

# CO-OCCURRENCE OF CHRONIC HEAD, FACE AND NECK PAIN, AND DEPRESSION IN WAR VETERANS WITH POST-TRAUMATIC STRESS DISORDER

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**SUMMARY** – This study investigated the relationship between chronic head, face and neck pain, and the level of depression in Croatian war veterans with post-traumatic stress disorder (PTSD). The presence of self-reported pain, pain on digital palpation, and pain severity in masticatory and neck muscles, temporomandibular joints and sinuses, as well as the level of depression were assessed in a group of war veterans with PTSD (n=52). Control groups consisted of war veterans without PTSD (n=50) and healthy men that were not engaged in war actions and were free from PTSD (n=50). The number of self-reported pain and number of painful sites were correlated with the level of depression. More self-reported pain and painful sites were recorded in the group of war veterans with PTSD as compared with either war veterans without PTSD or healthy men. Furthermore, PTSD patients mostly suffered from severe depression. There was a statistically significant positive correlation between all investigated pain parameters and level of depression. As the most important finding, the present study demonstrated chronic head, face and neck pain to be related to depression in PTSD patients.

**Key words:** *Chronic pain; Stress disorders, post-traumatic; Depression; Veterans*

## Introduction

Pain is defined as an unpleasant sensory and emotional experience. If pain persists for 6 months or longer, it is referred to as chronic pain<sup>1</sup>. Chronic pain is the most common complaint made by patients to their primary care providers, which causes huge losses in productivity and entails high healthcare cost<sup>2</sup>.

Temporomandibular disorders (TMDs) are a complex heterogeneous group of conditions involv-

ing the masticatory muscles, or temporomandibular joints (TMJs), or both, characterized by pain and dysfunction of the stomatognathic system. Pain of the masticatory muscles, in the TMJs, and in the associated hard and soft tissues (e.g., head, ears and neck), limitation in jaw function, and sounds in the TMJs are common signs and symptoms of TMDs<sup>3</sup>. TMDs have been identified as a major cause of non-dental pain in the orofacial region and have been considered to be a subclassification of musculoskeletal disorders<sup>4</sup>. Masticatory muscle disorder is one of the most common types of TMDs<sup>5</sup>. The precise etiology and mechanism of TMDs is still an enigma. It is well accepted that psychological factors play a role in the etiology and maintenance of TMDs. Elevated levels of anxiety, depression and stress-related somatic symptoms

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Received February 2, 2015, accepted June 3, 2015

have been reported in TMD patients<sup>6,7</sup>. Furthermore, many of chronic orofacial patients met the criteria for post-traumatic stress disorder (PTSD)<sup>8</sup>.

The American Psychiatric Association defines PTSD as a form of pathological response to stress in which the subject re-experiences the trauma through intrusive thoughts and dreams, and consequently is in a state of permanently increased alertness<sup>9</sup>. It is associated with high levels of psychological distress, such as anxiety, depression, dysthymic disorder, and alcohol abuse or dependence<sup>10-12</sup>. Also, a high rate of chronic pain condition (e.g., headache and back pain) has been reported among PTSD patients<sup>13,14</sup>.

Diagnosis of clinical depression usually requires evaluation by psychologists or psychiatrists. An alternative method is to use questionnaires to evaluate the levels of depression, such as the Symptoms Checklist 90-revised (SCL-90r) proposed by Derogatis<sup>15</sup> and included in the Research Diagnostic Criteria for Temporomandibular Disorder (RDC/TMD)<sup>5,16</sup>. The SCL-90r has been widely used in the grading of different levels of depressions, physical and psychological incapacity and somatization, as well as comparison of the quality of sleep with psychological factors in patients with TMD<sup>17,18</sup>.

There is little evidence for chronic pain in the orofacial and neck region, and for relationship between chronic pain and depression among PTSD patients. Therefore, the purposes of this study were to assess the presence and severity of head, face and neck pain (i.e. of masticatory and neck muscles, TMJs and sinuses), and the level of depression among PTSD patients; and to investigate the relationship between chronic head, face and neck pain, and the level of depression.

