Bruxism in Military Pilots and Non-Pilots: Tooth Wear and Psychological Stress

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Background: Bruxism is the diurnal or nocturnal para-functional habit of clenching or grinding the teeth and affects 5–10% of the general western population. Bruxism can cause pain and irreversible damage to the teeth, periodontium, masticatory muscles, and temporomandibular joint. Variables such as general stress, work-related stress, and personality traits have been increasingly considered as initiating, predisposing, and perpetuating factors for bruxism. We sought to evaluate the potential of work-related stress and personality factors to induce bruxism among military pilots and non-pilot officers. Methods: Subjects were 57 healthy male Israel Air Force officers (mean age 25.8 ± 4.3 yr). Of these, 17 were jet-pilots, 18 helicopter-pilots, and 22 non-pilot officers. Tooth wear was classified according to a six-point scale. In addition, the subjects responded to a battery of psychological questionnaires for self-assessment of stress at the workplace and their coping behavior. Results: Bruxism of clinical importance (i.e., with dentin exposure) was found in 69% of the aircrew members but only 27% of the non-pilot group. No difference was found between groups regarding stress levels. Discussion: Military aircrews may be relatively vulnerable to deleterious bruxism as well as other signs of chronic stress. Among bruxers, pilots tended to show coping strategies that were significantly more emotional and less task-oriented than non-pilots, whereas non-bruxers showed no significant differences in coping behavior. This study suggest that integrating dental and psychological preventive intervention may be helpful. Keywords: aviation dentistry, flight dentistry, dentistry, personality traits, work environment, sleep disorder, temporomandibular joint, dentin exposure.
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Prevalence of bruxism in a military environment and to define the relation between profession, stress, and personality among a population of aviators and other officers.

METHODS

This study was approved by the Ethics Committee of the Medical Corps, Israel Defense Forces; participation was voluntary. Subjects were 57 Israel Air Force officers who were undergoing routine annual dental examinations at a military dental clinic during a 4-wk period. Of these subjects, 17 were jet pilots, 18 were helicopter pilots, and 22 were non-pilot officers (10 aviation control and 12 commando unit officers). Subjects were healthy and homogeneous with respect to socioeconomic status and education; their mean age was 25.8 yr ± 4.3 SD. Officers who came to the clinic with dental emergencies were excluded from the study.

Dental assessment: Two dental practitioners using identical criteria (19) examined each subject and estimated the tooth wear visually, using a standard dental probe, #4 dental mirror, unit illumination, and cotton rolls, as needed. The tooth wear was estimated according to a 6-point scale: 0 = no apparent wear, 1 = slight wear, 2 = wear of enamel only, 3 = wear into the dentin in single spots, 4 = exposure of dentin in an area of more than 2 mm², 5 = wear of more than one-third of the clinical crown [modified from Magnusson et al. (19)]. Immediate comparison of the two evaluations was made while the subject was still in the chair. In cases of disagreement, the subject was re-examined by both observers together to develop a consensus evaluation.

In the statistical analysis, every subject had eight scores: the highest score for each four dental regions (incisors, canines, premolars, and molars) in the upper and lower jaws. Subjects who scored “3” in at least one tooth were defined as suffering from bruxism, since this degree of tooth-wear has clinical importance regarding dentin exposure with resulting tooth sensitivity, increased risk of rapidly developing dental caries, and the relatively rapid loss of facial vertical dimension.

Psychological evaluation: While waiting for the dental examination, subjects completed a battery of psychological questionnaires to assess two factors:

1) Magnitude of workplace stress—A questionnaire consisting of 11 questions was constructed. Each question used a scale from 1 (very low) to 5 (very high). The average of the 11 items was defined as the “stress degree.”

2) Coping style—A questionnaire consisting of 68 items, based on Folkman et al. (11), was used to assess individual cognitive and behavioral responses for confronting stress. A principal component factor analysis with orthogonal rotation was performed on the 68 items. Three factors were obtained that explained 39.3% of the items’ variance. Cronbach's α scores were 0.84, 0.84, and 0.77, respectively. The items included in these three factors were as follows: problem solving, emotion oriented, and denial.

