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The Role of Anxiety on Gingival Recession Occurrence: An Observational Study

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ABSTRACT

Aim: The gingival recession is recognized as a clinical manifestation of periodontitis; however, many evidences suggest that an incorrect brushing could be responsible of its occurrence too. Assuming that improper hygiene actions could be responsible of tissues damage and knowing that psychological factors can influence the oral hygiene habit, it could be possible that anxiety relates to gingival recession. This study investigated this potential correlation.

Material and Methods: Forty-three consecutive subjects showing at least one buccal recession were selected. Patients were interviewed using special forms to record oral hygiene habits and to define the anxiety level. A complete clinical and radiographic examination was also performed. By using the collected data, the study sample was divided into 2 groups: group A with intact periodontal support except for buccal recessions, and group B with not only buccal signs of attachment loss. Number of recessions and their depth were correlated with hygienic parameters.

Results: A positive correlation has been detected between anxiety and plaque index in both groups, a negative one was observed between anxiety and frequency of brushing in group A. A negative correlation between anxiety and gingival recession dimension has been detected only for group A.

Conclusions: Adult subjects with high value of anxiety display a worse oral hygiene habit, though this emotional aspect seems to have a protective effect on buccal recession development.

Key words: Anxiety, Gingival recession, Periodontitis, Buccal recession

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INTRODUCTION

The term gingival recession describes a location of marginal periodontal tissues apical to the cemento-enamel junction [1]. Showing a prevalence higher than 50% in adults (18 to 64 years) and being almost ubiquitous in seniors (65 and older), this clinical alteration appears widely represented in the population [2,3]. The gingival recession is recognized as a clinical manifestation of periodontitis [4,5], however the periodontal disease is not the only factor supposed to induce this kind of soft tissues destruction [6]. Nowadays many authors identify the traumatic brushing as one of the most prevalent determinants of the buccal recession's occurrence [7,8]. Even if a recent systematic review has evidenced the lack of a clear aetiological role of tooth brushing on this periodontal alteration [9], there are still many studies that support the potential role of the hygiene behaviour [10].

As a primary observation it has been stated that gingival abrasion may occur with toothbrushes [11] and epidemiological studies suggest that there is a direct relationship between gingival recessions and lower plaque scores [8,12]. In addiction the gingival recession is the most frequent periodontal alteration among subjects below 40 years of age with high standards of oral hygiene [13]. Finally, the observation that gingival recessions and tooth abrasions are usually restricted to the buccal aspects and the fact that their distribution is linked to the hand used during the personal oral hygiene,

corroborates the hypothesis of a brushing role [14]. An excessive and traumatic brushing has been correlated also to wedge-shaped cervical defects, commonly called tooth abrasion [15,16]. The oral hygiene behavior results from a multitude of factors and some evidences suggest that the psychosocial condition could represent a truly relevant one [17,18]. The anxiety is a psychological factor with important implications to the self-reported oral health [19, 20] and its positive correlation to high levels of plaque score [21,22] as the profound effect on the ability to correctly recognize provided information [23] have been demonstrated. All these observations underline the important influence that anxiety could exercise on oral hygiene behaviour. Many studies have investigated the association between psychosocial factors such as anxiety and periodontal diseases, but none was focused on the periodontal recession [24-26].

Assuming that an incorrectly performed oral hygiene could be responsible of tissues damage and knowing that psychological factors are able to condition the oral hygiene behaviour it could be possible that anxiety in some way relates to gingival recession. The purpose of the present paper was to evaluate the correlation between anxiety and gingival recession at the buccal tooth surface in an adult population sample.

MATERIAL AND METHODS

Forty-two consecutive caucasian subjects were selected among the patients attending the Department of Periodontolgy and Implantology of the University of Bologna.

The eligibility criteria for the study was the presence of at least 1 buccal gingival recession on natural tooth free from cervical cavity/filling, crown or partial denture anchorage.

Subjects with diabetes, smokers or healthy subjects previously treated with periodontal surgery were not enrolled in this study.

The study design fits the requirements of the "Declaration of Helsinki" as adopted by the 18th World Medical Assembly in 1964 and subsequently revised (www.wma.net/e/policy/17-c_e.html). All individuals signed an informed consent before taking part in the study.

Patients were interviewed using special forms to record the tooth brushing habit and define the level of anxiety. The tooth brushing habit was evaluated only for its frequency and time dedicated to. The frequency of brushing was defined as the times the subject performs this action daily.

