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PATTERN OF TOOTH LOSS IN GERIATRIC PATIENTS

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ABSTRACT:

In geriatric patients tooth loss is a main indicator of oral health status. Periodontal diseases of dental caries are responsible for tooth loss in geriatric patients. The aim of the study is to determine the pattern of tooth loss in geriatric patients. Total of 86,000 case sheets of patients who visited a Private Dental Hospital between June 2019 and March 2020 were reviewed and 1,787 patients who were >65 years were shortlisted. Data pertaining to tooth loss were collected and statistically analysed. 18.34% of the patients were found with missing right maxillary 3rd molar, 17.11% with right mandibular 3rd molar and 18.07% left maxillary 3rd molar, 17.21% with left mandibular 1st molar. The right and left maxillary anteriors had an incidence of 14.46%, maxillary posteriors at 37.59%, mandibular anteriors at 12.37% and mandibular posteriors 35.57%. Chi square shows $p>0.05$; Non significant association. From the study we could observe that the commonly missing tooth was the right maxillary 3rd molar and more of the maxillary posteriors were most prone to tooth loss followed by mandibular posteriors, maxillary anteriors and then mandibular anterior teeth. It was also seen that the males were more prone to tooth loss. However we did not observe any association between the gender of the patients and region of missing teeth.

INTRODUCTION

A beautiful smile is due to the harmonious relationship between the components of the oral cavity such as lips, teeth, and gingiva for all individuals[1]. Factors hindering this smile among the population is generally tooth loss. Tooth loss is a multifactorial process involving dental caries, periodontal disease, a variety of socio environmental factors, educational levels, access to care and insurance status and general health status [2,3].

Elders above 65 yrs. have health problems as a result of the aging process which calls for special considerations [4]. A significant population of the older adults do not view oral health care as important as their overall health [5]. Older adults in rural areas have a less favourable oral health that their urban counterparts [6]. The people in the urban areas are also said to have a lot of unmet dental needs[5]. The phenomenon of aging is a medical as well as a sociological problem indicating a greater demand for the health services of a community. This is because of the increasing risks of systemic disease and its treatment with age, there can be a substantial alteration in both the risk and the implications of oral disease. Oral diseases are progressive and cumulative across the lifespan of the elderly contributing to the functional difficulties like chewing, swallowing and social interaction. Several oral conditions such as tooth loss, denture irritations if wearing, dental caries experience, periodontal disease and cancer are highly prevalent in older populations. Improving oral health is significantly said to enhance the physical, mental and social attributes at home and work [7]. At an old age, high prevalence of co morbidities and also barriers to general health care are observed, together with oral health care challenges in relation to major disease conditions.Tooth loss in elderly people was reported by several studies to be strongly associated with mortality [8]. Periodontitis is considered one of the etiological factors of tooth loss. Periodontal breakdown of a crowned tooth is the most common reason attributing to tooth loss(59%)[9], other causes like fractured tooth or unrestored can lead to extracting the tooth. 2% of the teeth being lost can be due to prosthodontic purpose as well [10].

It is also said that coronal root caries and removable dentures had a synergistic effect on tooth loss and geriatric patients. [10,11]. Tooth loss is also accompanied by low quality of life due to more bacterial accumulation around the sulcus and denture [10–12]. Systemic diseases like diabetes play a major role in tooth loss among older adults. The need to analyse the pattern of tooth loss arises as it is easy to assign preventive therapy based on the tooth that is being missing at a maximum rate. Thus the aim of the study was to find the pattern of tooth loss among patients above 65 years.

MATERIALS AND METHOD

A retrospective study of sample size 1787 was conducted among patients >65yrs who had visited a Private Dental Hospital. The study was conducted in a university set up. The population selection was random.

Ethical Approval

The ethical approval for the retrospective study was obtained from the university (SDC/SIHEC/2020/DIASDATA/0619-0320).

Data collection

The data of missing teeth of all geriatric patients were collected and verified and the patient records were reviewed and analysed between June 2019 and March 2020. Cross verification of data was done.Incomplete and censored data was excluded.

Statistical analysis

The analysis was done using SPSS version 19. Descriptive statistics were used to correlate between the missing teeth. The dependent variables were the number of missing teeth. The independent variables were age and gender. The data after importing to SPSS was performed with a Chi-square test. The type of analysis performed was correlation and association.The level of significance was set at 0.05.

