Changes of Several Psychological Measures in the Patients with Craniomandibular Disorders, Bruxing Behavior and Sexual Abuse History

O.F. Molina[1,*], C.A. Rodrígues dos Santos[2], R.F. Marquezan[3], M.L. Cano[4], F.F. da Silva Junior[5], A. Alves de Carvalho[6] and L.K. Silva Hassumi[7]

[1]*UNIRG University, Department of Orofacial Pain, Gurupi-TO, Brazil*

[2]*Exercise Physiology Unit, UNIRG University, Gurupi, Brazil*

[3]*UNIRG University, Department of Psychology, Gurupi, Brazil*

[4] *MDS, Miami University*

[5]*UNIRG University, Department of Orofacial Pain, Gurupi, Brazil*

[6]*Associate Researcher, UNIRG University*

[7]*UNIRG University, Department of Oral Pathology, Gurupi-TO, Brazil*

Abstract: *Aim:* The understanding of psychological correlates of Craniomandibular disorders and Bruxing Behavior has seen significant progress in the last few years. However, studies evaluating association between more complex psychological measures in such disorders are extremely scarce. To investigate this, we evaluated frequency of sexual abuse history in the experimental and two control groups and scores in depression, somatization and dissociation in those with Craniomandibular Disorders and Bruxism with/without sexual abuse history.

Methods: Clinical examination, self-report, chief complaint, criteria for craniomandibular disorders and bruxism, the Becker-Lausen Questionnaire for sexual abuse were used in the Craniomandibular Disorder+ Bruxing Behavior, and in two control subgroups to gather data about sexual abuse history. The Beck Depression Inventory (BDI), 32 questions from the Screening Somatoform Disorders (SOMS-2) instrument and the Dissociative Experience Scale (DES) were used in the Craniomandibular Disorder + Bruxism + Sexual Abuse (n=39), in the Craniomandibular Disorder + Bruxism with no sexual abuse subgroup (n=158) and in the no Craniomandibular Disorders no Sexual Abuse subgroup (n=50) so as to gather data about depression, somatization and dissociation, respectively.

Results: We show that there was no a statistically significant difference when comparing frequency of sexual abuse history in the experimental and in the two control groups. Means in depression were about 14.7; 11.4; and 9.3 in the Craniomandibular Disorder + Bruxism and Sexual abuse, in the Craniomandibular Disorder + Bruxism with no sexual abuse history, and in the no Craniomandibular Disorders no Sexual abuse history subgroups, respectively (Kruskall-Wallis statistics with post test $p<0.02$). Means in somatization were 12.1, 10.3, and 8.0, respectively in those subgroups ($p<0.006$). Means in dissociation were about 22.3, 15.6, and 15.2, respectively ($p<0.007$).

Conclusions: Means in depression, somatization and dissociation were higher and significantly different in the Craniomandibular + bruxing behavior + sexual abuse history subgroup. This study provides further data on frequency of sexual abuse in craniomandibular disorder and bruxer subjects, expands current knowledge about depression and somatization and provides non previously reported data on dissociation.

Keywords: Bruxism, Craniomandibular disorders, Depression, Dissociation, Sexual abuse, Somatization.

INTRODUCTION

Craniomandibular disorders (CMD) is a collective term used to describe a set of signs and symptoms involving the temporomandibular joints (TMJs), craniofacial musculature and other associated and adjacent structures of the masticatory system characterized by pain, limitation of jaw movements, clicking and headaches [1]. CMD signs and symptoms include a complaint of pain, joint noises, and difficulties to perform normal jaw movements, tenderness to palpation and headache referred from the TMJs, masticatory muscles or both [2]. Bruxing behavior (BB) is an oral habit consisting of involuntary rhythmic or spasmodic nonfunctional gnashing, grinding, or clenching of teeth, unlike chewing movements of the mandible, which may lead to occlusal trauma and other masticatory disorders [3]. Nocturnal BB is a complex motor and neurophysiological disorder thought to occur more frequently during transition from deep to light sleep stages, but high amplitude BB episodes during rapid eyes movement (REM) sleep, also occur[4]. Nocturnal BB is a sleep-related movement disorder thought to be responsible for a number of signs and

*Address correspondence to this author at the Avenida Pará 1544, Gurupi-TO, Brazil. 77400-020; Tel: 00 55 63 92444575;
E-mail: omar-nyorker-harvardtexas@hotmail.com

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symptoms mostly of musculoskeletal origin in the orofacial region [5].

