Aggressive Periodontitis Among Young Israeli Army Personnel

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Background: The aim of this study was to assess the prevalence of aggressive periodontitis among young Israeli army recruits and to evaluate its association with smoking habits and ethnic origin.

Methods: The study population consisted of 642 young army recruits (562 men [87.5%] and 80 women [12.5%]), aged 18 to 30 years (average: 19.6 ± 1.6 years), who arrived at a military dental clinic for dental examinations between January and December 2004. Subjects filled out a questionnaire regarding their ethnic origin and family periodontal history, followed by radiographs and a clinical periodontal examination of four first molars and eight incisors.

Results: Aggressive periodontitis was found in 5.9% of the subjects (4.3% localized and 1.6% generalized). At least one site with a probing depth ≥5 mm was found in 20.1% of the subjects. A radiographic distance between crestal bone height and the cemento-enamel junction >3 mm was found in 43 (6.7%) subjects. Current smokers (39.9%) ($P = 0.03$) and subjects of North African origin ($P < 0.0001$) correlated with a high prevalence of aggressive periodontitis.

Conclusion: A relatively high prevalence of aggressive periodontitis was found in young Israeli army recruits, which was particularly associated with smoking and ethnic origin. *J Periodontol 2006;77:1392-1396.*

KEY WORDS

Epidemiology; ethnic origin; periodontal disease; smoking.

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The term "aggressive periodontitis" was first introduced at the International Workshop for a Classification of Periodontal Diseases and Conditions.[1] Previously, different clinical patterns of a significant loss of alveolar bone and attachment in young adults was known as early-onset or juvenile periodontitis. Ethnic and genetic factors have been suggested to play an important role in the development of periodontitis in young adults. The prevalence of localized aggressive periodontitis among teenagers and young adults varies greatly, from 0.1% to 0.2% reported in European populations[2,3] to 10% for African-American, 5% for Hispanic, and 1.3% for white populations in the United States.[4] Populations of African origin are more susceptible to aggressive periodontitis. Löe and Brown[5] estimated that African-American teenagers are 15 times more likely to present aggressive periodontitis than white teenagers. Harley and Floyd[6] reported a prevalence of 0.8% among Nigerian teenagers, and Arowojolu and Nwokorie[7] found a prevalence of 1.6% among 17- to 34-year-olds in a Nigerian hospital clinic. More recently, Albandar et al.[8] reported high prevalence rates of aggressive periodontitis among 12- to 25-year-olds who attended Ugandan schools: 6.5% had either localized or generalized aggressive periodontitis, and 22% had incidental aggressive lesions. Hodge et al.[9] suggested that genetic factors are more significant than smoking history in the manifestation

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of generalized aggressive periodontitis. Nevertheless, a positive association has been found between current smoking and an increased severity of chronic periodontitis[10,11] and an environmental influence in the etiology of the disease.[12] A relation between cigarette smoking and aggressive periodontitis has been indicated.[13,14] The precise mechanism by which cigarette smoking affects periodontal destruction remains to be elucidated.

The aim of this study was to assess the prevalence of aggressive periodontitis among young Israeli army recruits and to evaluate the relationship between aggressive periodontitis and smoking and ethnic origin.

MATERIALS AND METHODS

Consecutive patients, 642 healthy young individuals (562 men [87.5%] and 80 women [12.5%]) who arrived at a military dental office during January to December 2004 for dental examinations, participated in the study. Upon arrival at the basic training military base, all recruits received an examination that included dental screening. Age ranged from 18 to 30 years (mean: 19.6 ± 1.6 years). Subjects reporting any systemic disease were excluded from the study.

The Ethics Committee of the Medical Corps, Israel Defense Forces, approved the study protocol. Subjects provided informed consent to participate in the study. All subjects filled out a questionnaire regarding age, gender, number of siblings, smoking habits, ethnic origin (the geographic location from which the subject, parents, grandparents, etc., originated before immigrating to Israel), previous "gingival problems," previous periodontal surgical treatments, and periodontal history of close family members (parents and siblings). The clinical periodontal examination was performed on the four first molars and eight incisors and included the probing depth (PD) in four sites around each tooth (mesio-buccal, mesio-lingual, disto-buccal, and disto-lingual) using a Williams periodontal probe.# Measurements were rounded to the highest whole millimeter. Radiographic assessment of the crestal bone height and its anatomy were carried out for each of the 12 teeth using a long-cone paralleling technique.