RESULTS AND DISCUSSION

From the graphs it is seen that in the 9.65% of central incisors 9.65%, 9.33% of lateral incisors, 8.35% of canine , 10.30% of 1st premolar , 11.16% of 2nd Premolar 11.16%, 16.61% of 1 st molar , 16.61% of 2 nd molar , 18.34% of 3 rd molar of them were missing in the maxillary arch on the right side (Figure 1). 9.79% of central incisors , 9.87% of lateral incisors, 8.57% of canine, 10.32% of 1st premolar , 11.18% of 2nd Premolar , 15.76% of 1 st molar , 16.45% of 2 nd molar , 18.07% of 3 rd molar were missing in the maxillary arch on the left side (Figure 2)

14.24% of central incisors , 11.62% of lateral incisors , 7.37% of canine , 8.09% of 1st premolar, 9.31% of 2nd Premolar , 17.21% of 1 st molar, 15.39% of 2 nd molar , 16.77% of 3 rd molars were missing in the mandibular arch on the left side (Figure 3)

13.61% central incisors, 11.18% of lateral incisors , 7.52% of canine , 8.61% of 1st premolar , 10.70% of 2nd Premolar , 16.46% of 1 st molar , 14.80% of 2 nd molar, 17.11% of 3 rd molars were missing in the mandibular arch on the right side (Figure 4). Figure 5 denotes 14.46% missing in the right and left maxillary anteriors, 37.59% of maxillary posteriors, 12.37% of mandibular anteriors and 35.57% of mandibular posteriors . 22.91% of males and 14.68% of females had mandibular posteriors missing, 19.6% of males and 15.96% of females mandibular posteriors missing, 4.61% of males and 7.76% of females had mandibular anteriors missing, 5.48% of males and 8.98% of females had maxillary anteriors missing, Chi-square test shows p value= 0.2243, proving that there is no significant association between the number of missing teeth in each region and gender. (Figure 6)

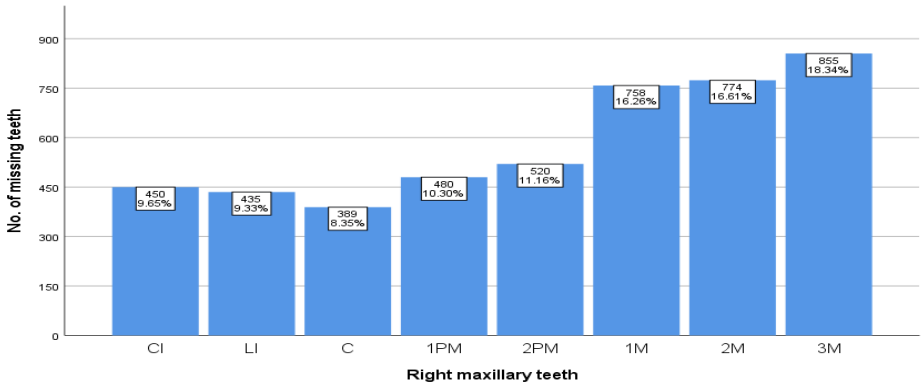

Figure 1: Bar graph denotes the distribution of missing teeth in the right maxillary arch. X axis denotes the right maxillary teeth types and Y axis denotes the number of missing teeth. Maximum number of missing teeth are seen in relation to 3rd molars. [CI-Central incisor; LI- lateral incisor; C-canine ; 1PM- 1st premolar; 2PM- 2nd Premolar ; 1M- 1 st molar; 2M- 2 nd molar ; 3M- 3 rd molar]