Statistical analysis: Data were collected and analyzed using SPSS 10.0 (SPSS Inc., Chicago, IL). The difference between the prevalence of bruxism between the experimental groups was analyzed by means of Chi-square for independency tests. The psychological questionnaires of the two groups were compared using t-tests for independent samples. The utilization of coping styles among “bruxers” was compared between non-pilots and pilots by means of 3 × 2 repeated measures ANOVA, followed by honest significant difference (HSD) post hoc comparisons.

RESULTS

Bruxism was found in 69% of the overall group of pilots: 70.6% (n = 12) of the jet pilots and 66.7% (n = 12) of the helicopter pilots. Among the non-pilots, bruxism was found in 6 subjects (27%).

The results of the questionnaires among pilots revealed a stress level of 3.84 (SD = 0.54), whereas among non-pilots the stress level was 3.59 (SD = 0.48).

DISCUSSION

The military aircrew population is vulnerable to certain dental pathologies. Besides the toothache arising during barometric pressure changes, i.e., barodontalgia (26,28) and dental fracture in high-altitude conditions (27), there is evidence of a higher prevalence of periodontal diseases among pilots than the general population (13). Researchers have assumed that military aircrew members have a higher prevalence of jaw parafunctional activity (13–15). Moreover, Goldhush et al. (13) estimated that 60–70% of fighter pilots in the World War II era had suffered from bruxism. However, that assumption had not relied on any scientific evidence.

In the present study, the bruxism was clearly more noticeable among pilots (69%) than among non-pilots (27%). However, no distinction was detected between the two different military flight sectors, namely jet pilots and helicopter pilots. This finding therefore dismisses the possibility that this problem derives from flight hazards such as G forces, vibrations, or centrifugal forces.

Previous research findings regarding the connection between the para-functional habit of the jaw and work-related stress are insufficient because of methodological problems (self-reporting) and contradictory results. Thus, knowledge in that area is based largely on clinical lore or anecdotal reports rather than on empirical evidence (18). The present results point to the possibility of a link between bruxism and the work environment, especially the coping strategies for work-related stressful demands.

Stress, the unique bond between the environmental demands toward the individual and his ability to cope with them, is associated with undesirable physical consequences. The relationship between stress and ailment is based on the assumption that stress brings about life changes that disturb the vital homeostasis of the affected individual followed by a struggle to regain the primary situation. This struggle entails undesirable changes in various physical systems. Life changes that
engender illness are not necessarily severe in their intensity, such as natural or personal disasters. Even low-key stressful causes or demands can trigger illness if they are frequent in appearance and chronic by nature. Whereas acute stress, limited by length, allows for the physical system to recover, a chronic stress factor can constantly waste the individual’s resources and interfere in the healing process. Human beings do not necessarily respond to stress in exactly the same way. Hence, the consequence of a stressful situation depends on numerous variables other than the intensity and length of the event. Personality variables include the individual’s coping style, both in stress perception and coping techniques. Thus, some people are less resilient to stress, and therefore suffer more from the physical and psychological consequences of stress. Since the study shows no difference in the intensity of stress experienced by pilots as compared to non-pilot officers, but rather differences in coping strategies to these stressful demands, the possibility arises that coping behavior contributes more to the high percentage of bruxism among this group. The pilots suffering from bruxism apparently tend to use less effective coping strategies: more emotionally oriented methods and denial, less task-oriented methods, as compared with other socio-economically matched non-pilots suffering from bruxism.

The work environment has been reported as one of the causal factors of dental pathology: car battery workers and wine testers have a relatively high prevalence of dental erosion due to acid vapor in the air and the acidity of the wine, respectively, and mine workers are prone to excessive dental mechanical attrition due to a dusty environment (10,12,23). In addition, work characteristics such as irregular shift work have been connected to bruxism (1). Since bruxism was diagnosed in a relatively high percentage of (27%) even the non-pilot group, it seems that the military setting and especially a military aviation setting is another pathogenic factor associated with dental diseases. The accelerated rate of tooth attrition in this young population calls for dental and psychological preventive efforts.

**SUMMARY**

An extremely high number of young helicopter and jet pilots participating in this study were diagnosed as having bruxism. Our study suggests a possible relationship between coping styles and bruxism in military jet pilots participating in this study were diagnosed as having bruxism. Our study suggests a possible relationship between coping styles and bruxism in military jet pilots. The pilots suffering from bruxism apparently tend to use less effective coping strategies: more emotionally oriented methods and denial, less task-oriented methods, as compared with other socio-economically matched non-pilots suffering from bruxism.

**REFERENCES**


