

## Association between Gingival Recession and Malpositioned Teeth - A Retrospective Cohort Study

Research Article

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### Abstract

Gingival recession is displacement of the soft tissue margin apically leading to root surface exposure. Malposition is the abnormal location of the tooth in the dental arch. In malpositioned teeth, occlusal factors like routine occlusal trauma caused by crowding of lower anterior teeth and the close proximity of the roots to the marginal bone are said to influence gingival recession. The aim of the study was to identify the relationship between gingival recession and malpositioned teeth. The study was a retrospective cross sectional study. The case details of the patients who reported to Saveetha Dental College during the period of June 2019 to March 2020 were included in the study. The patients with malpositioned teeth were identified and the gingival recession was evaluated in these patients. From the present study, among patients with malpositioned teeth the prevalence of gingival recession was found to be 22%, class I gingival recession was seen 59.09 %, class II gingival recession was seen 22.73% and class III gingival recession was seen 18.18% among patients with malpositioned teeth. The present study concludes that among the patients with malpositioned teeth, the class I gingival recession was seen more in the 21 to 30 years age group, class II and class III gingival recession was seen more in the 51 to 60 years age group. The malpositioned teeth most commonly seen with gingival recession was the mandibular anterior teeth.

**Keywords:** Gingival Recession; Malpositioned Teeth; Correlation.

### Introduction

Gingival recession is displacement of the soft tissue margin apically leading to root surface exposure. A variety of etiological factors are thought to cause recession of the gingiva, which are improper oral hygiene habits [1], tooth malposition [2], high muscle attachments and frenal pull [3], bone dehiscences [4], and iatrogenic factors related to various restorative and periodontal procedures [5]. Gingival recession develops due to anatomical and pathological factors. The prevalence of recession is dependent on the age and characteristic of the population because it usually presents in individuals with periodontal disease or those who practise improper oral hygiene methods [6]. Gingival recession is said to commonly result in periodontitis [7].

Periodontitis is a multifactorial disease, with the primary etiological agent being plaque microflora. Research has also shown that periodontal microflora is similar to that found in atheromatous plaques [8]. Cytokines play an important role in the pathogenesis and progression of periodontitis and the levels of TNF, endothelins, IL-21 and varies in chronic and aggressive periodontitis [9-12]. Periodontal disease can be a risk factor for cardiac disease and COPD [8, 11, 13, 14] and it is important to manage periodontal disease effectively and treat osseous defects for implant treatment [15]. Platelet rich fibrin and growth factors offer advantage over other forms of treatment [16, 17]. Researchers have attempted various regenerative methods [16-19] like PRF, growth factors and stem cells to salvage the destruction of periodontal tissues in chronic as well as aggressive forms of periodontitis [20]. The treatment modalities for chronic periodontitis and aggressive periodontitis though basically remain the same, antimicrobial

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therapy has provided added advantage in treating aggressive periodontitis cases [21]. Herbs have been used as antimicrobial agents in treating periodontal disease. Effectiveness of various herbal mouthwashes have been tested in different periodontal diseases [22].

Malposition is the abnormal location of the tooth in the dental arch. Out of the several pathologies that affect the oral cavity, malocclusion is the third most important problem in the world population. Abnormal tooth positions may already be present in the deciduous dentition. Therefore, dental care professionals, such as pediatric dentists and orthodontists, should act preventively to ensure correct tooth positioning and to avoid or reduce malocclusion that may perpetuate in the mixed and permanent dentitions [12, 18, 23].

Early diagnosis of any type of malocclusion provides information to direct treatment and, therefore, prevent periodontal diseases [24]. Orthodontic treatments, as part of periodontal rehabilitation programs, may bring benefits, such as the improvement of access for dental hygiene, adequate competency of lips and reestablishment of occlusal balance [25]. However Malocclusion alone does not directly result in periodontal disease, several studies on types of malocclusion, as well as of isolated malpositioned teeth and its effect on clinically healthy periodontal tissues, showed that most individuals had deficient oral hygiene and consequent accumulation of bacterial plaque, which may cause, in some cases, gingival inflammation, the most common periodontal problem [26]. Studies have also revealed the importance of oral hygiene instructions and referral to orthodontic treatment as preventive measures. When the periodontium has already been affected, its response is different and, in addition to the physiological response to the accumulation of bacterial plaque [11, 17, 27].

All types of tooth malposition, such as diastemas, crowding, rotated teeth, incisor proclination and mandibular molar tipping, may result in early tooth loss due to the formation of periodontal pockets on the mesial surface of the tooth involved, because the bone crest tends to follow the cemento-enamel junction [10, 16, 28]. Tooth malpositions, high muscle attachment, frenal pull, calculus and iatrogenic factors related to restorative, periodontal treatment procedures and incisor inclination and orthodontic treatments have been associated with gingival tissue recession [9, 13, 29]. previous studies suggest that malocclusions and malpositioned teeth were significant factors in the etiology of periodontal disease like gingival recession [15, 19, 30].