## Subjects and Methods

### *Subjects*

The study included 152 male subjects: 52 war veterans with chronic PTSD (mean age 41.1±6.4); 50 war veterans without PTSD (mean age 42.4±7.3); and 50 healthy men that did not participate in the war and did not suffer from PTSD (mean age 41.2±6.9). PTSD patients were selected from the group of treatment-seeking outpatients with a diagnosis of chronic combat-related PTSD according to the International Statistical Classification of Diseases and Related

Health Problems (F 43.1)<sup>19</sup>, treated at the Department of Psychiatry, Osijek University Hospital Center in Osijek, Croatia. At the time of the study, all subjects met all the criteria for PTSD according to the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders (PTSD part), which was applied by a psychiatrist<sup>20</sup>. The groups of war veterans without PTSD and of healthy subjects were randomly selected from dental outpatients attending dental clinics at the University of Rijeka. In those groups, PTSD was excluded by psychiatric examination. All subjects gave their informed consent for participation in the study. The Ethics Committees of the Osijek University Hospital Center and School of Medicine, University of Rijeka approved the study. Ethical guidelines of the Declaration of Helsinki were followed during the study.

### *Questionnaire*

Participants were asked to complete the questionnaire about the presence of pain for more than 6 months in the head, face and neck region at 7 sites (i.e. face, jaw, in front of ears, ears, neck, during mandibular movements, and head) and SCL-90r for depression<sup>5,15</sup>. Upon filling out the questionnaire, the level of depression and the number of self-reported painful sites were calculated. The number of self-reported painful sites was defined as a score of self-reported painful sites.

### *Clinical examination*

Masticatory muscles (extraoral: anterior, middle and posterior temporal, origin, body and insertion of masseter, stylohyoid/posterior digastric, and medial pterygoid/suprahyoid/anterior digastric; and intraoral: temporal tendon and the lateral pterygoid area), neck muscles (superior, middle and inferior sternocleidomastoid, insertion of trapezius, upper trapezius and splenius capitis), TMJs (lateral pole and posterior attachment) and sinuses (frontal, ethmoid and maxillary) were digitally palpated as it is recommended in RDC/TMD on the left and right side. Subjects were asked to evaluate pain severity during palpation on a 0 to 3 scale: 0=no pain, 1=mild, 2=moderate and 3=severe pain<sup>5</sup>. The number of painful sites on palpation was defined as a score of painful sites on palpation. Pain severity score was calculated as a score of

Table 1. Number of painful sites on palpation in study groups

Number of painful sites on palpation	Group 1	Group 2	Group 3	Statistical test ANOVA, p-value
Masticatory muscles	7.5±6.8*	0.5±0.9	0.3±0.6	F=34.925; p<0.001
Neck muscles	5.4±4.5*	0.5±1.1	0.2±0.7	F=36.285; p<0.001
Temporomandibular joints	1.1±1.5*	0.3±0.6	0.0±0.0	F=11.745; p<0.001
Sinuses	2.1±2.0*	0.1±0.4	0.0±0.0	F=28.839; p<0.001
Total	16.5±13.1*	1.4±2.3	0.4±1.0	F=42.272; p<0.001

Results are expressed as mean ± standard deviation; group 1, war veterans with posttraumatic stress disorder; group 2, war veterans without posttraumatic stress disorder; group 3, healthy subjects without war history and posttraumatic stress disorder; \*statistically significant difference from groups 2 and 3 (p<0.001, Scheffé post hoc test).

perceived pain during palpation. The number of painful sites on palpation, as well as the pain severity score were calculated as total, masticatory muscles, neck muscles, TMJs and sinuses, number of painful sites on palpation, and pain severity score.

All clinical examinations were performed by the same investigator (MM-U). Finger pressure was calibrated using manual algometer (FDK 5, Wagner Instruments, Greenwich, CT, USA) (Fig. 1). The intra-examiner reliability was established by re-examination of 20 subjects within 7 days. The weighted kappa statistics showed satisfactory agreement within the first and second stage of assessment (kappa=0.859-0.929, depending on the parameters assessed).