Sexual abuse (SA) is defined as sexual exploitation or misuse of a child up to the age of 14 years. It also refers to sexual behavior between a child and an adult or between two children where one of them is significantly older or uses coercion [6]. SA can be hard to define because of the many different forms it can take, the different levels of frequency, the variation of circumstances and the different relationships that it may be associated with [7].

SA in children and adolescents is a subject that has received much attention in recent years and is believed that more than 12% of both males and females report a SA history, but this frequency may vary significantly depending on the sample and method of investigation [8]. With such a high percentage of people having reported childhood SA, it is very likely that many people seeking treatment, more specifically, those demonstrating somatization and recalcitrant pain in many anatomic sites, report higher SA frequencies [7].The impact of childhood sexual abuse varies from person to person and from case to case. Most CMD patients are females and psychological factors may be expressed in the form of neck pain, headaches, widespread pain [9].These pain disorders constitute risk factors for chronic TMD pain among women in the structures of the masticatory system including masticary pain, headaches and disorders of jaw movement [9]. SA in childhood and adolescence may have a number of negative psychological implications in adulthood, including the presence of dissociation, depression and somatization [10].

Chronic pain and psychological disorders with their associated disability and socio-economic problems are the most common complaints in the United States. Depression in chronic pain is the most common condition and usually occurs together with somatization and drug dependence [11]. Depression is a complex construct and often co-occurs with anxiety disorders and substance abuse. Depression represents a common factor in chronic pain and may negatively influence pain severity, pain-related disability, treatment response and even quality of life [12]. In some studies, CMD patients with pain and illness behavior seem to be more likely to display anxiety, depression, poor quality of life and social impairment [13]. Recent evidence [14] indicates that higher scores in depression are observed in certain subgroups of CMD individuals when BB is more severe.

Somatization is a disorder wherein disturbed mental states and experiences are expressed as bodily symptoms and usually implies the presence of unconcious defense mechanisms in which bodily symptoms manifest in different organs or systems [15]. Somatization refers to the development of somatic or physical symptoms for which no organic cause is found, patients usually present many symptoms in different anatomic areas and emotional, physical and SA victims tend to score higher on self reports of somatization [16]. There are reasons to believe that some CMDs individuals are absolutely normal regarding somatization scores, whereas one subgroup of such patients presents higher scores in physical complaints adjacent and distant to the masticatory system [17].

The term dissociation is widely used with the connotation of a “disruption of the normal integration of experience, conciousness, memory or perception of the environment and compartimentalization of experience in which elements of the experience are not integrated into a unitary and functional whole, but are stored in isolated fragments” [18]. There is evidence that sexual trauma leads to repeated overuse of dissociation until it becomes a major individual´s psychological defense [9]. Because in some studies[19, 20], BB and CMD have been considered as somatization disorders, one may lead to think that some CMD individuals may present higher scores in somatization, depression and dissociation which predispose those individuals to myofascial pain. Such scores may even be higher in those with SA history. Even though there is some information in the current literature about some psychological variables in CMD and BB individuals, there is a paucity of studies about depression, somatization and dissociation in CMD and BB with SA history, thus, the objective of this study is twofold:

1. Evaluate SA frequency in CMD and BB individuals and in controls non CMD non BB;

2. Assess scores in depression, somatization and dissociation in CMD and BB individuals with and without SA history.

METHODS

Participants

Two hundred and fifty nine subjects (221 females and 38 males) participated in this study and were divided in those presenting $CMD^{+}BB^{+}$ (n=197, mean

age=31.3, SD=11.7, range=17-61), those with no CMD but with BB (n=34, mean age=32.3, SD=9.9, range=17-55), and those with neither CMD nor BB (n=28, mean age=30.6, SD=12.3, range=17-69). Participants were those referred consecutively to the division of orofacial pain, UNIRG-University, School of Dentistry in the period 2013-2015. Patients referred consecutively were included in the CMD^+ and BB^+ group if they demonstrated signs and symptoms including a complaint of facial and/or TMJ pain, actively seeking CMD treatment, presence of joint noises, difficulties to perform normal jaw movements, tenderness to muscle and/or joint palpation and headache of musculoskeletal origin. Patients were considered as presenting BB if they demonstrated at least three BB signs or symptoms from a comprehensive list published previously elsewhere [21]. It has been accepted in the literature that a combination of signs and symptoms assessed using clinical examination and self-report, better defines the presence of both CMD and BB [17]. The experimental group was the one demonstrating signs and symptoms of both CMD^+ and BB^+. A second group demonstrating signs and symptoms of BB^+ without signs and symptoms of CMD^- was considered as a control group. The second control group was formed by those with neither CMD^- nor BB^-. The experimental and both control groups were referred over the same period of time. Both control groups presented for evaluation of a craniofacial complaint, for instance, tinnitus, ear stuffiness, but without demonstrating CMD characteristics. Exclusion criteria for the experimental and control groups were the presence of severe psychiatric disorders, intellectual difficulties and/or reluctance to respond to questionnaires and to sign a formal consent, patient´s report of severe neuromuscular disorders (for instance, Parkinson Disease), and currently taking some serotonin reuptake inhibitors [22, 23], drugs thought to trigger, exacerbate and/or cause BB and/or undesirable jaw movements.

Procedures

Clinical evaluation and self report were used to gather information about both CMD and BB including muscle and joint palpation, evaluation of jaw movements, and digital palpation of the TMJs to evaluate the presence of both joint noises and pain. Chewing muscles were evaluated and palpated gently to gather information about pain, tenderness and the presence of trigger points. The degree of jaw opening was evaluated using a ruler and joint noises were classified as clicking, popping and crepitus or crackling. Information about the chief complaint was obtained including duration, quality, hour of the day, description and anatomic site where pain was felt. Severity of pain, pain sites and location of trigger points were recorded. Biomechanical tests were used to complement information and if possible to diagnose the type of internal derangement of the TMJs, for instance, capsulitis, retrodiskal pain, disk-attachment pain and so on. Once individuals were comprehensively evaluated, they were assigned to three groups: CMD^+ BB^+ (Experimental group), Non CMD^- and BB^+ (Control A), and Non CMD Non BB (CMD^- BB^-), or control B.

Sexual Abuse

In the current study, child /adolescent SA was defined as sexual exploitation or misuse of a child up to the age of 14 years, and as sexual behavior including touch, penetration, suggestion between a child and one or more adults with the use of coercion [24]. The Child Abuse and Trauma Scale is a 38-item self-reported instrument designed to evaluate emotional, physical and sexual abuse in childhood and adolescence [10] which correlates significantly with outcomes including victimization, depression and dissociation. The instrument is a scale designed to evaluate frequency of abuse as follows: no (0), rarely (1), occasionally (2), frequently (3) and very frequently (4). Once SA frequency was evaluated, the experimental and control groups were reorganized in three subgroups: CMD^+ BB^+ and SA^+ history, CMD+BB+SA^- and CMD^- SA^- history, independent of the presence of BB.

Depression

The Beck Depression Inventory (BDI) is a robust psychological test used widely in clinical situations to assess depression. The instrument is a 21-item questionnaire which may be answered in 5-10 minutes. Each item in the instrument is hierarchically arranged from normal to worst, thus, providing scores ranging from 0 to 3. The instrument has excellent reliability and good correlation with measures of depression and anxiety.