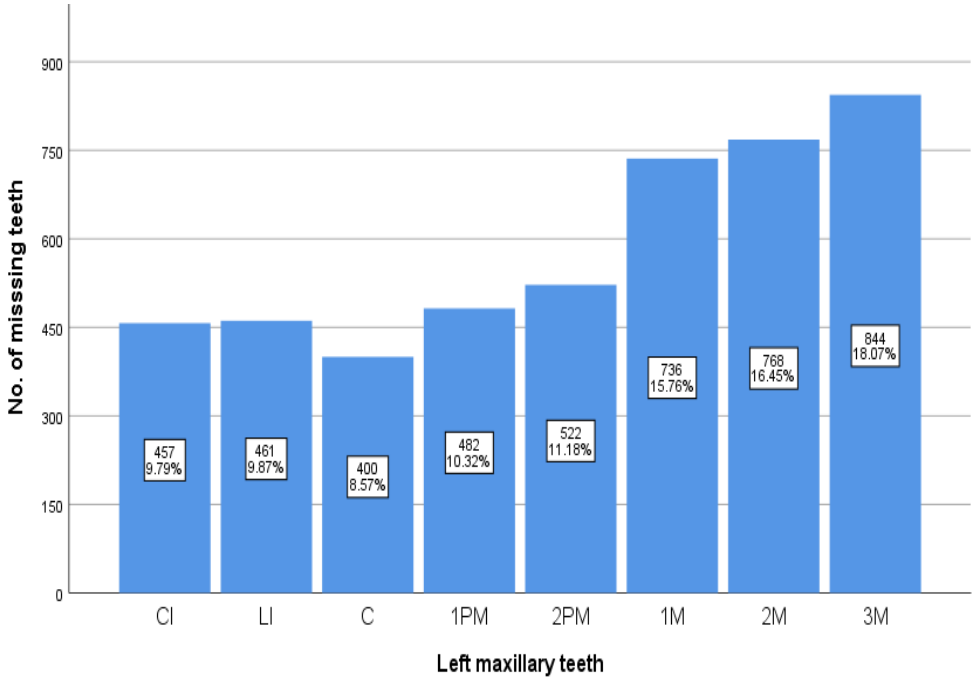

Figure 2: Bar graph denotes the distribution of missing teeth in the left maxillary arch. X axis denotes the left maxillary teeth types and Y axis denotes the number of missing teeth. Maximum number of missing teeth are seen in relation to 3rd molars. [CI-Central incisor; LI- lateral incisor; C-canine ; 1PM- 1st premolar; 2PM- 2nd Premolar ; 1M- 1 st molar; 2M- 2 nd molar ; 3M- 3 rd molar]

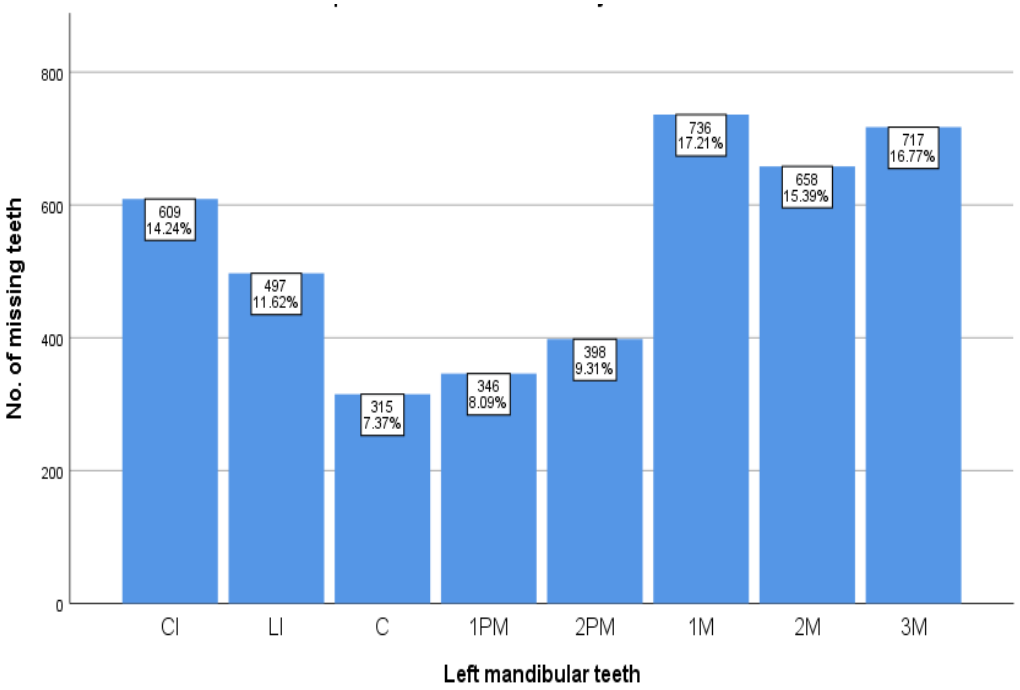

Figure 3: Bar graph denotes the distribution of missing teeth in the left mandibular arch. X axis denotes the left mandibular teeth types and Y axis denotes the number of missing teeth. Maximum number of missing teeth are seen in relation to 1st molar. [CI-Central incisor; LI- lateral incisor; C- canine ; 1PM- 1st premolar; 2PM- 2nd Premolar ; 1M- 1 st molar; 2M- 2 nd molar ; 3M- 3 rd molar]