All of the subjects received complete information on how to fill these forms.

The level of anxiety of each subject was identified by using the State–Trait Anxiety Inventory (S.T.A.I.-Y) [27]; that is a test composed by two scales, S.T.A.I.-Y1 and S.T.A.I.-Y2, aiming to record different conditions of anxiety: State and Trait respectively. A Trait Anxiety refers to an individual who is relatively stable but has a predisposition for anxiety; it describes the way the subject generally feels. State Anxiety refers to a transitory emotional state that may vary in intensity and fluctuate with time. Each scale consists of 20 items with four alternatives each, with values ranging from 20 to 80 for each scale without established categories. A subject is defined anxious when the value obtained is ≥ 50.

After completing the questionnaire, each subject was clinically examined on a dental chair, using a standard operating light, an explorer (3A HF*), a periodontal probe (PCP 15 HF*) and a mouth mirror. One single examiner, calibrated before the study, performed the clinical exam.

The teeth were not cleaned or scaled but only gently dried before the examination.

The clinical parameters collected were: O'Leary Plaque Index (PI) [28], probing pocket depth (PPD), periodontal phenotype, gingival recession (GR) and noncarious cervical lesion. Third molars were not included.

Probing pocket depth was measured in six sites (mesio-facial, mid-facial, disto-facial, mesio-lingual, mid lingual and disto-lingual) per tooth for all teeth. PPD was measured from the gingival margin to the bottom of the crevice to the nearest millimeter (mm).

The subject sample was grouped into "thin" and "thick" periodontal phenotypes based on the characteristics of marginal gingiva and tooth shape of maxillary frontal sextant [29]. A thin periodontal phenotype was identified by teeth with tapered tooth form, minute proximal contact and highly scalloped gingival margin. Teeth with a short but wide crown, relatively large proximal contact areas and bulky, slightly

scalloped marginal gingiva identified a thick periodontal phenotype.

The gingival recession was recorded as present if the buccal root surface was clearly observable without gingival margin retraction [30]. Gingival recession was measured to the nearest mm by reading off the distance from the cement-enamel junction (CEJ) to the gingival margin. The noncarious cervical abrasion was recorded positioning the tip of the periodontal probe perpendicular to the tooth surface and inserting it to the bottom of the gingival sulcus; if the probe was retained by some irregularity, we considered the irregularity to be a noncarious cervical lesion. [31]. A full mouth set of intraoral radiographs (16 peri-apical radiograms) was obtained for each subject; the radiographs were analysed with respect to the height of periodontal bone support. The same examiner who performed the clinical examinations made the radiographic evaluation.

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Statistical analysis

By hypothesizing a light effect (Cohen's effect) of anxiety on gingival recession, with two independent variable (S.T.A.I. Y-1, S.T.A.I. Y-2), with a power of 80% and an alfa level equal to 0.05, a minimum number of 30 subjects is required. The unit of analysis was the subject, the gingival recession was evaluated as dimension (mean value for each subject) and number of recessions in each subject. Descriptive statistics were computed; t-test and chi square test were used aiming to compare respectively age and gender between the two groups. The correlations between gingival recessions and the independent quantitative variables (S.T.A.I. Y-1, S.T.A.I. Y-2, noncarious cervical lesion, tooth-brushing frequency, time dedicated to oral hygiene, Plaque Index) were detected by using Pearson correlation coefficient (r); because of the different age in the two groups a partial correlation coefficient controlling for age was also computed. The same statistical analysis was performed between anxiety and noncarious cervical lesions, tooth-brushing frequency, time dedicated to oral hygiene, Plaque Index and age. Statistical significance was computed by using Student t-test for age and chi square test for gender, Alfa level was a priori set at 0.05. The software used for the statistical analysis was IBM SPSS Statistics (vs.25).

RESULTS

By using the clinical and radiographic parameters, the study sample was divided into 2 groups: group A with intact periodontal support except for buccal recessions and group B with not only buccal signs of attachment loss.

The operator who performed the sample allocation and the clinical examinations was blinded about the collected data on anxiety and tooth brushing habit.

Of the 43 enrolled subjects 19 were assigned to group A and 23 to group B.

