Prevalence and Aetiology of Gingival Recession in Mandibular Anterior Teeth

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ABSTRACT

Introduction: Periodontal disease is a significant oral health problem in developing countries. Hence, gingival recession which is a sign of periodontal disease is of great concern. Several factors affect gingival recession and its aetiology is complex. Tooth malposition, tooth shape, position in the arch, periodontal disease and treatment, iatrogenic, restorative or operative treatment, and improper oral hygiene methods are some of the known aetiological factors.

Objective: To assess the prevalence of gingival recession and its associated factors in the mandibular anterior teeth.

Materials and Method: A cross-sectional descriptive study was conducted in 260 patients of age group ≥ 18 years attending the dental department of Bir Hospital from 15-31 December, 2013. Ethical clearance was obtained before starting the study. Patient unwilling to sign an informed consent were excluded. Height of recession was measured in the mid labial region. Oral hygiene behaviour, oral hygiene status, and plaque scores were taken and presence of tooth malposition was also recorded. Data was entered in Microsoft Excel and analysed for descriptive statistics.

Result: Prevalence of gingival recession was seen in 121 (46.54%) of participants. No significant difference was found between male and female subjects. Prevalence was found to increase with age, cigarette smoking, oral hygiene status, and teeth malposition.

Conclusion: Prevalence of gingival recession in the mandibular anterior teeth was observed in about half the study population. For better oral health, patients should be counselled on good oral hygiene measures, tobacco cessation guidelines, and regular dental check-ups.

Keywords: Aetiology; gingival recession; mandibular anterior teeth.

INTRODUCTION

Gingival recession is the exposure of root surface by an apical shift in the position of gingival margin.[1] It may be localised or generalised and associated with one or more tooth surfaces. It leads to root exposure which is not aesthetically desirable and may lead to sensitivity and root caries. It is a common condition and its extent and prevalence increases with age. Several factors are associated with marginal gingival recession and its aetiology is complex. Two major

causative factors are plaque-induced local gingival inflammation and traumatic tooth-brushing. About 50% of the population has one or more sites with gingival recession and this prevalence rate increases to greater than 88% for individuals of 65 years and above.[2] Epidemiological studies done in western population had prevalence that varied from 50% to 90%.[3] However, periodontal disease is more prevalent in developing countries than in developed countries and since recession is a sign of periodontal disease, its prevalence and aetiology is of great concern.[4] Objective of this study was to estimate the prevalence of gingival recession in mandibular anterior teeth and also to assess the potential risk factors for the same in patients who attended the outpatient dental department of Bir Hospital.

MATERIALS AND METHOD

A hospital based cross-sectional descriptive study was conducted from 15-31 December 2013. The patients for this study were selected from the outpatient dental department of National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal. Written informed consent was obtained from participants who voluntarily agreed and the ethical clearance was obtained from the ethical committee of National Academy of Medical Sciences. All the expenses were borne by the principal investigator. Patients aged 18 years and above having all mandibular incisor teeth were included. Patients with extensive restorations and prosthesis in mandibular anterior region were excluded. Participants were recruited by convenience (nonprobability) sampling. The sample size of 262 was calculated by using the formula: $n= Z^2pq/d^2=261.96$; Where p= 78.2[5]; q=100-p; Z= 1.96 at 95% confidence level; d= tolerable error = 5%. The data was collected by clinical intraoral examination and verbal questionnaire. Clinical intraoral examination was carried out on a dental chair using mouth mirror and a University of North Carolina (UNC)-15 periodontal probe. The distance from the cementoenamel junction (CEJ) to the free gingival margin (FGM) was assessed at midlabial position. Gingiva recession was defined as the CEJ-FGM distance when the gingival margin was located on the root. The position of the CEJ was determined by visual observation and the "slight scratch" of a periodontal probe on the cervical tooth area in a cervico-occlusal direction. Total number of gingival recession sites in the mandibular anterior region was recorded for each patient. Furthermore, gingival recession scores were categorised as follows: 1–3 mm; 4–5 mm; and > 5 mm. In cases on which the CEJ was covered by calculus, hidden by a restoration, or possibly lost due to wear or carious lesions, the location of such junction was estimated on the basis of the adjacent teeth. Tooth malpositions including overeruption, rotation, and other malalignment were also recorded. Oral hygiene index by Greene and Vermilion[6] was used to know the oral hygiene status. Data was entered in Microsoft Excel sheet and analysed for descriptive statistics.

