

Function of the Stomatognathic System in Patients with Posttraumatic Stress Disorder

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Summary

The aim of this study was to determine the incidence of temporomandibular dysfunction (TMD) in veterans of the War for Independence, who suffer from posttraumatic stress disorder (PTSD). The examined group consisted of 100 male subjects with a diagnosis of PTSD, who had participated in the war, and a control group of 94 subjects of the same age and sex who had not participated in the war and in whom psychiatric diagnosis excluded PTSD. The study consisted of case history data and a medical examination. The examination included a questionnaire in which subjects answered questions with yes–no answers.

During the medical examination the condition of the jaw joints (sounds, sensitivity and pain during palpation of the jaw joint) and mastication muscles (sensitivity and pain during palpation of the masticatory muscles) was assessed and the functional ability of the stomatognathic system determined (maximal opening, maximal laterotrusion movement left and right and maximal protrusion with registration of eventual occurrence of pain or sound).

Statistically significant difference was determined in almost all measured parameters. The subjects with PTSD had subjective symptoms and clinical signs of temporomandibular dysfunction (TMD) significantly more frequently. Eighty-two percent (82%) of those with PTSD had at least one symptom and 98% at least one sign of dysfunction, compared with 23.91% and 50% respectively of the subjects in the control group. The most frequent sign in both groups was sound in the temporomandibular joint (TMJ), which occurred in 64% of subjects with PTSD and 17.3% of subjects in the control group. Statistically significant difference was also found in the limitation of maximal possible movements, i.e. the subjects with PTSD had significantly more often restricted movements in opening, left and right laterality and protrusion. The greatest differences between the groups related to parameters of pain. Namely, 52% of subjects with PTSD had painful TMJ and 91% had at least one painful muscular location. It can be concluded that correlation exists between PTSD and TMJ.

Key words: *temporomandibular dysfunction, posttraumatic stress disorder, orofacial pain.*

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Introduction

Temporomandibular dysfunction is a pathological disorder which includes a number of clinical problems of the masticatory muscles, temporomandibular joint (TMJ) and associated structures (1). Dominant signs and symptoms are pain, restricted function and sounds in the TMJ.

Aetiology and mechanisms of the occurrence of this disorder have still not been entirely explained. The relationship between stress and TMD is still controversial.

Followers of the bio-psychological theory claim that psychological stress induces emotional changes which, via complex interactions in the central nervous system (CNS), transform into motor response, i.e. muscular hyperactivity (2-5). Such induced muscular hyperactivity, manifests particularly intensively in the muscles of the head and face, due to the fact that they are involved in physical manifestation of emotion. It has been demonstrated that stress induces increased electromyographic (EMG) activity, i.e. that during a longer period of stress contact between the teeth becomes more frequent and intensive (6, 7).

Data from the literature indicate that stress can cause or aggravate TMD. A significantly higher level of stress has been registered in patients with TMD compared to a healthy population (8-10).

The basic hypothesis of this study was that in posttraumatic stress disorder preconditions exist for the occurrence of increased muscular activity, which can secondly lead to changes in the TMJ, and to disorder of the whole system.

The American Psychiatric Association define PTSD as a form of pathological response to stress in which the subject again experiences the trauma experienced through intrusive thought and dreams, and consequently is in a state of permanently increased alertness (11).

One of the possible causes of PTSD is war. War is a situation which involves stresses of various intensity and duration, and cumulative effects occur because of the frequent repetition, and consequently war is considered a catastrophic stressor.

With the increased motor activity and disturbed neurotransmitters which accompany PTSD, partic-

ularly noradrenalin, serotonin, endogenous opiates and hypothalamo-pituitary-adrenalin axes, it can be anticipated that the aforementioned disorders will also have an effect on the function of the stomatognathic system (12-14).

Materials and Methods

One hundred and ninety two (192) male subjects participated in the study. The examined group consisted of 100 male subjects, veterans of the war for independence ($x = 35$ years, range = 25 - 50 years), with a diagnosis of PTSD. A control group comprised 92 subjects ($x = 34$ years, range = 24 - 51 years) who had not participated in the war and in whom PTSD was excluded by psychiatric analysis (15). The study was carried out at the Dental Polyclinic of the Medical Faculty in Rijeka.

History data and medical examination were performed by two persons, one history data and the other the medical examination. The examiner who performed the medical examination was unaware of the results of the case history data examination. History data examination was carried out by means of a questionnaire in which the subjects answered the questions with yes-no answers.

In order to avoid the problem of the reliability of the examination all procedures of the medical examination, i.e. measurements and palpation was performed by the same person (16, 17). Assessment was made of the condition of the jaw joints (sounds, sensitivity and pain during palpation of the jaw joint) and masticatory muscles (sensitivity and pain during palpation of the masticatory muscles). The functional ability of the stomatognathic system was determined (maximal opening, maximal laterotrusion movement to the left and right and maximal protrusion, with registration of the eventual occurrence of pain or sound).

