Original Article

Relationship between Alexithymia and Chronic Periodontitis

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Abstract

Objective: The aim of this study was to investigate the potential relationship between alexithymia and chronic periodontitis. **Materials and Methods:** A case–control study of 222 male and female subjects aged 21–63 years was conducted. The participants were divided into a chronic periodontitis group (n = 114) and a control group (n = 108) with no history of periodontitis. The Toronto Alexithymia Scale (TAS-20) was used to evaluate alexithymia status of the subjects. Clinical data were collected on parameters such as the plaque index, bleeding on probing, probing depth, and the clinical attachment level (CAL). Socioeconomic data on the patients were also recorded. **Results:** Chronic periodontitis group showed higher frequency in alexithymic patients as compared to control group. The proportion of high dental anxiety did not differ between the groups. The total TAS-20 score was statistically significantly higher in male subjects than in female subjects ($P < 0.05$). The bivariate analyses of the psychometric measures and the periodontal parameters revealed positive correlations with the severity of periodontal disease/CAL and the total TAS-20 score ($P < 0.05$). **Conclusion:** The results of the current study suggest that alexithymia is a possible risk factor for chronic periodontitis. Further research is needed to identify the underlying mechanism.

Keywords: *Alexithymia, clinical attachment loss, periodontitis*

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Introduction

Periodontitis is one of the most common chronic disorders in the world today. It is initiated by gum colonization by pathogenic bacteria, followed by the activation of host defense mechanisms.[1] The etiological significance of some biological and behavioral risk factors for periodontal diseases, which include smoking,[2] oral cleanliness,[3] and systemic diseases such as diabetes mellitus,[4] has already been established. However, these factors alone cannot account for a significant proportion of the variation in the development of periodontitis.[5] It is possible that many factors, including psychosocial conditions, are associated with the development, progression, and aggressiveness of the disease.

A number of studies revealed an increase in necrotizing periodontal diseases, during in which patients were exposed to stress,[6,7] and several studies have reported a higher prevalence of chronic destructive periodontal diseases in patients with certain psychological disorders.[8-10] Certain psychosocial conditions such as depression, together with inadequate coping strategies, and increased plaque accumulation, have been reported to be more common in subjects, who experience great financial strain.[11] Moreover, reduced cell-mediated immune function was observed in patients with several psychological disorders.[12]

The term alexithymia, literally meaning "absence of words for emotions" (from the Greek, "alexis" means no words, and "thymos" means emotion), was coined by Sifneos[13] to describe a specific difficulty in identifying and verbally expressing emotions. Over the past 3 decades, alexithymia has come to be defined by the following distinct features: Difficulties in identifying and describing feelings to other people and distinguishing feelings and the bodily sensations accompanying emotional arousal;

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constricted imagination processes, with a paucity of fantasies; and a stimulus-bound, externally oriented cognitive style.[14] The prevalence of these cognitive and affective characteristics varies from 8% to 19% in the general population,[15] but it can be higher in individuals with chronic diseases or conditions such as inflammatory bowel disease,[16] chronic respiratory diseases,[15] type 1 diabetes,[17] psoriasis,[18] and alcohol dependence.[19]

Several possible explanations have been suggested for the elevation of alexithymia in patients with various health problems. For example, one hypothesis has related alexithymia to the avoidance of the regulation of negative emotions, resulting in increased negative affect, elevated resting sympathetic arousal, and immune impairments, all of which may contribute to the development or exacerbation of somatic disease.[20-22] Another hypothesis proposed that alexithymia may lead to somatic diseases as a result of behavioral, maladaptive strategies, and unhealthy actions.[23] According to this suggestion, alexithymia may prompt people to engage in behaviors that have a potentially adverse effect on health, such as failing to seek prompt medical assistance when necessary.[24] For all the above reasons, alexithymia may represent a general risk factor for somatic diseases.