RESULT

In the present study, out of 260 subjects examined, gingival recession in mandibular anterior region was seen in 121 (46.54%) participants (Table 1). There was a total of 147 (56.54%) females and 113 (43.46%) males (Table 2, 3). Of 147 females, 62 (42.18%) had gingival recession while 59 (52.21%) out of 113 males had gingival recession (Table 1). The mean age of the participants was 38.46±12.06 years (minimum 19 years and maximum 71 years). Maximum percentage of gingival recession was found in the 50-59 years age group (27, 62.79%) and minimum was found in 20 to 29 years age group (25, 32.89%) (Table 1). It was also observed that the mandibular right central incisor (R1) had the highest percentage (115, 44.23%) of gingival recession (Table 4, Figure 1). Maximum percentage of gingival recession was found in subjects using hard brush (11, 50%) (Table 1). Among the total population of 195 non-smokers, 81 subjects (41.54%) had gingival recession (Table 1). Among 18 subjects who used smokeless tobacco, 14 (77.78%) had gingival recessions (Table 1). The result was also significant for oral hygiene index as 60 (81.08%) subjects with poor oral hygiene status, 51 (77.27%) of individuals with poor plaque index, and 33 (80.49%) subjects with tooth malposition had gingival recession (Table 1). In the method of brushing, both the participants using vertical technique had gingival recession (2, 100%).

Table 1: Prevalence of recession with respect to demographics and oral parameters.

Particulars		Frequency	Recession, n (%)
Age in years	≤ 19	1	-
	20-29	76	25 (32.89)
	30-39	53	21 (39.62)
	40-49	74	42 (56.76)
	50-59	43	27 (62.79)
	≥ 60	13	6 (46.15)
		260	121 (46.54)
Sex	Male	113	59 (52.21)
	Female	147	62 (42.18)
Frequency of brushing	Once	168	74 (44.05)
	Twice	92	47 (51.09)
Type of toothbrush	Hard	22	11 (50)
	Medium	200	92 (46)
	Soft	38	18 (47.39)
Method of brushing	Combined	166	79 (47.59)
	Horizontal	92	40 (43.48)
	Vertical	2	2 (100)
Smoking	Yes	65	40 (61.54)
	No	195	81 (41.54)
Smokeless tobacco	Yes	18	14 (77.78)
	No	242	107 (44.21)
Oral hygiene index	Good	73	12 (16.44)
	Fair	113	49 (43.36)
	Poor	74	60 (81.08)
Plaque index	Good	78	17 (21.79)
	Fair	116	53 (45.69)
	Poor	66	51 (77.27)
Malposition	Yes	41	33 (80.49)
	No	219	88 (40.18)

Table 2: Distribution of demographics, oral hygiene habits, and other oral parameters.

Particulars		n (%)
Age in years	≤ 19	1 (0.38)
	20-29	76 (29.23)
	30-39	53 (20.38)
	40-49	74 (28.46)
	50-59	43 (16.54)
	≥ 60	13 (5)
Sex	Male	113 (43.46)
	Female	147 (56.54)
Frequency of brushing	Once	168 (64.62)
	Twice	92 (35.38)
Type of toothbrush	Hard	22 (8.46)
	Medium	200 (76.92)
	Soft	38 (14.62)
Method of brushing	Combined	166 (63.85)
	Horizontal	92 (35.38)
	Vertical	2 (0.77)
Smoking	Yes	65 (25)
	No	195 (75)
Smokeless tobacco	Yes	18 (6.92)
	No	242 (93.08)
Oral hygiene index	Good	73 (28.08)
	Fair	113 (43.46)
	Poor	74 (28.46)
Plaque index	Good	78 (30)
	Fair	116 (44.62)
	Poor	66 (25.38)
Malposition	Yes	41 (15.77)
	No	219 (84.23)

Table 3: Distribution of gingival recession and sex in various age groups, n (%).

Age group (years)	Recession		Sex	
	Yes	No	Male	Female
≤ 19	-	1 (0.72)	1 (0.88)	-
20-29	25 (20.66)	51 (36.69)	41 (36.28)	35 (23.81)
30-39	21 (17.36)	32 (23.02)	15 (13.27)	38 (25.85)
40-49	42 (34.71)	32 (23.02)	31 (27.43)	43 (29.25)
50-59	27 (22.31)	16 (11.51)	21 (18.58)	22 (14.97)
≥ 60	6 (4.96)	7 (5.04)	4 (3.54)	9 (6.12)
Total	121 (100)	139 (100)	113 (100)	147 (100)

Table 4: Extent of gingival recession on each tooth (mm).

