, Velavan K, Thulasiraman S, Krishna Kumar Raja VB. Non-suturing microvascular anastomosis in maxillofacial reconstruction- a comparative study. *Journal of Cranio-Maxillofacial Surgery.* 2020 Jun 1;48(6):599–606.
  28. Hintao J, Teanpaisan R, Chongsuvivatwong V, Dahlen G, Rattarasarn C. Root surface and coronal

- caries in adults with type 2 diabetes mellitus. *Community Dent Oral Epidemiol.* 2007 Aug;35(4):302–9.
29. Soni S, Mehta M, Aruna DM, Radha P, Pallavi, Kadanakuppe S, et al. Root caries among type 2 diabetes mellitus patients visiting a hospital [Internet]. Vol. 34, *Special Care in Dentistry*. 2014. p. 273–7. Available from: <http://dx.doi.org/10.1111/scd.12065>
  30. Chi DL, Berg JH, Kim AS, Scott J. Correlates of root caries experience in middle-aged and older adults in the Northwest Practice-based REsearch Collaborative in Evidence-based DENTistry research network [Internet]. Vol. 144, *The Journal of the American Dental Association*. 2013. p. 507–16. Available from: <http://dx.doi.org/10.14219/jada.archive.2013.0153>
  31. [Khan AA, Jain SK, Shrivastav A. Prevalence of Dental Caries among the Population of Gwalior \(India\) in Relation of Different Associated Factors \[Internet\]. Vol. 02, \*European Journal of 2Dentistry\*. 2008. p. 081–5. Available from: <http://dx.doi.org/10.1055/s-0039-1697359>](#)
  33. Urquhart O, Tampi MP, Pilcher L, Slayton RL, Araujo MWB, Fontana M, et al. Nonrestorative Treatments for Caries: Systematic Review and Network Meta-analysis [Internet]. Vol. 98, *Journal of Dental Research*. 2019. p. 14–26. Available from: <http://dx.doi.org/10.1177/0022034518800014>