Baker et al., [31] in his study stated that malocclusion is a major etiological agent in the pathogenesis of gingival recession. In malpositioned teeth, occlusal factors like routine occlusal trauma caused by crowding of lower anterior teeth, thrusting of mandible anteriorly on occluding because of posterior interdigitation are also sought to be causes of gingival recession [8, 14, 22, 32]. The amount of gingival recession was classified by many authors based on the involvement of the soft tissue and its relationship with the mucogingival junction by Sullivan and Atkins [33], Miller's classified gingival recession as shallow narrow and shallow deep, which is difficult to employ in epidemiological studies, so in the present study the amount of gingival recession was calculated by measuring the amount of gingival recession from the cemento-enamel junction using a periodontal probe based on Nagappa and Mukta's classification of gingival recession [34], which stated that

Class I – Apical shift in the crest of marginal gingiva 1–2 mm from CEJ, Class II - Apical shift in the crest of marginal gingiva >2 mm <3 mm from CEJ and Class III - Apical shift in the crest of marginal gingiva  $\geq$ 3 mm from CEJ

The present study is conducted to identify the relationship between gingival recession and malpositioned teeth. The objectives of the present study were (i) to identify the prevalence of gingival recession among patients with malpositioned teeth (ii) to identify the amount of gingival recession among various age groups.

## Materials and Methods

The study setting was that it was done under university setting, the pros of the study was data retrieval and ethnicity and the cons were that the study was not performed under different geographical locations. The study approval was by the institutional ethical board (SIHEC/2020/DIASDATA/0619-0320) of Saveetha dental college and hospital. The participants included in the study were there who visited Saveetha dental college and hospital during the period of June 2019 to March 2020 and had malposition of teeth. The data was collected by evaluating the retrospective data of patients who visited the institution. The patients with malpositioned teeth were selected and the gingival recession was evaluated among various age groups, the data collected was cross verified for errors and the data was entered in Microsoft MS Excel sheet and it was imported to IBM SPSS version 20 and the data analysis was done by descriptive statistics and the results were tabulated.

## Result and Discussion

From the present study among patients with malpositioned teeth the prevalence of gingival recession was found to be 22%, class I gingival recession was seen 59.09%, class II gingival recession was seen 22.73% and class III gingival recession was seen 18.18% among patients with malpositioned teeth.

From table 1 and figure 1 we can infer that among patients with malpositioned teeth the gingival recession was seen maximum in the 21 to 30 years age group which was 36.6% class I, and 9.09% both class II and class III. The amount of gingival recession was not statistically significant when compared between various age groups in patients with malpositioned teeth (P value - 0.773) Pires et al., [35] in a similar study stated that the presence of gingival recession in the anterior lingual mandibular region of a young population was associated with age. Younes et al., [36] stated that Incidence of gingival recession in the mandibular central incisor region was examined in a sample of 1336 male and female Saudi school children aged between 10 and 15 years and the amount of gingival recession was found in 9.88%.

From table 2 and figure 2 we can infer that the amount of gingival recession was maximum among males (63.64%) compared to females (36.36%). The gingival recession was not statistically significant when compared between males and females in patients with malpositioned teeth (P value - 0.156). Abu alhaija et al., [24] similar study stated that there was no association between irregularity of teeth and periodontal diseases in presence of good oral hygiene. Estela et al., [26] in a similar study stated that the malposition of teeth is associated 67.8% with gingival recession.

Table 1. Shows gingival recession in different age groups among patients with malpositioned teeth, Chi square test 0.773, p value > 0.05 - not statistically significant.

		gingival recession			Chi square test
		class 1	class 2	class 3	
age groups	10 to 20 years	9.09	4.55	4.55	0.773
	21 to 30 years	36.36	9.09	9.09	
	31 to 40 years	9.09	4.55	0	
	41 to 50 years	4.55	0	0	
	51 to 60 years	0	4.55	4.55	
Total		59.09	22.73	18.18	

Table 2. Shows gingival recession recorded in males and females among patients with malpositioned teeth. Chi square test 0.156, p value > 0.05 - not statistically significant.

		gingival recession			Chi square test
		class 1 %	class 2 %	class 3 %	
Gender	male	31.82	22.73	9.09	0.156
	female	27.27	0	9.09	
Total		59.09	22.73	18.18	

Figure 1. Shows gingival recession in different age groups among patients with malpositioned teeth (X axis shows age groups, Y axis shows percentage of patients. Chi square test, p value 0.773 (> 0.05) there was no statistically significant association between gingival recession and age groups, the class I (blue) gingival recession was seen maximum among 21 to 30 years age group.

