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Gingival recession at the University College Hospital, Ibadan - prevalence and effect of some aetiological factors

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Summary

Four hundred and ninety-one consecutive patients comprising 259 (52.7%) males and 232 (47.3 %) females who attended the periodontology clinic of the University College Hospital Dental Centre between May 1995 and May 1996, were recruited into this study. One hundred and thirty-seven patients comprising 101 males and 36 females were found to have gingival recession of at least one tooth surface representing 27.7%. The age range of the patients investigated was 16 years to 82 years; mean age was 39.2 ± 14.4 for males and 34.1 ± 14.4 for females. The peak incidence of gingival recession was in the 46 - 55 year age group. The incidence of gingival recession increases with advancing age with 0.04% in the 16 - 25 year age groups as compared to 58.5% in the 56 - 65 year age group. The aetiological factors which appeared to be related to gingival recession were found in the following order of frequency: malalignment; chewing stick trauma; toothbrush trauma; calculus. Eighty-eight percent (88.8%) of malaligned teeth in the age range 66 years and above had recession. A higher percentage of the subjects who used chewing stick had recession (29.4 %) when compared to those who used toothbrush alone (22%) $P < 0.05$ - this is statistically significant. Of great concern is the prevalence of recession (58%) among those subjects who used toothbrush and chewing stick together, with majority of them having generalized gingival recession. The possible reasons for these different prevalence rates of recession are discussed, measures by which incidence of gingival recession can be reduced are briefly summarized.

Keywords: *Gingiva, recession, prevalence, aetiology, toothbrush, chewing stick*

Résumé

Quatre cent quatre vingt et ney patients consentifs comprenant 259 (52, 7%) hommes et 232 (47, 3%) femmes qui ont visite la clinique periodontologique des centre Hospitalier Univeisitaire (Centre Dentaire) entre Mai 1995 et Mai 1996, ont ete recrute dans cette etide/ Cent trente et sept patients comprenant 101 hommes et 36 femmes avaient la recession gingivale d'an moins une dent (en surface) representant 27,7. L'interval d'age des patients etait de 16 oi 82 ous; moyenne d'age 39.2 ± 14.4 pour les hommes et 34.1 ± 14.4 pour les femmes. Le somment de l'incidence de la recession gingivale etait dans les 46-65 ars. Les faiteurs actiologiques qui paraissent etre lies < la recession gingivale ont ete retronee dans l'ordre de frequence suivant: malalignement, tranmatisme du bois brosse, trammatisme de la brosse < dento, calcul. Quatre vingt et huit pour cent (88,8%) des dents mal alignees frequence suivant: malalignement, tranmatisme du bois brosse, trammatisme de la brosse < dento, calcul. Quatre vingt et huit pour cent (88,8%) des dents mal alignees dans l'internal d'>ge de 66 ans et plus avaient la reussion. Un pourcentage eleve des individus utilisant le bois brosse avant

la recession (29,4%). Compare < ceux qui utilisent la brosse < dento seulement (22%) $P < 0,05$? ceci est statistiquement significatif. De grande importance est le taux de prevalence de la recussion (58%) chez les soyets qui utilisent < la fois le bois brosse et la brosse < dents, avec une majorite ayant la recussion gingivale generalisee. Les mission possibles de ces different taux de prevalence de en recession sont discutés, et les mesures par lergnelles l'incidence de la recession gingivale pent etre reduite sont brevement resumees.

Introduction

Recession of the gingival margin and gradual exposure of the roots is common and it has been reported to increase with age. However, gingival recession is not an invariable feature of ageing, and some individuals are more predisposed to it than others [1]. The predisposing factors that have been implicated in the aetiology of gingival recession include malalignment of teeth, faulty tooth brushing, presence of inflammation, frenal attachment, impingement of restoration margins and traumatic occlusion [2]. Of all these, malalignment and faulty tooth brushing as well as frequency of tooth brushing seem to play a major role [2].