Subjects presenting radiographic evidence of bone loss or probing depths ≥5 mm received a full-mouth radiographic examination. The diagnosis of aggressive periodontitis was made on the basis of clinical and radiographic assessment using the classification workshop criteria[1] and the specific characteristic radiographic appearance of aggressive periodontitis.

Radiographic evidence of bone loss in more than two sites besides the molars and incisors was considered generalized aggressive periodontitis. Information regarding family history was self-reported because there was no possibility to examine other family members in this setting.

Table 1.

Distribution of Demographic Parameters and Self-Reported Risk Factors of Periodontal Disease

Age (years) (mean)	19.6 ± 1.6
N siblings (mean)	2.6 ± 1.7
N smokers (%)	256/642 (39.9)
N subjects with "gum disease" in family (parents and siblings) (%)	84/638 (13.2)
N subjects with dentures in family (parents and siblings) (%)	101/638 (15.8)
N subjects with previous periodontal care (by an oral hygienist or periodontist) (%)	114/642 (17.8)
N subjects with previous periodontal surgery (%)	10/642 (1.6)

Names were not recorded on the questionnaire to ensure anonymity. To avoid potential information bias, clarification was made to the subjects that the study had no impact on their military service. One dentist served as the only examiner after calibration with the military Department of Periodontology staff. Data were analyzed** using Pearson's χ^2 test and analysis of variance.

RESULTS

Table 1 presents the demographic data (age, number of siblings, previous "gingival problems," and previous periodontal surgical treatments) and familial and habitual risk factors (smoking and denture wearers in the family). The overall prevalence of aggressive periodontitis was 5.9% (38 subjects), which was localized in 4.3% (28 subjects) and generalized in 1.6% (10 subjects) of subjects.

No difference in the prevalence of aggressive periodontitis was detected between genders. However, a higher prevalence was found among smokers, which was statistically significant for generalized aggressive periodontitis ($P = 0.03$; Table 2) and for localized aggressive periodontitis.

The extent (percentage of teeth) of PD ≥5 and ≥7 mm in the entire study population was 20.1% and 10.6%, respectively. Radiographic distance between crestal bone height and the cemento-enamel junction >3 mm was found in 43 (6.7%) subjects.

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** SPSS 10.0, SPSS, Chicago, IL.

Table 2.

Association Between Smoking and Aggressive Periodontitis

Class	Smokers (N [%])	Non-Smokers (N [%])	Total (N [%])
Localized	12 (4.7)	16 (4.2)	28 (4.4)
Generalized*	8 (3.1)	2 (0.5)	10 (1.6)
Healthy*	236 (92.2)	367 (95.3)	603 (94.1)
Total	256 (39.9)	385 (60.1)	641† (100)

* $P = 0.03$.
† One subject (from the 642 subjects who participated in the study) was unavailable for testing.

Table 3.

Association Between Ethnic Origin and Aggressive Periodontitis

Ethnic Origin	Localized* (N [%])	Generalized* (N [%])	Healthy* (N [%])	Total (N [%])
Eastern Europe	5 (2.2)	1 (0.5)	218 (97.3)	224 (35)
Western Europe	3 (5.3)	0	54 (94.7)	57 (8.9)
North America	0	0	12 (100)	12 (1.9)
South America	0	0	11 (100)	11 (1.7)
South Africa	0	0	3 (100)	3 (0.5)
North Africa	14 (7.6)	3 (1.6)	168 (90.8)	185 (28.9)
Central Africa	0	4 (28.6)	10 (71.4)	14 (2.2)
Middle East	6 (4.4)	2 (1.5)	127 (94.1)	135 (21.1)
Total	28 (4.4)	10 (1.6)	603 (94.1)	641† (100)

* $P < 0.001$.
† One subject (from the 642 subjects who participated in the study) was unavailable for testing.

A higher prevalence of aggressive periodontitis was also related to the number of siblings ($P < 0.0001$), self-reported periodontal disease in the close family, i.e., parents and siblings ($P = 0.047$), and self-reported previous periodontal care by an oral hygienist or periodontist ($P = 0.0009$) or periodontal surgery ($P = 0.048$).