Female were 53% in group A and 48% in group B; no significant difference for gender was observed between the two groups (chi-square test p=0.75). The mean age was 26.58 (SD ±6.92) years in group A and 46.74(SD ±7.16) years in group B (t-test p=0.0001). The mean score of the anxiety questionnaires for group A and group B were respectively: 43.33 (SD±24.67) and 50.29 (SD±20.76) for the S.T.A.I.-Y1, and 42.61 (±26.34) and 43.52 (± 21.47) for S.T.A.I.-Y2. A significant difference between the two groups was obtained only for S.T.A.I.-Y2 (t-test p=0.0001).

A thin periodontal phenotype was identified on 68% of patients of group A, while in group B 96% had a thin phenotype.

The correlations between gingival recessions and the variables studied are reported in Table 1.

It is interesting to observe the significant negative association of gingival recession dimension with tooth brushing frequency ($p<0.05$) and S.T.A.I.-Y2 ($p<0.01$) in Group A subjects, confirmed also when controlling for age; in Group B a significant negative association with plaque index was evidenced.

The correlations between the gingival recessions number and the variables studied are reported in Table 2. Positive associations in Group A were observed with age (r=0.37); number of tooth abrasions were significantly ($p<0.05$) positively associated with number of recessions both in Group A (r=0.83) and Group B (r=0.65); negative associations, even if not significant, were observed both in Group A and B with S.T.A.I.-Y1

Table 1: Correlations between gingival recession depths and quantitative variables in the two groups. In parentheses is reported the partial correlation coefficient controlling for age. S.T.A.I.= State–Trait Anxiety Inventory.

		Plaque index	Tooth-brushing frequency	Time dedicated to oral hygiene	Anxiety S.T.A.I. Y-1	Anxiety S.T.A.I. Y-2	Tooth abrasions
Gingival Recession Depth	Group A	-0.19 (0.03)	-0.40 (-0.49)	-0.24 (-0.18)	0.14 (-0.03)	0.68 (-0.64)	0.19 (-0.04)
	Group B	-0.52 (-0.56)	-0.07 (-0.12)	-0.18 (-0.22)	-0.25 (-0.19)	-0.23 (-0.26)	0.30 (0.25)

Table 2: Correlations between gingival recessions number and quantitative variables in the two groups. In parenthesis is reported the partial correlation coefficient controlling for age. S.T.A.I.= State–Trait Anxiety Inventory.

		Plaque index	Age	Tooth-brushing frequency	Time dedicated to oral hygiene	Anxiety S.T.A.I. Y-1	Anxiety S.T.A.I. Y-2	Tooth abrasions
Gingival Recession numbers	Group A	-0.48 (-0.42)	0.37	-0.04 (-0.01)	0.04 (0.11)	-0.27 (-0.21)	-0.22 (-0.25)	0.83 (0.81)
	Group B	-0.10 (-0.12)	0.15	0.14 (0.11)	0.17 (0.16)	-0.27 (-0.33)	-0.22 (-0.11)	0.65 (0.65)

and S.T.A.I.-Y2 . A negative correlation between number of recessions and plaque index was observed in Group A ($r=-0.48$, $p<0.05$).

DISCUSSION

This study evaluated the existence of an association between anxiety on buccal periodontal recession. The results illustrate an interesting inverse connection between this emotional aspect and the studied anatomical alteration in those patients where no other signs of clinical attachment loss were detectable. In the last years, the influence of the psychological aspect has shown a rising importance on the oral condition. Many studies have shown how psychosocial factors can influence the individual oral hygiene habit [17,18], the approach to dental therapy [32] and the healing process following surgical treatments [33].

About the oral hygiene habits, notwithstanding a direct association is still lacking [9], it seems that an excessive and incorrect oral hygiene behaviour could develop some oral tissues damages, like gingival recession and tooth abrasion. [7,10]. In spite of a plausible role of the daily oral hygiene, the correlation between recession and/or non-carious cervical lesions and psychosocial conditions has never been investigated before.

Presupposing the existence of pure traumatic periodontal recessions, it was attempted to separate them from those with a strongly probable bacterial origin. To do that two groups was created by the study sample: group A with intact periodontal support except for buccal recessions and group B with not only buccal signs of attachment loss.

This concept is supported by the observation that data from epidemiological studies on periodontally untreated populations reveal that approximal tooth surfaces, as a rule, show greater loss of probing attachment than buccal and lingual surfaces [34,35] while, on the contrary, in populations maintaining a high standard of oral hygiene loss of attachment has been reported to be more frequent at buccal than at approximal and lingual surfaces [36,37].