In the U.S., gingival recession has been reported to occur in 78% to 100% of middle aged individuals [3,4,5] In Oslo, Norway, 51% of adults aged 18 years and above had gingival recession [6] and in Germany, gingival recession occurred in 76% to 87% of middle aged subjects [7]. Lower prevalence rates of gingival recession are however reported from studies in populations with a primitive life style. In 1986, Baelum et al [8] examined 170 adult Tanzanians from Zanzibar and Peruba Islands. Gingival recession was present in 15% to 40% of surfaces examined. Arain and Kumar [9] in a pilot study of 100 Nigerians found a prevalence of gingival recession to be 14% in males and 8% in females.

Research into gingival recession has been hampered by the lack of a suitable experimental model. Also, reports of recession show a great variety in prevalence values [3,4,5,6,7,8,9] and besides, most of the studies have not paid any attention to factors related to the occurrence of recession

The present study investigated the occurrence of gingival recession in adults, in a developing country, Nigeria, by age and gender. The study also analysed gingival recession in relation to the types of tooth cleaning devices, frequency of tooth brushing, technique of tooth brushing, oral hygiene status and malalignment of teeth.

Patients and methods

Patients who, from May 1995 to May 1996, attended the periodontology clinic of the University College Hospital Dental Centre were consecutively recruited into the study, and examined for gingival recession. The baseline survey consisted of a health interview and a clinical examination [10]. Diagnosis of gingival recession was based on the presence of clearly visible root surface without retraction of the gingival tissue [11], with reference to the cemento enamel junction.

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Table 3: Relationship of techniques of tooth brushing and occurrence of gingival recession

Technique of tooth brushing	Total (%) no. of subjects	No of (%) subjects with recession	No of males (%)	No of males with recession (%)	No. of females (%)	No. of females with recession (%)
Horizontal scrub	130 (26.5)	66 (50.8)	79 (30.5)	47 (59.5)	51 (22.0)	19 (37.3)
Vertical roll	313 (63.7)	44 (14.1)	156 (60.2)	37 (23.7)	157 (67.7)	7 (4.5)
Both (1+2)	48 (9.8)	27 (56.3)	24 (9.3)	17 (70.8)	24 (10.3)	10 (41.7)
Total	491 (100)	137	259	101	232	36
			$X = 39.49$ $df = 2$		$X = 45.55$ $df = 2$	

Table 4: Relationship between type of tooth brushing and occurrence of gingival recession

Technique of tooth brushing	No of subjects (%)	No with recession (%)	Males (%)	No with recession (%)	Females (%)	No with recession (%)
Toothbrush	352 (71.1)	78 (22.2)	188	67 (35.6)	164	11 (6.7)
Chewingstick	75 (15.3)	22 (29.4)	37	12 (32.4)	38	10 (26.3)
Both	64 (13.00)	37 (57.8)	34	22 (64.7)	30	15 (50.0)
Total	137 (27.9)	137 (27.9)	259	101 (39)	232	36
			$X = 11.01$ $df = 2$ $P = 0.004$		$X = 40.30$ $df = 2$ $p = 0.000$	

 $P = 0.05$ **Table 5:** Relationship between frequency of tooth brushing and occurrence of gingival recession

Frequency of toothbrushing	No of subjects (%)	No with recession (%)	Male (n)	No with recession (%)	Female (%)	No with recession (%)
Once a day	422 (85.9)	109 (26.1)	223	76 (34.1)	199	33 (16.6)
Twice a day	65 (13.2)	26 (40.0)	35	25 (71.4)	30	1 (3.3)
Thrice a day	4 (0.8)	2 (50.0)	1	0 (0)	3	2 (66.7)
Total	491	137 (27.9)	259	101 (39)	232	36 (15.5)
			$X = 18.38$ $df = 2$ $P = 0.000$		$X = 9.56$ $df = 2$ $P = 0.008$	

 $P < 0.05$

subjects with good oral hygiene had recession, 16.38% of those with fair oral hygiene were affected while 17.14% of the subjects with poor oral hygiene had gingival recession.