Tooth	Recession, n (%)	Mean±SD, mm	SEM	Minimum	Maximum
Left central incisor (L1)	102 (39.23)	0.80±1.17	0.073	0	5
Left lateral incisor (L2)	73 (28.08)	0.60±1.12	0.069	0	7
Left canine (L3)	63 (24.23)	0.56±1.13	0.070	0	6
Right central incisor (R1)	115 (44.23)	0.92±1.24	0.077	0	5
Right lateral incisor (R2)	79 (30.38)	0.65±1.16	0.072	0	7
Right canine (R3)	63 (24.23)	0.58±1.17	0.072	0	5

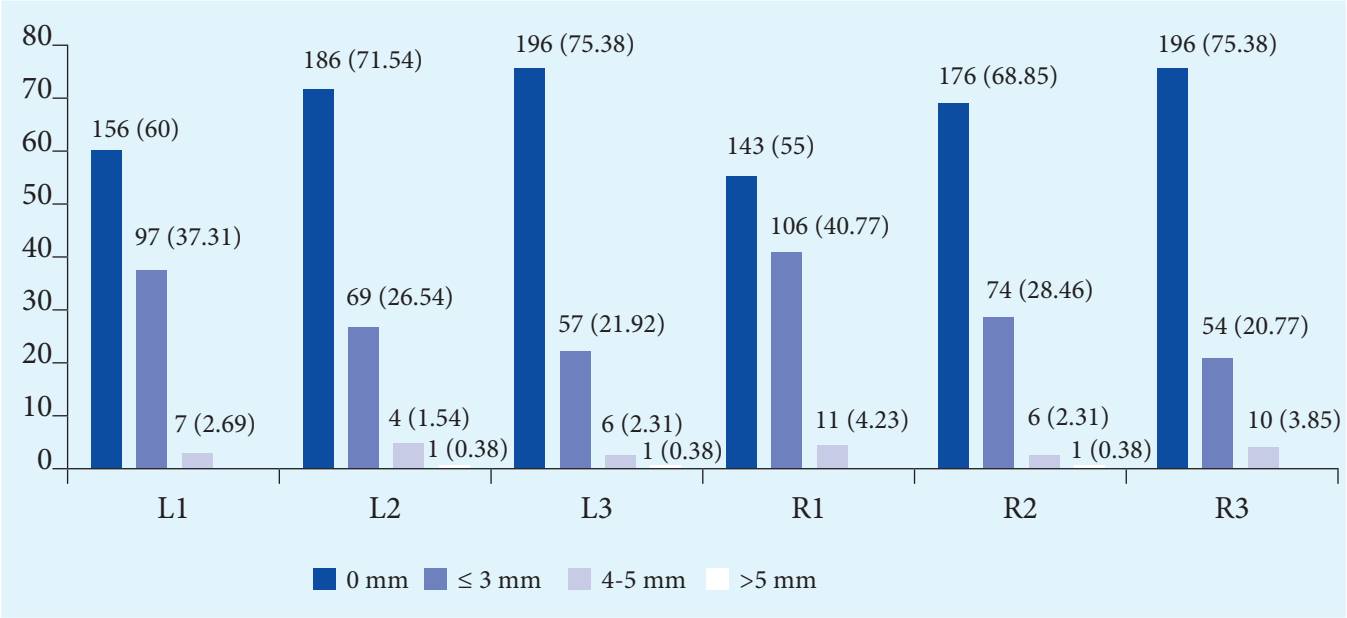

Figure 2: Percentage distribution of subjects based on intensity of impact on performance.

DISCUSSION

In the current study, individuals meeting the inclusion criteria were selected among patients who visited the dental department of Bir Hospital. Gingival recession in the mandibular anterior region was selected as the mandibular incisors are one of the most frequently affected regions for gingival recession. The mandibular anterior region is also an area of great aesthetic concern to the patient having very high therapeutic possibilities. The main findings of the current study was that 121 (46.54%) of the total samples had gingival recession present in the mandibular anterior region. This was in agreement with the study by Manchala et al.[7] which also showed that mandibular central and lateral incisors had the highest prevalence of gingival recession when compared to other teeth. The larger occurrence of gingival recessions in the mandibular teeth is probably related to the characteristics of the keratinised mucosa, which is wider and also thicker in the maxilla than in the mandible, since a strong correlation has been observed between the quantity and quality of gingival tissue.