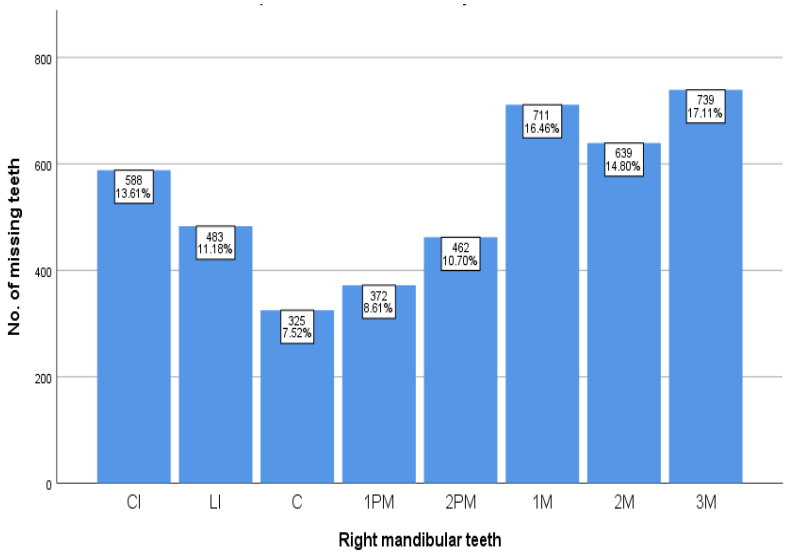

Figure 4: Bar graph denotes the distribution of missing teeth in the right maxillary arch. X axis denotes the right maxillary teeth types and Y axis denotes the number of missing teeth. Maximum number of missing teeth are seen in relation to 3rd molars. [CI-Central incisor; LI- lateral incisor; C- canine ; 1PM- 1st premolar; 2PM- 2nd Premolar ; 1M- 1 st molar; 2M- 2 nd molar ; 3M- 3 rd molar]

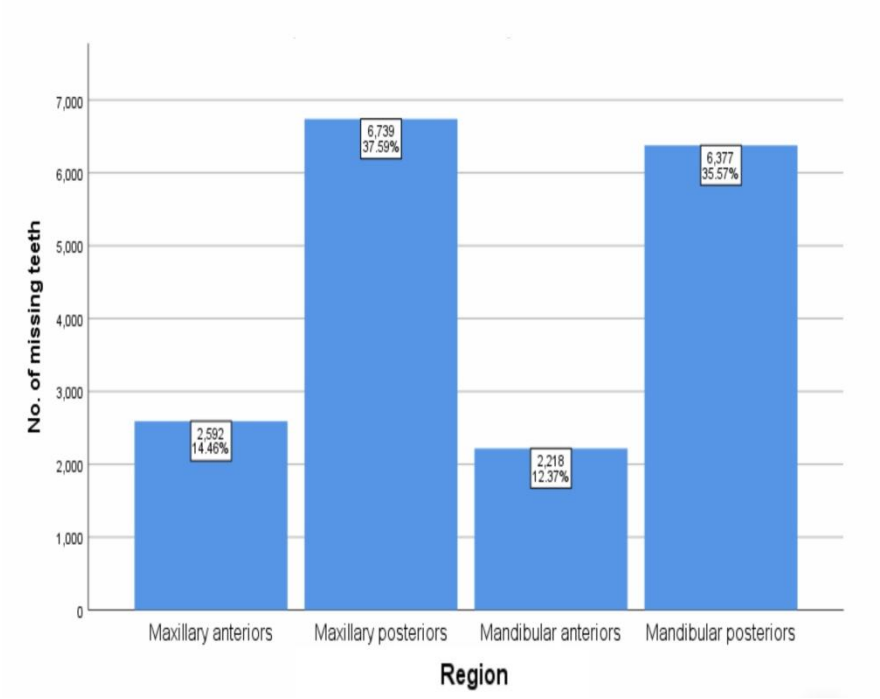

Figure 5: Bar graph denotes distribution of tooth loss in relation to region of teeth (maxillary/mandibular, anterior/posterior). X axis denotes the type of teeth and Y axis denotes the number of missing teeth. It is seen that the maxillary posteriors are missing the most.