Alexithymia may contribute to the progression of periodontal disease via psychological, immunological, or behavioral mechanisms, or a combination of these mechanisms. As the development of periodontal disease is related to psychological conditions that alter the host's resistance to periodontopathic bacteria,[25] immune impairment associated with alexithymic features may negatively affect the host's response to periodontal diseases. Alexithymia may also be associated with periodontal destruction through alterations in behavior. Alexithymia may increase behaviors that promote periodontal disease, for example, by neglecting oral hygiene or dental care.[26] In addition, the characteristics of alexithymia may lead to a delay between the onset of symptoms and clinical consultation for periodontal diseases and the delay in the treatment of early periodontal lesions may result in disease progression. The features of alexithymia can also worsen the dentist-patient relationship. Although the role of psychosocial conditions in the progression of periodontal diseases is of interest, there are limited studies concerning the effects of alexithymia on dental patients.[27,28]

Thus, the aim of the present study was to investigate the potential association between chronic periodontitis and alexithymia in adult subjects.

Materials and Methods

Participants

A case–control design was used to measure alexithymia in periodontitis patients and periodontally healthy individuals. A convenience sample was selected from these individuals who were referred from the Department of Oral Diagnosis and Radiology Clinic for treatment due to periodontal problems or routine checkups to the Gaziantep University, Faculty of Dentistry, Department of Periodontology. The study protocol was approved by the Ethical Committee for the Use of Human Subjects in Research, Gaziantep University, Gaziantep. All suitable patients received written information concerning the study's aims and procedures and the voluntary nature of participation. On agreement, they were asked to fill out an informed consent document to take part in this study. Medical history and socioeconomic data were also collected.

In total, 350 individuals were asked to participate in this study. Of these, 7 (2%) refused to participate, and 36 (10%) were excluded because of systemic conditions or disorders, resulting in a total of 307 individuals available for periodontal and alexithymia analyses. Of the 307 individuals, 85 (24%) were excluded because of not meeting periodontal classification and dental criteria. After matching the participants by age and gender, a total of 222 patients (63%) were included in this study. A total of 144 patients with chronic periodontitis (57 males and 57 females, age range: 27–63; mean age: 43.58 ± 8.92 years [mean ± standard deviation (SD)]) were compared with 108 age- and gender-matched periodontally healthy controls (54 males and 54 females, age range: 21–62; mean age: 41.23 ± 9.48 years [mean ± SD]).

Participants were excluded if they presented with acute necrotizing ulcerative gingivitis or a systemic/psychiatric disorder, or if they were taking medicines related to periodontal alterations or psychotropic drugs if they were pregnant, and if they had received periodontal therapy during the last 6 months. Patients who had <18 teeth were also excluded from this study.

Measures

Sociodemographic assessment

A sociodemographic questionnaire was designed to obtain information on the subjects' age, gender, educational level, employment status, marital status, smoking history, and family income. All participants were asked to complete this demographic questionnaire.

Psychological assessment

Alexithymia was assessed with the Turkish version of the Toronto Alexithymia Scale (TAS-20),[29,30] which is the most widely used and, presumably, the most carefully

validated self-reported scale for measuring alexithymia. The reliability and the validity of the Turkish version of the TAS-20 have been demonstrated by Gulec *et al*.[31] The TAS-20 is a self-report scale composed of 20 items. Each item is rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), with total scores of 20–100. Items 4, 5, 10, 18, and 19 are negatively keyed. The first factor difficulties identifying feelings (DIF) in the factor 3 model for the TAS-20 consists of 7 items (items 1, 3, 6, 7, 9, 13, and 14) assessing the ability to identify feelings and to distinguish them from the somatic sensations that accompany emotional arousal. Factor 2 difficulty describing feelings (DDF) consists of 5 items (items 2, 4, 11, 12, and 17) assessing the ability to describe their feelings to other people. Factor 3 externally oriented thinking (EOT) consists of 8 items (items 5, 8, 10, 15, 16, 18, 19, and 20) assessing EOT. The total scores of the TAS-20 were categorized according to the recommendations of Gulec *et al*.[31] Thus, a score of 61 or greater indicated alexithymia, and a score below 61 indicated no alexithymia.

Psychological data were collected by the dental receptionists or dental nurses. The receptionists and the dental nurses were instructed not to prompt the participants, while they completed the questionnaires or to assist them when choosing a response.