The examination technique and site of palpation were previously tested for reliability and incontestability (18, 19). Sound in the TMJ was determined by direct auscultation and palpation, without the use of auxiliary devices. All the subjects were acquainted with the study and gave their written consent.

Statistical methods

Results were statistically analysed in the programme "Statistics 5.0 for Windows". Student t-test for independent samples was used to test the significance of the differences of the arithmetical means of some parameters. For the variables whose values were expressed in categories median, mode and frequency were calculated, and testing the significance of the differences between the groups was performed by chi-square test. In cases when there was a small number of subjects with a single data, Mann-Whitney test was used.

Results

Results of the Questionnaire

Eighty-two percent (82%) of the subjects with PTSD had at least one symptom of dysfunction in relation to 23.91% of the subjects in the healthy control group (Table 1).

Subjects answered questions in the questionnaire with yes-no answers. Affirmative answers to the questions are shown in Table 2.

Subjects with PTSD significantly more frequently perceive sounds in the TMJ, experience spasms in the masticatory muscles, fatigue, locking of the jaw and pain in the cheeks, face and jaw joints. They significantly more frequently suffer from headaches, have difficulty opening the mouth widely, feel pain or discomfort during movements of the lower jaw, and significantly more frequently clench and grind their teeth.

Results of the medical examination

Clinical signs of dysfunction were determined in 98% of the subjects with PTSD and 50% of the subjects in the control group (Table 3).

The clinical presence of sounds in the TMJ was determined by auscultation and palpation. Sound was the most frequent sign of dysfunction in both groups. Sixty-four percent (64%) of the subjects with PTSD had clinically detected sound in the TMJ compared to 17.39% of subjects in the control group (Table 4).

Sensitivity of the TMJ on palpation

The temporomandibular joints were palpated laterally and posteriorly. Painful sensitivity was significantly more frequently present in the subjects with PTSD (52%) compared to only 2.17% of subjects in the control group (Table 5).

Sensitivity of the muscles of the face, head and neck on palpation

The following muscles were palpated: m. masseter profundus, m. masseter superficialis, m. temporalis (anterior, posterior, and (inzercija?) on the coronoid (nastavku), m. pterygoideus lateralis, m. pterygoideus medialis. Ninety-four percent (94%) of the subjects with PTSD had at least one sensitive muscle on palpation compared to 43.48% of the subjects in the control group (Table 6).

Evaluation of the functional activity of the stomatognathic system

During the medical examination maximal opening, left and right maximal laterotrusion and protrusion were measured, and the eventual occurrence of pain registered (Table 7).

In almost all parameters significant differences were found between the two groups. In the parameters which determine mandibular movement difference was found for maximal opening, protrusion and left laterotrusion. Greatest differences were found in the parameters of pain. In the PTSD group pain during opening occurred in 22% of cases and protrusion in 20%, right laterotrusion in 16% and left laterotrusion in 20% of cases. In the group of healthy subjects pain was present in only 2.17% of cases.

Discussion

PTSD is a pathological condition which is accompanied by disturbed neurotransmitter mechanisms which can be directly or indirectly connected with the occurrence and course of TMD. Disturbed noradrenergic system, hypothalamo-pituitary-adrenal axes, mechanisms of endogenous opiates and disturbed level of serotonin can have an effect on dysfunction by inducing muscular hyperfunction and by changed perception of pain.

The results of this study indicate that signs and symptoms of dysfunction were most frequent in subjects suffering from PTSD compared to a healthy group of subjects.

Eighty-two percent (82%) of the subjects with PTSD had symptoms of dysfunction compared to 23.91% of subjects in the healthy control group. The most frequent anamnestic symptom in both groups was sound (60% of subjects with PTSD, 13.04% of the healthy subjects). The results confirm previous studies in which sound in the TMJ was the most frequent anamnestic symptom (20, 21).

The frequency of the occurrence of sound in the healthy group is in agreement with the results found in other studies, performed on a non-patient population, while the values of the examined group were significantly higher and corroborate the results obtained by analysis of dysfunctional patients (22, 23).

The medical examination revealed that 98% of the subjects with PTSD had at least one sign of dysfunction compared to 50% of the subjects in the healthy control group. The values of the healthy control group corroborate the values of studies performed on non-patient populations (24, 25). The

most marked difference between the groups occurred with regard to the occurrence of pain both during functional movement and palpation.

In general it is considered that TMD is a chronic, painful condition and that pain is the fundamental reason for seeking the help of a physician (26).

The values obtained for patients with PTSD agree with the results of studies of dysfunctional patients (22, 27).

Such significantly present pain in the PTSD group can be explained by data from the literature which show that pain is often connected with stressful situations, anxiety and depression (28).

Conclusion

The subjects suffering from PTSD showed significantly more marked subjective symptoms and clinical signs of dysfunction of the stomatognathic system than the subjects in the control group. The very high presence of functional disorders of the stomatognathic system, particularly pain in the group of subjects suffering from PTSD, confirms the hypothesis of the effect of stress, i.e. PTSD on the function of the stomatognathic system.