Somatization

The Instrument for Screening Somatoform Disorders (SOMS-2) [25] is a robust psychological test used to detect psychosomatic symptoms in a number of different clinical settings. Only 32 questions from this self reported questionnaire were used in the current

investigation as researchers believe that 32 questions are sufficient enough to obtain information about a large spectrum of somatic symptoms. Additionally, many questions in the instrument are rarely reported. Using this instrument, participants are encouraged to report physical symptoms they suffer in their daily life that significantly disturb their well- being or personal life style. Additionally, participants are instructed to respond never (0), rarely (1), occasionally (2), frequently (3) and always (4) to each question in the instrument.

Dissociation

The Dissociative Experience Scale (DES) [26], is a twenty-eight item self –reported reliable questionnaire widely used to evaluate dissociative experiences in the individual´s daily life. This instrument scores each question on a scale from 0% to 100% and was developed to provide a reliable, valid and convenient way to quantify dissociative experiences and is used on a wide range of clinical settings.

Statistical Analysis

Frequencies and percentages were used for social and demographic variables. Fisher´s exact test was used for comparison of patients on categorical variables. Analysis of variance (Kruskal-Wallis) was used to compare mean differences in depression, somatization and dissociation in three different subgroups. Significance was accepted if $p<0.005$.

RESULTS

The results of this investigation are presented in Tables **1** and **2**.

Females were overrepresented in the CMD^+ BB^+ (92.4%) as compared to the CMD^-BB^+ subgroup (70.6%, Fisher´s exact test $p<0.0009$) and in the CMD^+ BB^+ subgroup (92.4%) as compared to the CMD^- BB^- one (53.6%, Fisher´s exact test $p<0.0001$). There was no age difference in the CMD^- BB^+ (70.6%) subgroup as compared to the CMD^-BB^- one (53.6%, Fisher´s exact test $p=0.19$). The frequencies of sexual abuse history were about 19.8%, 26.5% and 10.7% in the CMD^+ BB^+, CMD^- BB+, and in the CMD^-BB^- subgroups, respectively. The frequencies of sexual abuse were higher in the CMD^+ BB^+ and in the CMD^- BB^+ as compared to the CMD^- BB^-, but the differences were not statistically significant. See Table **1** for further details.

Table 1: Social and Demographic Data in CMD^+ and BB^+ Patients, CMD^- BB^+ Subjects, and CMD^-BB^- Individuals. Frequency of Sexual Abuse in $CMDs^+$ BB^+ and Controls $CMDs^-$ BB^+ and CMD^- BB

	CMD^+ BB^+ N=197	CMD^- BB^+ N=34	CMD^- BB^- N=28
GENRE	**n %**	**n %**	**n %**
Females	182 92.4	24 70.6	15 53.6*
Males	15 7.6	10 29.4	13 46.4
Totals	197 100	34 100	28 100
Mean Age	31.3	32.3	30.6**
S.D	11.7	9.9	12.3
Range	17—61	17—55	17--69
Sexual Abuse			
Yes	39 19.8	9 26.5	3 10.7*
No	158 80.2	25 73.5	25 89.3
Totals	197 100	34 100	28 100

*Fisher´s exact test: CMD^+ BB^+ versus CMD^- BB^+ $p<0.0009$; CMD^+ BB^+ versus CMD^- BB- $p<0.0001$; CMD^- BB^+ versus CMD^- BB- $p>0.19$.

**Fisher´s exact test: CMD^+BB^+versus CMD^-BB^+, $p>0.36$; CMD^+BB^+ versus CMD^- BB^- $p>0.30$; CMD^- BB^+ versus CMD^- BB^- $p>0.19$.