Figure 2 is a composite bar chart, which shows the percentages of the subjects with recession to the different aetiologic factors. The aetiologic factors, which appeared to be related to gingival recession, were found in the following order of frequency:

[1] malalignment [2] chewing stick trauma [3] toothbrush trauma [4] calculus.

Discussion

The results confirm a lower prevalence of gingival recession in Nigerian subjects when compared with earlier results from developed countries - 27.9% in the present study versus 68%, 78% to 100% found in the developed countries [3,4,13]. Scaling and polishing was not carried out before examination

in these other studies as well, because oral hygiene status notably calculus, was usually one of the aetiological factors considered [6,9,10,13,14]. It is however closer to earlier findings in Nigerian subjects where a prevalence of 14% was found in males and 8% in females [9]. These differences may be as a result of the sampling methods employed in the various studies or may actually be a result of difference in the susceptibility of the gingivae to the different aetiological factors between Caucasians and Blacks.

The relationship between age and recession had been accepted in most earlier reports. This was also confirmed by this present study, as the majority of the subjects with recession fell in the age ranges 46 - 55, 56 - 65 years. Generally, the older one is, the longer he or she could have been exposed to factors influencing recession. This is most pronounced in the case of malalignment of teeth, 89% of malaligned teeth of

The clinical dental examination was carried out in a dental chair using a standard operating light, an explorer, a periodontal probe and a mouth mirror. Scaling and polishing of the teeth was not done before the examinations. The subjects were graded on an oral hygiene basis. The classification good, fair and poor were used and varied according to the amount of calculus observed [12]. A subject was regarded as having gingival recession if at least one tooth was affected. Information on the frequency of tooth brushing, types of tooth cleaning devices used and the technique of tooth brushing was collected by the examiners. Calibration of the examiners was done 2 - 3 weeks before the clinical examinations. Malaligned teeth were noted and charted accordingly. Chi Square statistics were used to analyse the differences of the groups to be compared.

Results

Four hundred and ninety-one patients were examined during the study period, of which 259 (52.7%) were males and 232 (47.3%) females. Their ages ranged from 16 years to 82 years mean age 39.2 ± 14.4 years for males and 34.1 ± 14.4 for females.

One hundred and thirty-seven subjects (27.9%) had recession present on at least one tooth surface. Men had recession present more frequently than women (39.0% versus 15.5%). This difference was statistically significant. Table 1 presents the age group distribution of the subjects by gender. $X^2 = 31.88$ while $P < 0.05$. Table 2 shows the number of subjects with recession in both sexes according to the various age groups. Majority of the subjects with recession fell in the age range 36 years - 65 years with the peak age range at 46 - 55 years representing 86.7% in males and 64.7% in females of that age group.

Table 1: Distribution of the subjects by age and gender

Age groups in years	Male (%)	Female (%)	Total (%)
16-25	68 (26.3)	90 (38.8)	158(32.2)
26-35	50 (19.3)	71 (30.6)	121(24.6)
36-45	55 (21.2)	24 (10.3)	79 (16.1)
46-55	45 (17.4)	17 (7.3)	62 (12.6)
56-65	31 (12.0)	22 (9.5)	53 (10.8)
66 and above	10 (3.9)	8 (3.4)	18 (3.7)
Total	259 (52.7)	232 (47.3)	491(100.0)

Male: mean age = 39.2 + 14.4

Female: mean age = 34.1 + 14.4

$X^2 = 31.88$, $df = 5$, P value < 0

Table 2: Number of subjects with recession in both sexes according to the age groups