Periodontal assessment

All the periodontal examinations were conducted by the same clinician (USA). All the variables were assessed at six different sites (mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual, and distolingual) of each tooth present, excluding the wisdom teeth. Clinical measurements of periodontal parameters included the plaque index (PI),[32] probing pocket depth (PD), clinical attachment level (CAL), and the percentage of bleeding on probing (BOP). All the assessments were carried out using a Williams periodontal probe. The diagnosis was based on the clinical and radiographic criteria outlined in the 1999 Consensus Classification of Periodontal Diseases.[33] In this classification system, periodontally healthy (control) is denoted by a BOP with a mean ≤25% and no sites of attachment loss. Chronic periodontitis is defined by having at least 4 teeth with a PD ≥5 mm and CAL ≥2 mm.[33]

Data analysis

The sample size was estimated using a power calculation based on a 50% increase in the frequency of alexithymia in the chronic periodontitis group. It was estimated that at least 100 patients would be required to detect a statistically significant difference between the chronic periodontitis and the control groups at an 80% power level and with an error of 5%.

The normality of the data was assessed with the Kolmogorov-Smirnov test. Independent samples *t*-test was used to determine the differences between the chronic periodontitis and the control groups. The frequency distribution of gender, educational level, employment status, marital status, family income, and smoking was compared between the groups using the Chi-square test. The differences in the total TAS-20 score and the 3-factor score between the chronic periodontitis group and the control group were determined using the independent sample *t*-test. The Pearson correlation coefficient was used to determine the linear relationship between the TAS-20 indexes and the clinical periodontal parameters and age. All the analyses were conducted with SPSS statistical software version 17.0 (SPSS, Inc., Chicago, IL, USA). Differences were considered significant at a $P = 0.05$ or highly significant at $P = 0.001$.

Results

Demographic and socioeconomic data

The demographic and socioeconomic characteristics of the chronic periodontitis group and controls are shown in Table 1. The subjects in the groups were age- and

Table 1: Demographic and socioeconomic variables in the chronic periodontitis patients and the controls

Characteristics	Patients (*n*=114)	Control (*n*=108)	*P*
Age (mean±SD)*	41.23±9.48	43.58±8.92	0.059
Gender (%)			
Male	50	50	1.000
Female	50	50	
Educational level (%)†			
Less than high school	37	31	0.597
High school	42	43	
College	21	26	
Employment status (%)			
Unemployed	11	9	0.626
Employed	75	80	
Retired	14	11	
Marital status (%)			
Unmarried/alone	25	26	0.820
Married	60	62	
Divorced/detached	15	12	
Smoking status (%)			
Nonsmoker	45	52	0.569
Former smoker	23	20	
Current smoker	32	28	
Family income (minimum wage)			
<1.500	30	25	0.719
1.500-3.000	45	47	
>3.000	25	28	

*Independent *t*-test; †χ^2 test. SD=Standard deviation

sex-balanced ($P > 0.05$). No significant differences were found for sociodemographic variables between the groups ($P > 0.05$).

Clinical findings

All periodontal parameters in (CAL, PD, PI, and BOP) of the chronic periodontitis group were statistically significantly higher than the control group ($P < 0.001$) (data not shown).

Findings of psychosocial variables

The internal consistency of the Turkish version of the TAS-20 scale was evaluated with Cronbach's α, which verifies the confidence of the scale to maintain the original results. In the current study, the α value was 0.80, which is considered satisfactory.

The psychosocial variables of the groups were first analyzed by comparing the frequencies in the subjects with alexithymia. The chronic periodontitis group showed a higher frequency of alexithymic patients when compared with the controls ($P < 0.05$). The distribution of alexithymia, according to gender, did not differ in any of the groups ($P > 0.05$). When compared with the control group, the mean total DIF and DDF TAS-20 scores of the chronic periodontitis group were statistically significantly higher ($P < 0.05$). However, there was no statistically significant difference between the EOT score of the groups [$P > 0.05$; Table 2].

Table 3 presents the summary of the total TAS-20 and factor scores by gender. The results of the *t*-test analysis showed that the total TAS-20 score was statistically significantly higher in male subjects than in female subjects ($P < 0.05$). No significant associations were found between the patients' TAS-20 measurements and age, education level, employment status, marital status, smoking status, and family income ($P > 0.05$) (data not shown).