### Statistics

Data were analyzed using SPSS for Windows 11.0 (SPSS Inc., Chicago, IL, USA). One-way ANOVA followed by Scheffé post-hoc tests was performed to evaluate differences in continuous variables among

three groups. Differences in categorical variables among three groups were tested by Fisher exact test. Spearman's rank correlation was used to explore association between parameters of interest. A 5% level of significance was used for statistical tests.

## Results

### Self-reported pain

The mean number of self-reported pain sites in the PTSD group, group of war veterans without PTSD, and group of healthy subjects without war history and PTSD was 3.89±1.88, 0.71±0.78 and 0.58±0.85, respectively. The ANOVA showed a statistically significant difference between the groups (F=69.698; p<0.001). Scheffé post hoc test showed that PTSD patients reported statistically significantly more painful sites than subjects from the two other groups (p<0.001).

### Number of painful sites on palpation and pain severity

Each patient was palpated at 42 sites: masticatory muscles at 20 sites, neck muscles at 12 sites, TMJs at 4 sites, and sinuses at 6 sites. PTSD patients had significantly more painful sites than war veterans without PTSD and subjects free from war history and PTSD (p<0.001) (Table 1). In the PTSD group, approximately 8 of 20 sites on masticatory muscles (40%) and 5 of 12 sites on neck muscles (41.67%) were painful.

Furthermore, PTSD patients mostly evaluated pain on palpation as moderate or severe. There was a statistically significant difference in pain perception between the group of PTSD patients and the other



Fig. 1. Manual algometer.

Table 2. Pain severity on palpation in study groups

Pain severity on palpation	Group 1	Group 2	Group 3	Statistical test-ANOVA, p-value
Masticatory muscles	15.6±15.5*	0.6±1.1	0.3±0.6	F=29.508; p<0.001
Neck muscles	12.5±12.4*	0.8±1.5	0.2±0.7	F=28.750; p<0.001
Temporomandibular joints	1.9±2.8*	0.3±0.7	0.0±0.0	F=11.274; p<0.001
Sinuses	5.8±6.9*	0.1±0.4	0.0±0.0	F=21.405; p<0.001
Total	35.8±33.3*	1.7±2.7	0.5±1.1	F=33.427; p<0.001

Results are expressed as mean ± standard deviation; group 1, war veterans with posttraumatic stress disorder; group 2, war veterans without posttraumatic stress disorder; group 3, healthy subjects without war history and posttraumatic stress disorder; \*statistically significant difference from groups 2 and 3 (p<0.001, Scheffé post-hoc test).

two groups (Table 2).

### Depression

Patients with PTSD were statistically significantly more depressed than subjects from either control group (p<0.001). Table 3 summarizes data on depression levels. In the PTSD group, 86.5% of subjects were severely and 5.8% moderately depressed.

### Correlation between pain and depression

We first observed positive correlation between all investigated pain parameters (number of self-reported pain and number of painful sites) and depression levels (Table 4). However, no correlation was found between pain parameters and depression level within any patient group.

### Discussion

There is a growing body of evidence suggesting that chronic pain and PTSD frequently co-occur<sup>8,13,21-23</sup>. For example, de Leeuw *et al.*<sup>8</sup> observed a high prevalence of PTSD (15%) in patients with chronic orofacial pain. McFarlane *et al.*<sup>21</sup> report that PTSD

patients suffer from back pain (45%) and headaches (34%). In a sample of Vietnam veterans with PTSD, Beckham *et al.*<sup>13</sup> observed that 80% of subjects reported the presence of chronic pain conditions. Mottaghi and Zamani<sup>24</sup> found a high prevalence of masticatory muscle and TMJ pain in a group of Iran/Iraq war veterans with PTSD. Our results supplement the findings mentioned above. In our previous study, we have reported that PTSD patients suffer from headache (63.8%), facial pain (21.8%)<sup>25</sup> and TMDs, mainly myofascial pain (48%)<sup>26</sup>. Also, we showed that PTSD patients reported more intense pain on digital palpation of the muscles<sup>27</sup>. In the present study, we observed more self-reported pain and more painful sites in the head, face and neck region in the group of war veterans with PTSD as compared with the groups of war veterans without PTSD and of healthy men without war history and PTSD. The most painful sites on digital palpation were neck muscles, followed by masticatory muscles, sinuses, and TMJs.