Aggressive periodontitis was more prevalent among subjects who originated from Central and North Africa and from the Middle East ($P < 0.0001$) (Table 3).

DISCUSSION

Destructive forms of periodontal diseases, such as aggressive periodontitis (localized and generalized), usually diagnosed in a young population, are relatively rare.[3-8,15] In the present study population, a relatively high prevalence of aggressive periodontitis was found, which was higher than that found in Israel more than a decade ago in an identical population.[16] This increase in prevalence can be related to the demographic alteration of the population since the 1990s or a result of using different diagnostic methods. In the latter study,[16] a prevalence of 0.9% was found. A panoramic radiograph was the only measure used to diagnose the presence of aggressive periodontal disease, which could definitely underestimate the actual prevalence of the disease without a clinical examination. Nevertheless, the high prevalence of aggressive periodontitis among young adolescents suggests that the disease may initiate at a younger age when children might still be treated by pediatric dentists. Therefore, both pediatric and general dentists should increase their awareness to diagnose the disease as early as possible.

The fact that a full-mouth probing was not performed in the current study could underestimate the results in terms of the occurrence of aggressive periodontitis and the extent of PD ≥5 and ≥7 reported here. Moreover, this partial-mouth probing limits the comparability of the present results to other studies. Unfortunately, a full-mouth probing assessment was not possible in the study setting and thus was not carried out. Nevertheless, the occurrence of aggressive periodontitis in this cohort was still relatively high. It is noteworthy, in that context, that according to the World Workshop on Periodontal Disease Classification,[1] aggressive periodontitis is characterized by interproximal attachment loss.

According to the Israeli Central Bureau of Statistics,[17] there has been a dramatic 10-fold increase in immigration since the 1990s, particularly from Eastern European and Central African countries, where no epidemiologic studies regarding the prevalence of diseases, in general, and periodontal diseases, in particular, have been published. The present data showed the significant ethnic, socioeconomic, and cultural changes in the Israeli population since the 1990s and their potential effect on dental health. In a preliminary study,[18] the effect of this recent massive immigration on oral health status and treatment needs was investigated. In the present study, ethnic origin was related to the prevalence of aggressive periodontitis, which is in accordance with previous studies.[2-9,12,13] These findings show a strong genetic predisposition to this periodontal disease.

A higher prevalence of aggressive periodontitis was found among smokers, particularly the generalized form, which agrees with previous reports that found a positive relation between cigarette smoking and aggressive periodontitis.[13,14] Among smokers, an increase in plaque accumulation, a higher incidence

of gingivitis and periodontitis, a higher rate of tooth loss, and increased resorption of the alveolar ridge have been found in the oral cavity.[19] The exact mechanisms by which tobacco exerts its influence on periodontal tissues are not completely known. It is likely that smoking has a systemic influence by altering the host response and/or by directly damaging the periodontal cells.

Bone loss and lower basic bone levels may be associated with smoking, even with good oral hygiene. This suggests that smoking is a risk factor in periodontal health.[20,21] It is unclear whether there is a consistent effect of smoking on the bacterial population selection.[22-24] Smokers should be encouraged by their dentists or treating physicians to cease smoking, emphasizing that smoking can increase the risk of periodontal diseases among its other adverse effects.

Socioeconomic status is a significant risk indicator of aggressive periodontitis,[13] which could explain the relation between the high number of siblings (considered one of the parameters that represents a low socioeconomic status) and aggressive periodontitis found in the present results.

A higher prevalence of aggressive periodontitis was also related to self-reported periodontal disease in the family and self-reported previous periodontal care or surgery. The high frequency of the disease among other members of the family suggests a hereditary predisposition to aggressive periodontitis.[25,26]

Etiologic and predisposing factors associated with the high occurrence of aggressive periodontitis and therapeutic and preventive measures of the disease in this study population need further investigation.

CONCLUSIONS

Aggressive periodontitis, prevalent in this studied cohort, was found in 5.9% of the subjects. A significant proportion of aggressive periodontitis occurred in smokers and in subjects who originated from North Africa.

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