Age group (years)	Total no. of subjects	No. of subjects with recession (%)	No of males (n)	Males with recession n (%) (in the age group)	No of females (n)	Female with recession n (%) (in the age group)
16-25	158	7	68	2 (2.9)	90	5 (5.6)
26-35	121	18	50	14 (28.0)	71	4 (5.6)
36-45	79	21	55	16 (29.1)	24	5 (20.8)
46-55	62	50	45	39 (86.7)	17	11 (64.7)
56-65	53	31	31	23 (74.2)	22	8 (36.4)
66 and above	18	10	10	7 (70.0)	8	3 (37.5)
Total	491	137	259	101	232	36

$X = 105.14$
 $df = 5$

$X = 54.24$
 $df = 5$

Table 3 shows the technique of tooth brushing used by the subjects. Sixty-four percent of the subjects claimed to employ the vertical roll technique while 26.5% claimed to employ the horizontal scrub technique. Only 9.8% claimed to employ both techniques interchangeably. $X^2 = 4.56$ and $P > 0.05$. There was no statistical significant difference between males and females.

Table 4 shows the association between the type of tooth brushing and presence of recession. Twenty-two percent of those who used toothbrush had recession in at least one tooth while 29.4% of those who used chewing stick had recession. Out of the subjects who claimed to use both types (toothbrush and chewing stick), 58% of them had recession - 64% in males and 50% in females, $P < 0.05$ with the majority having generalised gingival recession Fig 1.

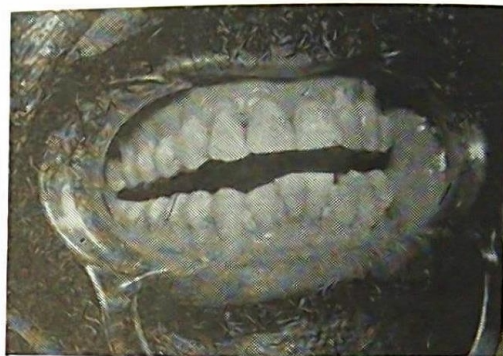


Fig 1: Intraoral photograph of patient, who claimed to use both toothbrush and chewing stick, showing generalised gingival recession

Table 5 shows the relationship of frequency of tooth brushing to presence of recession. The result revealed that 86% of the subjects claimed to brush once a day, 13% twice a day and only 0.8% thrice a day. Twenty-six percent of those who claimed to brush once a day had recession in at least one tooth, compared with 40% of those who brushed twice a day and 50% of those who brushed thrice a day.

Table 6 shows the average numbers of malaligned teeth per individual in the different age groups. This table also shows the percentage of malaligned teeth showing gingival recession. Twenty-five percent of malaligned teeth had recession in the 16 - 25 year age group while 88.8% of the malaligned teeth of subjects in the 66 years and above range showed recession, $P < 0.05$.

Table 7 shows the oral hygiene status of the subjects in relation to gingival recession. Thirty-seven percent of the

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subjects in the 66 years and above age range, showed gingival recession while only 25% of malaligned teeth in the 16 - 25 year age range showed gingival recession, $P < 0.05$. According to Loe *et al.* [15], destruction of the periodontal tissues progresses steadily over time. This also might partly explain the association between recession and a subject's age.

The prevalence of gingival recession was found to be higher in males (39%) when compared to females (15.5%). This is in agreement with earlier findings of Arain and Kumar [9]. This can be explained by the higher prevalence of chronic periodontal disease in Nigerian males when compared to Nigerian females [16]. A large percentage of the subjects (64%) claimed to employ the vertical roll technique while 26.5% claimed to employ horizontal scrub and 9.8% claimed to use both techniques interchangeably. This may be as a result of positive impact from various oral health care awareness programmes being organised by dentists, dental students and dental therapists.