Association between chronic pain syndromes and depression has long been recognized<sup>28</sup>. The prevalence of depression in patients with chronic pain syndromes has been variously reported as ranging from 4.3% to

Table 3. Distribution of depression levels in study groups

Depression level	Group 1 (n)	Group 2(n)	Group 3(n)	Total(n)	p-value
Normal	4	49	48	101	p<0.001**
Moderate*	3	1	2	6	
Severe*	45	0	0	45	
Total	52	50	50	152	

Group 1, war veterans with posttraumatic stress disorder; group 2, war veterans without posttraumatic stress disorder; group 3, healthy subjects without war history and posttraumatic stress disorder; \*categories pooled for data analysis because of the small number in cells; \*\*Fisher exact test

Table 4. Correlation between pain and depression

	Depression
Number of self-reported pain	r=0.738; p<0.001
Number of painful sites on palpation of masticatory muscles	r=0.673; p<0.001
Number of painful sites on palpation of neck muscles	r=0.634; p<0.001
Number of painful sites on palpation of temporomandibular joints	r=0.418; p<0.001
Number of painful sites on palpation of sinuses	r=0.640; p<0.001
Total number of painful sites	r=0.727; p<0.001

87%, although most studies report between 30% and 60%<sup>29</sup>. Many studies were focused on the relationship of depression with chronic facial pain and TMD<sup>30-33</sup>. For example, Korszun *et al.*<sup>32</sup> report that 53% of TMD patients met the criteria for the diagnosis of major or minor depression and another 22% self-reported depressive symptoms. In this study, 92.3% of PTSD patients suffered from depression, mostly severe. Our results are in accordance with the results of Irwin *et al.*<sup>23</sup>, who suggest that measuring anxiety and depression symptoms are important factors when treating comorbid PTSD and pain.

Accordingly, the present study found high co-occurrence of chronic head, face and neck pain and depression among PTSD patients. Furthermore, there was positive correlation between chronic pain and depression.

It is concluded that chronic head, face and neck pain and depression co-occur in PTSD. Therefore, we suggest that when TMD pain treatment for PTSD patients is planned, the level of depression should be calculated and depression treatment should be included. This study supports the theory on a complex etiology of chronic TMD pain and the need of a multidisciplinary approach and therapy.

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#### Sažetak

### ISTODOBNA POJAVNOST BOLI U PODRUČJU GLAVE, LICA I VRATA TE DEPRESIJE U RATNIH VETERANA S POST-TRAUMATSKIM STRESNIM POREMEĆAJEM

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Svrha ovoga rada bila je istražiti odnos između kronične boli u području glave, lica i vrata te razine depresije u skupini hrvatskih ratnih veterana s post-traumatskim stresnim poremećajem (PTSP). U skupinama ratnih veterana s PTSP-om (n=52), ratnih veterana bez PTSP-a (n=50) i zdravih muškaraca koji nisu sudjelovali u Domovinskom ratu i ne boluju od PTSP-a (n=50) određivani su: samouzještavanje boli, broj bolnih točaka i stupanj bolnosti pri digitalnoj palpaciji žvačnih mišića i mišića vrata, temporomandibularnih zglobova i sinusa. Broj samouzještavajućih bolnih lokacija i broj bolnih točaka pri palpaciji korelirani su sa stupnjem depresije. U skupini ratnih veterana s PTSP-om zabilježeno je statistički značajno više samouzještavajućih bolnih lokacija i više bolnih točaka pri palpaciji nego u skupinama ratnih veterana bez PTSP-a i zdravih muškaraca. Bolesnici s PTSP-om bili su uglavnom visoko depresivni. Utvrdili smo statistički značajnu pozitivnu korelaciju između svih istraživanih parametara boli i stupnja depresivnosti. Glavni zaključak ovoga istraživanja je da je kronična bol u području glave, lica i vrata povezana s depresijom u bolesnika s PTSP-om.

*Ključne riječi: Depresija; Kronična bol; Stresni poremećaji, posttraumatski; Veterani*