

Epidemiology of gingival recession and risk indicators in dental hospital population of Bhimavaram

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Abstract

Objective: Gingival recession (GR) is a common manifestation in most populations, and is considered as an early sign of periodontal disease. GR is an intriguing condition where various factors play an important role in its etiology. Only few studies have been undertaken to assess the prevalence and risk factors for GR in patients visiting dental hospitals. The aim of this study is not only to estimate prevalence, severity, and extent of GR in hospital population, of Vishnu Dental College, Bhimavaram, Andhra Pradesh, India, but also to assess the potential risk factors for the same. **Materials and Methods:** In this study, 2837 patients were examined of which 627 were included into the study. The age range was 16-80 years. Subjects were interviewed using a structural questionnaire, and full mouth clinical examination was done to assess recession. **Results:** Of all subjects examined 45.6%, 16.2% of individuals and 13%, 4.8% of teeth per individual showed GR >3 mm. Prevalence and severity of recession was correlated with age. Recession was present but recession threshold ≥ 3 and ≥ 5 mm affected only small percentage of teeth in subjects younger than 45 years. Mandibular incisors showed the highest prevalence of GR ≥ 1 mm with 61% of teeth being affected. Smoking and presence of supragingival calculus were most significantly associated localized and generalized recession. **Conclusion:** Prevalence of periodontal disease is high among this population based on the presence of gingival recession in most the individuals. High prevalence of GR is significantly associated with supragingival calculus and smoking habits. This suggests a need to improve their periodontal condition through education, motivation, and improving their periodontal health.

Key words: *Epidemiology, gingival recession, risk factors*

INTRODUCTION

Gingival recession (GR) has been defined as the condition in which the gingival margin is located apical to the cemento-enamel junction and the root is exposed to the oral environment,^[1-3] resulting in problems such as root caries,^[4-8] dental hypersensitivity,^[9-11]

and esthetic problem,^[12,13] probably one of the most esthetic concerns associated with the periodontal tissue. However, till date the exact mechanism for gingival recession is not well understood, as various etiological factors have been reported. The main etiological factor for GR is due to the accumulation of dental plaque resulting in gingival inflammation.^[1,14-18] Along with these, the other risk factors include developmental defect such as bone dehiscence,^[19] chronic trauma that may arise from habits such as chronic impaction of foreign bodies against the gingiva,^[1,12,20] frictional injury due to scratching of gingival, and also abnormal tooth cleaning.^[18,21-24] Others include tooth malposition of teeth,^[25,26] gingival ablation, abnormal frenum attachment,^[1,21,27] ageing,^[28-30] smoking,^[10,31,32] and iatrogenic dentistry.^[20]

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Unlike other periodontal conditions such as pockets and furcation involvement that are unnoticed or unrecognized, GR however is clinically visible and the changes are well noticed and reported by the patient to the dentist that is of great concern. A large number of epidemiological studies have been done on the prevalence and occurrence of gingival recession in western population than in Indian population.^[15,16,21,22,33-37] The prevalence varied from 50-90% among these populations.^[38] However, periodontal disease is more prevalent in developing countries than in developed countries and since recession is a sign of periodontal disease it is of great concern.^[1] The aim of this study is to estimate the prevalence, severity, and extent of gingival recession in patients who attended for outpatient department of Vishnu dental college, Bhimavaram, Andhra Pradesh, India, and also to assess the potential risk factors for the same.

MATERIALS AND METHODS

Study population

The study was carried out at department of periodontics, Vishnu dental college. All patients were been evaluated for GR from May-August 2010. Samples of 2837 patients were examined of which 627 (22%) were included into the study. Study population age ranged from 16-80 years (mean: 32.5 SD) there were 424 (67.6%) males; 203 (33.4%) females. Table 1 shows the distribution of patients according to age and gender. Gingival recession was defined as distance from the cemento-enamel junction (CEJ) to the free gingival margin (FGM) was measured with the help of University of North Carolina-15 (UNC-15) probe. All measurements were made in mm and were rounded to the nearest mm. All permanent fully erupted teeth excluding third molars were examined and measurements were made at six sites per tooth: Mesio buccal, mid buccal, disto buccal, mesio lingual, mid lingual, disto lingual, and the highest measurement

was recorded. Gingival recession was scored as zero if the FGM was located at the CEJ, and was assigned a negative if FGM was coronal to CEJ.