As regards the relationship between the type of tooth cleaning devices used and occurrence of recession, the percentages of subjects who had recession among those who claimed to use toothbrush and chewing stick together was highest (58%); with 29.4% among those using chewing sticks alone and least among those who claimed to use toothbrush alone (22%). Chewing sticks are usually used by vigorous horizontal movements across both the tooth surfaces and the gingivae. The usual movements of the chewing sticks are on the labial or buccal surfaces of the teeth from the last molar on one side across the mid line to the last molar on the other side which occurs in either arch (mandibular or maxillary) [9]. There are also vertical movements across the arches. All these movements of the chewing sticks traumatise the gingivae and constitute improper use of the chewing stick. The correct use should involve chewing of the chewing stick to make adequate tuft as bristles followed by gentle vertical movements on the tooth surfaces from the gingival margin to the incisal or occlusal edge of each tooth.

The occurrence of the gingival recession is found to be positive related to the frequency of toothbrushing as is shown in Table 5. This confirms the findings of Vehkalahti [13] and Mierau [17]. Ainamo *et al.* [18] in their findings among Finnish adolescents suggested that the amount of damage caused by tooth brushing must be due to the brushing frequency. The effects of oral hygiene on the prevalence of gingival recession, Table 7, shows that subjects with good oral hygiene showed greater overall gingival recession than those with poor

Table 6: Gingival recession of malaligned teeth

Age group (years)	Average numbers per individual		Percent of Malaligned teeth showing recession
	No (n)	Malaligned teeth showing recession	
16-25	158	4	25%
26-35	131	6	33.30%
36-45	79	6	50%
46-55	62	8	62.50%
56-65	53	9	77.70%
66 and above	18	9	88.80%

$P < 0.05$

oral hygiene ($P < 0.05$). This may have been a result of tooth brushing and or chewing stick techniques or frequency of tooth cleaning. It must be noted however, that the number of times a subject brushes his teeth and gingiva daily is consid-

ered less important to oral cleanliness than the manner in which it is carried out.

Table 7: Oral hygiene status in relation to gingival Recession.

Oral hygiene	No of patients (n)	No of patients with recession (n)	%
Good	270	100	37.03
Fair	116	19	16.38
poor	105	18	17.14

$P < 0.05$

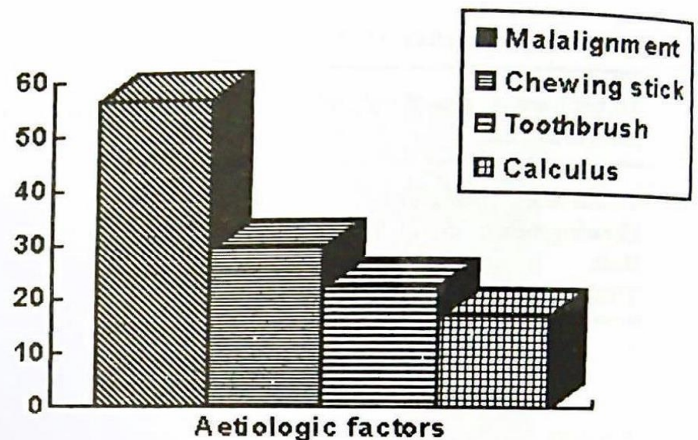


Fig. 2: Aetiologic factors associated with gingival recession

Conclusion

The results of this present study have confirmed the positive relationship between tooth malalignment, ageing, toothbrush technique, frequency and type of tooth brushing with occurrence of gingival recession. Tooth malalignment seems to be the most important aetiological factor. Of great concern is the effect of the use of both toothbrush and chewing stick together, which resulted in 58% prevalence rate. This practice should be highly discouraged. While the use of chewing stick alone is not being condemned, the technique of its proper use should be emphasised. The mass media could be used extensively for the purposes of creating public awareness in the proper use of chewing sticks. Other measures could include illustrations of the vertical roll technique and include a phrase like "your gums recede when you brush wrongly". This could be an adjunct to an advertisement of any oral prophylaxis materials such as toothpaste and toothbrushes.

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