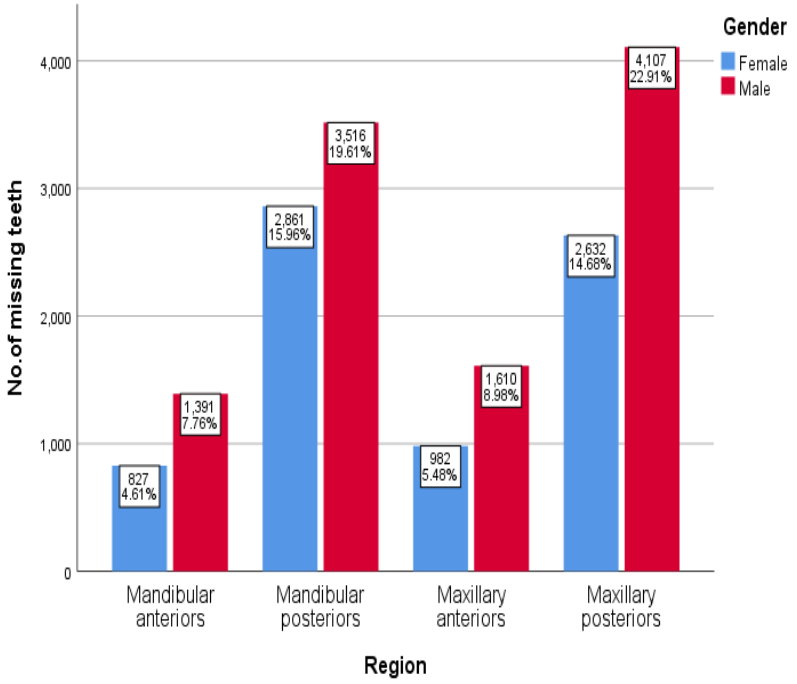

Figure 6: Bar graph shows association between tooth loss in relation to region (maxillary/mandibular, anterior/posterior) and gender of patients. X axis denotes the region of tooth loss and Y axis denotes the number of missing teeth. Males (red) had the maximum number of missing maxillary posteriors than females (blue). Chi-square test shows p value= 0.243, not significant,

proving that there is no significant association between the number of missing teeth in each region and gender of patients.

From the study conducted it was seen that the right and left maxillary anteriors had an incidence of 14.46%, maxillary posteriors at 37.59%, mandibular anteriors at 12.37% and mandibular posteriors 35.57%. Previous studies show that posterior teeth were missing at an incidence of 45.5% and anterior tooth 20.7% [13]. Other forms of diseases causing tooth loss is Generalized aggressive periodontitis (GAP) which is a debilitating form of the disease and it results in deteriorating effects on esthetics and functional aspects of the oral cavity [14]. Studies show that the missing of mandibular anteriors is explained by the opening of the mandibular salivary duct which secretes saliva in turn which proposes action of streptococci which contributes to formation of dental plaque and periodontal disease [13,15]. In elders Periodontitis and COPD share a common risk factor profile, with both diseases showing increased susceptibility of the host to environmental and genetic factors [16]. During extractions LA is being given and Trauma to the inferior alveolar nerve (IAN) is one of the complications during surgical procedures in the posterior mandible. Most of the time, it is due to inaccurate assessment of an operator from conventional radiographs [17].