A difference in average age between the two groups was observed, with group A younger than group B ($p=0.001$). It has been reported that the periodontal disease prevalently affects forty-years or older subjects, probably set out in group B [38]. This result seems to confirm the attempt of the present study to isolate pure traumatic gingival recessions in group A. Because of this difference a second-grade correlation coefficients controlling for age were therefore computed.

In group A the number of gingival recessions increases with age: this data agrees with previous studies [39,40]. In both groups a high percentage of thin biotype emerges. This observation is supported by the study of Müller, et al. where it has been reported that the thick biotype has a lower prevalence on the caucasian population [41]. Nevertheless it is important to put in evidence how the thin periodontal phenotype has been recognized as a predisposing condition to gingival recession [29], therefore it is quite probable that the study design has induced a prevalent isolation of subjects with a thin periodontal phenotype.

A significant correlation between anxiety and gingival recessions has been detected only for

group A (Table 1). This observation doesn't exclude a potential role of anxiety in both groups; however, the results support the usefulness of the study design in distinguishing different typologies of this multifactorial periodontal lesion.

The inverse association between gingival recessions and S.T.A.I. Y-2 (trait anxiety) demonstrates the presence of a minor number of gingival recessions in more anxious patients. From this observation it is possible to speculate that particularly anxious patients, generally less prone to a constant oral hygiene [42], tend to avoid the insight lesivity of the hygiene procedures, reducing the incurrence of traumatic gingival recessions.

In group B no correlation between anxiety and gingival recessions was found, suggesting the implication of more determinant factors such as the microbiological one.

Several studies have investigated the relationship between psychosocial factors and periodontal illness; however, a consensus on this topic is still lacking and many reasons have been advocated for the discordances [26,43]. It has been reported that the psychosocial factors are able to influence either the individual's physiology or the behaviour, consequently their role on the periodontal diseases could be multiple [44]. This observation and the results of the present study suggest that the isolation of the high probably traumatic gingival recessions could be a useful device for future investigations. A positive correlation between gingival recession and abrasions has been obtained for both groups. Since gingival recession precedes abrasion [42], and abrasion is generally caused by brushing related factors [16], the data obtained could confirm a potential role of incorrect tooth-brushing forces in the study sample. Anyway, the gingival recession, independently from its aetiology, exposes mineralized tissues less resistant than the enamel to abrasive forces [45]. This clinical situation consequently predisposes to tooth abrasion occurrence and from the present data it is possible to conclude that tooth-brush has had a role on the observed tooth damage but its contribution in gingival recession development for group B remains undefined. Interestingly in group A, in agreement with O'Leary et al. [12], when the number of recessions increases the P.I.% decreases.Consequently, the infective factor seems to have a really marginal role on the development of these periodontal lesions, while oral hygiene quite probably actively contributed to their incurrence. This study fails in establishing a relationship among the number of gingival recessions, the frequency of brushing and the time dedicated to oral hygiene; only in group A a negative association was found between recession dimension and tooth-brushing (r=-0.49). This result generally contrasts with the findings of other studies [40,46]. Anyway, many other hygiene variables such as brushing techniques [46,47], hardness of toothbrush bristle [48] or bristle tips morphology [49] have been associated to gingival recession and it is quite probable that other hygiene factors, compared to those evaluated in this study, could have played a role on the gingival recessions development. In both groups a light positive association have been detected between anxiety and PI%. These results agree with previously reported findings showing a negative influence of anxiety on oral hygiene habit [22].

A difference between trait anxiety and state anxiety has been detected in group A. This result shows how anxiety tends to decrease in relation to the circumstances, leading to the hypothesis that the patient of the group A has a positive approach to the impending dental appointment. In spite of the difficulty that anxious patients have dealing with regular dental appointments [32,50], from the present results it is possible to speculate that subjects in group A probably perceive the visit as a moment of clarification on their health condition, with beneficial effects on their psychological state.

CONCLUSION

This study identifies a correlation between anxiety and periodontal recessions for those subjects where no periodontal breakdown other than buccal recession was present. From the results obtained, it is possible to conclude that subjects with low level or not suffering of anxiety seem to be more predisposed to develop gingival recessions, when a thin periodontal phenotype is present. On the contrary subjects with high value of anxiety, displaying a worse oral hygiene habit, seems to be less prone to buccal recession incurrence. Furthermore, the hypothesis of

the traumatic origin for buccal recession is here supported. More investigations on larger samples and new studies on other psychosocial factors are however suggested.

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