Ethical considerations

The study was reviewed and approved by the institutional review board of Vishnu dental college, Bhimavaram, India. Written informed consent was taken from every participant prior to the study and at the end of the study all the patients were treated according to the particulars mentioned in the case sheet.

Measurement of reproducibility

All measurements were made by two examiners. Both the examiners were trained, intraexaminer and interexaminer reliability was assessed with Kappa statistics.

Data analysis

Prevalence was defined as the percentage of individuals having at least one tooth with the condition and extent as the percentage of teeth per person having at least one site with the condition. Mean gingival recession was calculated and was used as a measure of the condition severity in the population. Severity was also assessed as the threshold for gingival recession.

A total exposure to cigarette was calculated for current smokers only and was made separate for younger (16-35 years) and older (>35 years) cohorts. Number of cigarettes smoked were calculated and classified accordingly. The presence of supragingival dental calculus was categorized in to three categories according to the percentage of sites with calculus. Data analysis was done with Statistics Package for the Social Sciences (SPSS) software version-10. A weight variable was used to adjust the probability of selection and deviations in the sample distribution from the target population distribution by age and gender. Pairwise comparisons of crude estimations were carried out by using Wald's test and 95% confidence intervals were calculated. Multinomial logistic regression analysis was done between gingival recession and potential variables.

A new variable was calculated and used as the department variable in the analysis, based on the extent of gingival recession ≥ 1 or ≥ 3 mm for individual below 35 and above 35 years. Hence, the subjects were scored as having localized or generalized recession in between 1% and 15%, or $\geq 16\%$ of the teeth were affected, respectively. Individuals without ≥ 1 or ≥ 3 mm

Table 1: Age and gender classification of study population

Age (yrs)	Sex		Total (%)
	Male (%)	Female (%)	
16-25	63 (69)	28 (31)	91 (15)
26-35	92 (70)	40 (30)	132 (21)
36-45	104 (61)	67 (39)	171 (27)
46-55	83 (64)	46 (36)	129 (21)
56-65	58 (76)	18 (24)	76 (12)
>65	24 (86)	4 (14)	28 (4)
	424 (68)	203 (32)	627

recession below 35 years or above 35 years were used as the reference group in the model. In both the analyses the multinomial logistic regression method was used to assess the contribution of the independent variables to the probability of occurrence of localized or generalized gingival recession, separately, compared to nonoccurrence of gingival recession. The probability of occurrence of recession was expressed as a relative risk ratio (RRR) that is equivalent to the odds ratio statistics in the ordinary logistic regression.

RESULTS

In all 79.4%, 45.6%, 16.2% of the individuals and 37.5%, 13%, 4.8% of teeth per individual showed GR ≥ 1 , ≥ 3 , and ≥ 5 mm, respectively. The prevalence, severity, and extent of recession were correlated with the age [Table 2]. Recession was present but recession threshold ≥ 3 and ≥ 5 mm affected only small percentage of teeth in subjects younger than 45 years. On the other hand moderate recession was ubiquitous in the older age group. Among subjects aged 45 years or old, $\geq 79\%$ of subjects and $\geq 32\%$ of teeth per subject had recession more than 3 mm.

In subjects less than 35 years, mandibular central and mandibular lateral incisors showed the highest prevalence of gingival recession of ≥ 1 mm with (35%) and (26%) of these teeth effected, respectively. Other teeth showing high prevalence of gingival recession were the maxillary first molar (19%), maxillary first premolar, and mandibular second premolar.