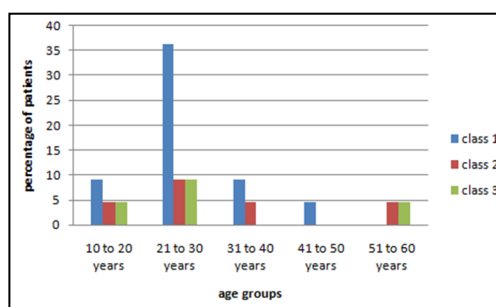
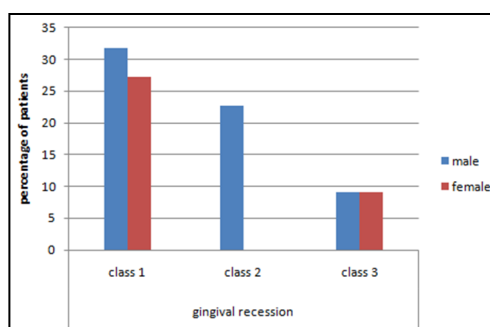


Figure 2. Shows gingival recession recorded in males and females among patients with malpositioned teeth (X axis shows gingival recession and Y axis shows percentage of patients, Chi square test, p value 0.156 (> 0.05) there is no statistically significant association between gingival recession and gender, the class I gingival recession was seen commonly among males (blue) and females (red) with malpositioned teeth.



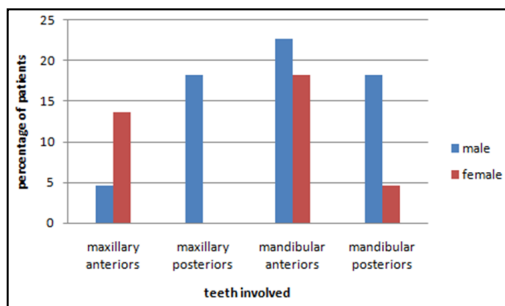
From table 3 and Figure 3 we can infer that the gingival recession was maximum in the mandibular anterior teeth (40.91%) among males (22.73%) and females (18.18%), this may be due to the reason that malocclusion seen in the mandibular anteriors are usually either crossbite or edge to edge bite cases due to which excessive occlusal force is transferred to those teeth in malocclusion leading to pathological periodontal changes like gingival recession, Mazurova et.al., [37] in a similar study stated that gingival recession

was commonly seen in the mandibular anteriors (19.3%) and was due to the reason that the bone covering the labial aspect of mandibular anteriors are thin and the proclination of the incisors may facilitate formation of dehiscences of alveolar bone leading to gingival recession. Hossam A. Eid et.al., [38] in a similar study stated that gingival recession was seen in mandibular teeth with crowding 21.2%.

**Table 3. Shows gingival recession recorded in various teeth among patients with malpositioned teeth, Chi square test 0.127, p value > 0.05 - not statistically significant.**

		maxillary anteriors%	maxillary posteriors%	mandibular anteriors %	mandibular posteriors %	Chi square test
gender	male	4.55	18.18	22.73	18.18	0.127
	female	13.64	0	18.18	4.55	
Total		18.19	18.18	40.91	22.73	

**Figure 3. Shows gingival recession and teeth involvement among patients with malpositioned teeth (X axis shows teeth involved and Y axis shows percentage of patients, Chi square test, p value 0.127 (> 0.05) there is no statistically significant association between gingival recession and teeth involvement, the gingival recession was seen commonly in mandibular anteriors among both males (blue) and females (red) with malpositioned teeth.**



From present study we can infer that 22% of patients that had malpositioned teeth had some type of gingival recession in several degrees of severity. Shoba et.al., [39] reported that Overall prevalence of malocclusion was 89.9% among the south Indian population. So malpositioning should not be overlooked at the phase of early detection of dental care professionals should make therapeutic decisions as early as in the first visit of the patient if not the malposition may result in periodontal problems like gingival recession.

Clinical periodontal health is essential for the success of any type of orthodontic treatment in the same way that orthodontic correction should not result in damage to periodontal tissues. Therefore, dental care professionals should combine their efforts and act according to a predetermined treatment plan for each patient. Although the main etiological factor of periodontal disease is the bacterial plaque, other factors are usually associated and may lead to changes in host responses. Of these factors, malpositioned teeth is a predisposing factor because oral hygiene becomes more difficult and bacterial plaque is retained and accumulates and, therefore, proliferates and leads to pathological periodontal changes like gingival recession [26].

The findings from the present study adds on to the consensus with previous similar studies and the limitation of the present study was conducted among patients visiting a dental hospital only and cannot be generalized to the whole population, Further studies can be done in future among a larger population.

**Conclusion**

The present study concludes that among the patients with malpositioned teeth, the class I gingival recession was seen more in the 21 to 30 years age group, class II and class III gingival recession was seen more in the 51 to 60 years age group. The malpositioned teeth most commonly seen with gingival recession was the mandibular anterior teeth.

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