Table 2: Comparison of the frequency of alexithymia, total TAS-20 scores, and factor scores between the chronic periodontitis patients and the controls (mean±SD)

Variable	Patients (*n*=114)	Control (*n*=108)	*P* (*t*-test)
Frequency of alexithymia (%)	22.81	11.1	0.033*
TAS-20 total score	47.39±12.12	43.69±12.31	0.025*
TAS-20 DIF score	14.86±3.54	13.80±3.67	0.029*
TAS-20 DDF score	12.00±3.65	10.98±3.68	0.039*
TAS-20 EOT score	20.68±6.06	19.09±6.32	0.057

Independent *t*-test; *Difference is significant at the 0.05 level; χ^2 test. SD=Standard deviation; TAS-20=Toronto Alexithymia Scale; DDF=Difficulty describing feelings; EOT=Externally oriented thinking; DIF=Difficulties identifying feelings

Table 3: Comparison of the total TAS-20 scores and the factor scores by gender (mean±SD)

Variable	Male (*n*=114)	Female (*n*=108)	*P*
TAS-20 total	47.26±12.59	43.92±11.87	0.043*
TAS-20 DIF	14.47±3.74	13.95±3.49	0.104
TAS-20 DDF	11.90±3.70	11.11±3.65	0.109
TAS-20 EOT	20.69±6.29	19.13±6.07	0.60

Independent *t*-test. *Difference is significant at the 0.05 level. SD=Standard deviation; TAS-20=Toronto Alexithymia Scale; DDF=Difficulty describing feelings, EOT=Externally oriented thinking; DIF=Difficulties identifying feelings

Correlation analysis between psychosocial factors and age and periodontal clinical parameters

The correlation analyses revealed a statistically significant relationship between the participants' CAL and their TAS-20 total score. There were no significant associations among the total TAS-20 and factor scores and age, probing depth, PI, and BOP [Table 4].

Discussion

In the present study, the finding of a higher proportion of alexithymia in chronic periodontitis patients compared to the healthy controls confirms that alexithymia was significantly associated with chronic periodontitis. Moreover, a notable association of alexithymia with periodontal disease severity according to the CAL was demonstrated in the current study for the 1st time.

Table 4: Correlations (Pearson coefficient) among age, clinical periodontal parameters, and the total TAS-20 scores and factor scores

Parameter	TAS-20 total	TAS-20 DIF	TAS-20 DDF	TAS-20 EOT
Age	0.069 (*P*=0.305)	0.103 (*P*=0.124)	0.079 (*P*=0.241)	0.044 (*P*=0.512)
CAL	0.146 (*P*=0.029)*	0.131 (*P*=0.051)	0.130 (*P*=0.054)	0.131 (*P*=0.051)
PD	0.101 (*P*=0.135)	0.089 (*P*=0.185)	0.090 (*P*=0.182)	0.096 (*P*=0.154)
PI	0.121 (*P*=0.073)	0.129 (*P*=0.054)	0.105 (*P*=0.119)	0.102 (*P*=0.129)
BOP	0.097 (*P*=0.148)	0.083 (*P*=0.220)	0.105 (*P*=0.119)	0.082 (*P*=0.224)

*Correlation is significant at the 0.05 level. TAS-20=Toronto Alexithymia Scale; DDF=Difficulty describing feelings; EOT=Externally oriented thinking; DIF=Difficulties identifying feelings; CAL=Clinical attachment level; PI=Plaque index; PD=Probing pocket depth; BOP=Bleeding on probing

The frequency of alexithymia in the study population seems comparable with the prevalence found in the study of Candansayar *et al*.[34] who evaluated alexithymia with the TAS-20 scale in the general population in Turkey. The discrepancy between the frequency of alexithymia in the current study compared with that reported in surveys of the general population in other countries[35,36] could be explained by ethnocultural differences.

In various chronic disorders, the presence of alexithymia, including disturbance of interoceptive awareness, may contribute to maladaptive behaviors,[37,38] such as neglecting oral hygiene or reducing compliance with dental care. These may lead to the onset and progression of periodontal diseases. Alexithymic characteristics could also contribute to the delay between symptom onset and clinical consultation in certain diseases.[39,40] Moreover, the delay in the treatment of early periodontal lesions may lead to irreversible tissue damage, disease progression, and, ultimately, loss of teeth. In light of these findings, it is reasonable to suppose that alexithymic individuals who are prone to develop periodontitis ignore preventive procedures such as oral cleansing. They are also unlikely to be unable to perceive the severity of their periodontal status and to seek treatment in a timely manner.