Table 3 shows subjects younger than 35 years, there was no statically significant difference in prevalence or extent of recession between males and females. However, in individuals above 35 years, males consistently showed higher prevalence and extent of recession than their counter parts. The percentage of

teeth with recession ≥ 2 mm (0.008) and ≥ 5 mm (0.001) was relatively more for males than females. [Table 4]. The relative risk of males having recession ≥ 1 mm was 1.8 times more when compared to females.

The prevalence of recession in smokers was relatively high when compared to normal individuals. Individuals who were moderate to heavy smokers below 35 years having recession ≥ 1 mm had significant higher prevalence of recession compared to nonsmokers. The relative risk for localized recession was 2.1 for moderate to heavy smokers and for generalized recession it was 4.2 for the same [Table 5]. The relative risk for recession ≥ 1 mm in subjects above 35 years in moderate to heavy smokers is 2.1 for localized recession and 3.2 for generalized recession. Young subjects who were heavy smokers and individual ≥ 35 years who were moderate to heavy smokers had a significantly higher prevalence of recession ($P < 0.01$) and had higher percentage of teeth affected ($P < 0.01$) in smoking group compared to nonsmokers. Furthermore, in both age groups individuals with higher percentage of teeth with supragingival calculus had a significantly higher prevalence ($P < 0.01$) and percentage of teeth ($P < 0.01$) showing recession.

Furthermore, in both age group individuals with a high percentage of teeth with supragingival calculus had a significantly higher prevalence and percentage of teeth with recession. The relative risk for localized recession ≥ 1 mm was 3.8 for individuals less than 35 years [Table 4].

DISCUSSION

This is the first epidemiological study done in hospital population in India to evaluate the prevalence of gingival recession. Results indicate that gingival recession is a common condition with a prevalence of 68% for males compared to females who had 32%

Table 2: Percentage of subjects and teeth per subject with gingival recession by age

Gingival recession	Age (years)						Total
	16-25	26-35	36-45	46-55	56-65	>65	
Subjects (mm)							
>1	21.6 (5.2)	66.5 (3.5)	89.8 (1.3)	93.3 (1)	100 (0)	100 (0)	79.4 (1.1)
>2	10.3 (2.3)	50.6 (2.3)	76.6 (2.1)	86.4 (2.3)	100 (0)	100 (0)	65.3 (1.1)
>3	2.1 (0.6)	21 (1.8)	51.8 (2)	79.2 (2.6)	90.6 (3.2)	94.2 (3.8)	45.6 (1.2)
>5	0	3.2 (0.8)	10.8 (1.2)	46 (3.2)	53.8 (3.7)	60.6 (2.9)	16.2 (1.3)
Teeth (mm)							
>1	2.1 (0.4)	16.2 (1.2)	42.3 (1.6)	58.8 (3.1)	70 (2.3)	81.4 (2.3)	37.5 (1.1)
>2	0.7 (0.2)	7.8 (0.8)	23.4 (1.1)	49 (1.8)	56 (2.0)	64.3 (3.1)	29 (1.2)
>3	0.4 (0.1)	2 (0.7)	10 (0.4)	31.6 (2.3)	31 (1.8)	43 (2.8)	13 (0.8)
>5	0	1 (0.0)	2.1 (0.2)	10.8 (1.2)	10.3 (1)	16.3 (2.1)	4.8 (0.6)

Table 3: Percentage of subjects more than 35 year old and percentage of teeth per subject with gingival recession by sex

Gingival recession	Male	Female	P value
Subjects (mm)			
>1	93.2 (1.3)	90 (1.8)	0.16
>2	89.3 (0.6)	86.2 (1)	0.12
>3	79.2 (2.2)	71.8 (2.1)	0.22
>5	34.5 (1.7)	29.2 (1.7)	0.01*
Teeth (mm)			
>1	62.4 (1.6)	56.2 (1.4)	0.40
>2	50.3 (1.8)	41.8 (1.6)	0.008**
>3	29.8 (1.2)	20.1 (1.5)	0.10
>5	10.7 (1)	6.2 (1)	0.001***

* = Statistically significant, ** = Statistically insignificant, *** = Statistically highly significant

Table 4: Assessment of risk for having gingival recession more than 1 mm in subjects of age above 35 years