In this study, 42.18% of females had gingival recession in mandibular anterior teeth while 52.21% of male subject had recession. Though this difference is not great, finding is consistent with previous studies which also show increased prevalence of gingival recession in males like Toker and Ozdemir (2009)[5] and Slutzkey and Levin (2007).[8]

In the present study the subjects were grouped into six age groups and the prevalence of gingival recession seemed to increase with increasing age with 32.89% prevalence in 20-29 age group, 39.62% in 30-39, 56.76% in 40-49, and a maximum of 62.79% in 50-59 age group. However a drop

to 46.15% was seen in age group ≥ 60 years and this could have been because there were only 13 individuals in this age group. The increase in percentage of recession with age is consistent with other studies like the one by van Palenstein et al. (1998)[9] who also showed that recession increased with age. Similarly Kassab and Cohen (2003)[2] estimated that 50% of the population had one or more sites with 1 mm or more of gingival recession and this prevalence rate increases to greater than 88% for individuals who are 65 years or older. The increase in prevalence of recession with age is consistent with other studies. The relationship between increased prevalence of gingival recession and age could be due to the cumulative effect of age, periodontal disease, and longer period of exposure to the agents that cause gingival recession.

In the present study, the relation of type of brush, frequency of brushing, and method of brushing with gingival recession was assessed and the result was not significant. This is in contradiction to previous studies and could be due to small sample size and non-stratification of samples (poor sampling technique or convenience sampling).

The oral hygiene status of subjects including the debris and presence of supra- and sub-gingival calculus was found to be associated with gingival recession. Susin et al.[10] in their Brazilian study, suggested that the presence of supragingival calculus was strongly associated with gingival recession. They suggested that compared to subjects with low levels of calculus, and after adjusting for other variables, 14 to 29 year old individuals with > 15% sites with calculus had 2.3 and 3.8 times higher risk for having localised and generalised recession ≥ 1 mm, respectively. In addition, subjects 30 years of age or older, and with 25% to 50% and > sites with calculus, respectively, had 2.2, and 6.4 times higher risk for having generalised recession ≥ 3mm.

Another aetiological factor that has been strongly associated with gingival recession is smoking. In this study also, the subjects were asked about their smoking history. A total of 25% of participants smoked cigarettes while only 6.92% used smokeless tobacco (Table 2). Among the subjects who smoked cigarettes, 61.54% had gingival recession while 41.54% non-smokers had gingival recession (Table 1). There is ample evidence in literature of a strong association between cigarette smoking and attachment loss.[11] Study by Chrysanthakopoulos[12] has showed that tobacco smoking was regarded as one of the main risk factors for development of destructive forms of periodontal disease. Toker and Ozdemir[5] also suggested that the combination of smoking and supragingival calculus was associated with localised and generalised gingival recession. In a study by Manchala et al.,[7] the prevalence of recession in smokers was relatively high when compared to non-smoker individuals. The relative risk for localised recession was 2.1 for moderate to heavy smokers and for generalised recession it was 4.2 for the same.

A Nigerian study by Arowojolu[13] showed that among other factors, tooth malalignment was an associated factor for recession. Similarly, Indian study by Dodwad[14] and Greek study by Chrysanthakopoulos[12] also showed malalignment as an associated factor. However, an Iranian study by Lafzi et al.[15] showed no relationship between gingival recession and tooth malposition.

Although this study has suggested a significant relation of gingival recession with some probable aetiological factors, causal inference cannot be drawn as this is a cross-sectional descriptive study done in a very short duration of time. The sample size is also quite small for a prevalence study . Convenience sampling was done so no stratification of samples could be done and hence there were very few samples in certain subgroups. Also clinical examination was made manually and is subject to intraoperative variation.

CONCLUSION

Gingival recession is multifactorial and its occurrence is always the result of more than one factor acting together. There are probably many more implicating factors other than the ones already stated in the current study in the initiation of gingival recession that may not have been considered in the present study. A large population based studies could be done to find out the cause and effect relationship. Studies with detailed examination including the

classification of recession defect is needed in order to clearly know the association of causative factors and severity of recession and possible preventive and therapeutic approaches.

Conflict of Interest: None.

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