Although the role of microorganisms in the etiology and the pathogenesis of periodontal disease are evident, studies have revealed that the protective and/or destructive effects of the host response are one of the determinant factors in the severity of periodontal diseases and disease outcomes. Moreover, several studies have pointed to a link between alexithymia and impaired immune response.[20-22,41] Common inflammatory cytokines such as interleukin-6 and tumor necrosis-α have been reported to be elevated in both periodontitis and alexithymia.[20,41,42] Although there is no biochemical evaluation of these cytokines in the current study, the increase in the systemic inflammatory burden in both periodontitis and alexithymia may further contribute to the progression of these diseases.

The chronic periodontitis patients' TAS-20 DIF and DDF scores were consistently higher than the controls, suggesting that individuals with chronic periodontitis tend to show a reduction in, or an absence of, symbolic thoughts and limited ability to fantasize. Such scores also point to difficulty with expressing feelings in words and identifying physical sensations, such as pain. Although the EOT scores were higher in the periodontitis group, the difference did not reach statistical significance.

Although there were no gender differences in the frequency of alexithymia, the total TAS-20 score of the male participants was significantly higher than that of the females. Previous studies reported a similar gender tendency in alexithymia.[43-45] Interestingly, a large body of evidence exists showing that adult males have a higher risk of developing chronic periodontitis than females.[46,47] Albandar[47] related this gender difference in the prevalence of periodontitis to poorer oral hygiene by males and hormonal and other physiological and behavioral differences between males and females. The finding of higher alexithymia levels in male patients may explain the higher risk of males developing periodontitis.

The correlation analyses revealed statistically significant positive correlations between periodontal disease severity, CAL, and the total TAS-20 score. Given the correlation between CAL and the total TAS-20 score, it can be concluded that alexithymia is associated with the severity of periodontitis in terms of the CAL. These results are in accordance with previous findings that patients with more psychosocial problems had a statistically significant correlation with a poorer periodontal prognosis.[5,8,9,48,49] The correlation analysis also revealed a marginal association between poor oral hygiene as determined by the PI and total TAS-20 score, and the TAS-20 DIF scores showing that individuals with alexithymic features tend to neglect oral hygiene or reduce compliance with dental care. The weakness of the correlations for both CAL and PI may be related to the low dental awareness of the overall population, something that may hinder the detection of robust correlations among alexithymic features and PI and CAL.

The current findings need to be interpreted in light of several limitations. First, all the psychosocial assessments were self-reports. It is not possible to make psychiatric diagnostic assessments using questionnaires alone. Second, the cross-sectional design did not permit a retest investigation of alexithymia after periodontal therapy in the chronic periodontitis group. After undergoing treatment, psychosocial data might provide further information on the question of whether alexithymia is a trait or a state construct in periodontitis patients. Third, the effect of alcohol consumption on the alexithymic features of the study population was not evaluated. Fourth, although smoking is a risk factor for periodontitis, the lack of difference between the groups may hinder the relationship among alexithymia, smoking, and periodontitis. As alexithymia increases at-risk health behaviors, smoking may be an expected to be more common in patients with this condition. However, the commonness of smoking among the overall population may hinder the efforts to link alexithymia with the onset of chronic periodontitis and disease progression via smoking. The high rate of alexithymia in periodontitis patients means that dental professionals must be equipped

to respond to these patients and to prescribe appropriate treatment if necessary. Detecting alexithymic patients at an earlier stage may help protect these patients' overall well-being, including their periodontal health.

Conclusion

The present study suggests that patients with alexithymia have an increased frequency of chronic periodontitis. In addition, the features of alexithymia may affect the severity of periodontitis. Although the current study points to an association between alexithymia and periodontal disease, the mechanism could be psychological, immunological, behavioral, or a combination of these mechanisms. Further studies are needed to clarify the role of alexithymia as a psychological determinant of periodontitis and as a risk factor for the disease.

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Conflicts of interest

There are no conflicts of interest.

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