Variable	Localized recession		Generalized recession	
	RRR	CI	RRR	CI
Sex				
Male	1.8*	1.1-3.8	1.2	0.6-2.4
Female	1	-	1.0	-
Smoking				
Non smokers	1.0	-	1.0	-
Light smokers	1.4	0.7-2.6	1.2	0.4-2.8
Moderate	1.6	0.8-2.6	1.8	0.8-3.1
Heavy	2.1	0.7-2.8	3.2*	1.3-6.1
Calculus				
<25%	1.0	-	1.0	-
25-	1.2	0.8-2.2	1.8	1.2-3.2
50%	1.4	0.9-2.6	4.4**	1.8-8.0
>50%				

** = Statistically significant, RRR = Relative risk ratio, CI = Calculus index

Table 5: Assessment of risk for having gingival recession more than 1 mm in subjects of age below 35 years

Variable	Localized recession		Generalized recession	
	RRR	CI	RRR	CI
Smoking				
Non smokers	0.6	0.4-1.5	0.7	0.3-1.6
Light smokers	1	-	1	-
Moderate/heavy	2.1*	1.3-3.6	4.2**	2.2-7.8
Calculus				
<5%	1.0	-	1.0	-
5-	1.4	0.6-3.4	1.2	0.4-2.8
15%	2.0*	3.8**	3.8**	2-8.4
>15%				

*Statistically significant, ** = Statistically highly significant, RRR = Relative risk ratio, CI = Calculus index

gingival recession.^[10,36] In general, these findings are consistent with the previous cross-sectional studies were 65% of Norwegian and Sri Lankans had gingival recession by the age of 22 years. By 30 years of age more than 75% of Norwegian and 90% of Sri Lankans had one or more sites with gingival recession and at these ages only 16% and 22% of buccal surfaces showed recession between 1-2 mm.^[15] In US studies, the prevalence of gingival recession of 1 mm or greater was 58% for persons between 30 and 90 years of age.^[36] Mandibular central and lateral had highest prevalence of gingival recession when compared to other teeth that was consistent with other studies that could be attributed to local factors such as plaque and calculus.^[36-38] However, this was in contrast to the findings of the UK-based study where they reported high prevalence of gingival recession in upper canines, first premolar, lower canines, first premolar and incisors in a group aged between 25-70 who suffered with dentinal hypersensitivity.^[39] Cheicci *et al.* reported high prevalence of gingival recession involving premolars.^[40] In this study, males had more percentage of gingival recession compared to their counterpart that was consistent with the previous studies.^[10,36,41,42]

However, maintenance of good oral health is arguably the best method to prevent and control progression of periodontal disease. Various risk factors are associated with gingival recessions that include age, high frenum, trauma from tooth brushing, calculus, and smoking. It is evident that prevalence of calculus is much higher in most developing countries than in the developed countries.^[43] In this study >80% individual above 35 years had >40% of teeth covered with calculus and was strongly associated with gingival recession that was consistent with previous studies showing a correlation between calculus and recession.^[10,14,42,44]

Cigarette smoking was strongly associated with occurrence of localized and generalized gingival recession in both the age groups, that is, ≥35 and ≤35 years that was statistically significant. There is a strong association between cigarette smoking and attachment loss;^[45,46] however, there is inconsistency between smoking and gingival recession that could be due to the reporting of the data or the study design were as others used 6 months follow up studies to report the data.^[47] In this study, there was high prevalence of periodontal disease and calculus was a common finding suggesting an association between these two.

CONCLUSION

The cross-sectional study design of this study does not permit an unequivocal inference about the causal relationship between the studied risk indicators and gingival recession. However, it can be concluded that high prevalence of gingival recession could be associated to improper oral hygiene and cigarette smoking, which emphasizes the need for management of recession. Initial treatment would be preventive measures such as quitting smoking and measures to improve oral hygiene, followed by surgical correction as it would be easy to motivate them since they are all hospital population. Further studies are required to assess the relationship between risk factors and gingival recession.

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