As regard to the pattern of tooth loss the posterior tooth in the maxillary arch is most commonly involved[13]. The pattern of tooth loss is regarded as one of the most important measures for assessing the standard, availability, utilization of curative and preventive dental care[18,19]. Most cases tooth loss is due to periodontitis in patients above 65 years , thus newer studies aim at determining whether the addition of an autologous platelet rich fibrin (PRF) membrane to a coronally advanced flap (CAF) would improve the clinical outcome in terms of root coverage, in the treatment of isolated gingival recession[20]. Platelet rich fibrin (PRF) is said to be a second generation platelet concentrate which consisting of viable platelets that releases various growth factors such as platelet-derived growth factor, basic fibroblast growth factor, insulin-like growth factor, transforming growth factor, epidermal growth factor and vascular endothelial growth factor[21]. Periodontitis is a chronic inflammatory disease which ends up in the destruction of supporting structures. The etiology is multifactorial with periodontopathogens forming a major crux in the initiation and progression of the periodontitis [22]. Tumor necrosis factor-alpha (TNF-α) is an important pro-inflammatory mediator that causes destruction of periodontal tissues[23]. Once these tissues are lost or rather destroyed, the foremost goal of periodontal therapy is to regenerate the diseased tissues if possible to their original form, architecture, and function [24]. It in the 9.65% of central incisors 9.65%, 9.33% of lateral incisors , 8.35% of canine , 10.30% of 1st premolar , 11.16% of 2nd Premolar 11.16%, 16.61% of 1 st molar , 16.61% of 2 nd molar , 18.34% of 3 rd molar of them were missing in the maxillary arch on the right side. 9.79% of central incisors , 9.87% of lateral incisors, 8.57% of canine, 10.32% of 1st premolar , 11.18% of 2nd Premolar , 15.76% of 1 st molar , 16.45% of 2 nd molar , 18.07% of 3 rd molar were missing in the maxillary arch on the left side . 14.24% of central incisors , 11.62% of lateral incisors , 7.37% of canine , 8.09% of 1st premolar, 9.31% of 2nd Premolar , 17.21% of 1 st molar, 15.39% of 2 nd molar ,

16.77% of 3 rd molars were missing in the mandibular arch on the left side 13.61% central incisors, 11.18% of lateral incisors , 7.52% of canine , 8.61% of 1st premolar , 10.70% of 2nd Premolar , 16.46% of 1 st molar , 14.80% of 2 nd molar, 17.11% of 3 rd molars were missing in the mandibular arch on the right side. Studies show that tooth loss is highly related to age. As there is an increase in age, the periodontal status of the patient might require more care and as a lack of care might become weak and lead to tooth loss [19]. Periodontitis and atherosclerosis both signify a chronic inflammatory process. The incidence of periodontitis among cardiac patients with atherosclerosis is a well-established fact [25]. The study by Braimon shows that 33.7% of maxillary posterior teeth were lost.38.8% mandibular tooth were lost, 14.2% maxillary anterior segments and 13.2% of mandibular anteriors [26].
Inflammation and tissue breakdown are due to inflammatory destructive mediators associated with initiation as well as progression of inflammatory diseases like periodontitis [27]. Plasma rich in growth factors (PRGF) is a concentrated suspension of growth factors that promotes restoration of lost periodontal tissues [28].

The consensus match in the anterior segment but don't in the posteriors as our study shows that maxillary posteriors are more prone to tooth loss, which might be due to the study being conducted in a different ethnic group.
As per the results obtained from our study it is seen that 22.91% of males and 14.68% of females had mandibular posteriors missing, 19.6% of males and 15.96% of females mandibular posteriors missing, 4.61% of males and 7.76% of females had mandibular anteriors missing, 5.48% of males and 8.98% of females had maxillary anteriors missing , hence showing that the males were more suppeptibe to tooth loss. Desavariex et al. concluded similar to our study that more males were prone to tooth loss than females. He also put forth a number of reasons supporting his literature. It was said that as males are associated with more risk factors like smoking , there is a high incidence of tooth loss among the elderly [29].

There are studies that aim to estimate the serum ET-1 levels in healthy subjects and those with chronic periodontitis, pre and post treatment along with correlation of it with the clinical parameters [30]. This can be useful to avoid tooth loss in cases of periodontitis. Studies have stated that ET-1 in gingival tissues obtained from tissues that are affected by chronic periodontitis or gingival overgrowth [31]. Further studies can be carried out on advancements just as hlw studiesaim at comparatively evaluate the levels of cathepsin K (CSTK) in gingival crevicular fluid (GCF) among smoking and nonsmoking patients with chronic periodontitis [32].

Limitations: The limitation included that the people in the study belonged to different ethnicities.

Future scope: The study further aims at creating special preventive therapeutic measures for geriatric patients.

CONCLUSION

Within the limitations of the study it was seen that the pattern of tooth loss observed was the maxillary posteriors having the maximum tooth loss, followed by mandibular posteriors and maxillary anteriors and mandibular anteriors. It was also seen that the males were more prone to tooth loss. However we did not observe any association between the gender of the patients and region of missing teeth.

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CONFLICT OF INTEREST

The authors have no conflict of interest.

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