Means in depression in the CMD^+ BB^+ SA^+, CMD^+ BB^+ SA^- and CMD^- BB^- were about 14.7 (SD=10, range=1-36); 11.4 (SD=7.4, range 0--33), and 9.3 (SD=7.9, range 0--30), respectively. Kruskal-Wallis statistics + Dunn, ($p<0.02$): CMD^+ BB^+ SA^+ versus CMD^+ BB^+SA^- ($p>0.05$); CMD^+ BB^+SA^+ versus CMD^- with/without BB and SA^- ($p<0.05$); CMD+ BB^+ SA^- versus CMD^- with/without BB and SA^- ($p>0.05$).Se Table **2** for further details.

Means in somatization in the aforementioned three subgroups were about 12.1 (SD= 5.8, range= 4-28), 10.3 (SD=5.4, range=0-24) and 8.0 (SD=6, range=1-28), respectively. Kruskal-Wallis + Dunn $p<0.006$: CMD^+ BB^+ SA^+ versus CMD^+ BB^+ SA^- ($p>0.05$); CMD^+ BB^+ SA^+ versus CMD^- SA^- ($p<0.01$); CMD^+ BB^+SA^- versus CMD^- SA^- ($p<0.05$). Means in dissociation were 22.3 (SD=14.6, range=5-63), 15.6 (SD=11.7, range=0.63), and 15.2 (SD=14.3, range=0-53) in the three subgroups mentioned previously. Kruskal-Wallis and Dunn statistics, $p<0.007$: CMD^+ BB^+ SA^+ subgroup versus CMD^+ BB^+ SA^- ($p<0.05$); CMD^+ BB^+SA^+ versus CMD^- SA^- ($p<0.01$); CMD^+ BB+ SA^- versus CMD^- SA^- ($p>0.05$). See Table **2** for further details.

Table 2: Means in Depression, Somatization and Dissociation in the CMD^+BB^+ with and without Sexual Abuse Subgroups and in all those without CMD and without Sexual Abuse History (CMD^-SA^-)

	$CMD^+BB^+SA^+$ n=39	$CMD^+BB^+SA^-$ n=158	CMD^-SA^- n=50
Depression			
Mean	14.7	11.4	9.3*
S.D	10.0	7.4	7.9
Range	1—36	0---33	0—30
Somatization			
Mean	12.1	10.3	8.0**
S.D	5.8	5.4	6.0
Range	4—28	0--24	1—28
Dissociation			
Mean	22.3	15.6	15.2***
S.D	14.6	11.7	14.3
Range	5—63	0—63	0—53

*Kruskal-Wallis + Dunn p=0.02: CMD^+ BB^+ SA^+ versus $CMD^+BB^+SA^-$ p>0.05; CMD^+ BB^+ SA^+ versus CMD^- with/without BB and SA^- p<0.05; $CMD^+BB^+SA^-$ versus CMD^- with/without BB and SA^- p>0.05.

**Kruskal-Wallis + Dunn p<0.006: $CMD^+BB^+SA^+$ versus $CMD^+BB^+SA^-$ p>0.05; CMD^+BB^+ SA^+ versus CMD^-SA^- p<0.01; $CMD^+BB^+SA^-$ versus CMD^-SA^- p<0.05.

*** Kruskal – Wallis + Dunn p<0.007: $CMD^+BB^+SA^+$ versus $CMD^+BB^+SA^-$ p<0.05; $CMD^+BB^+SA^+$ versus CMD^- SA^- p<0.01; $CMD^+BB^+SA^-$ versus CMD^-SA^- p>0.05.

DISCUSSION

In the current study we found higher frequencies of SA history in the subgroups CMD^+BB^+ and CMD^-BB^+ as compared to the second control group, however, the difference was not statistically significant. In the current study we found a frequency of 19.8% SA history in the experimental group. This outcome is not in line with one investigation in orofacial pain patients [27], reporting a frequency of 49% SA and/or physical abuse. The higher prevalence in such a study as compared to the current investigation is explained as follows: Researchers in such a study included physical abuse. If sexual and physical abuse are summed up, they yield a higher frequency of those types of abuse. Not all patients included in the subgroup of CMD^+BB^+ demonstrated a history of physical abuse. In another research [28], investigators reported a frequency of 44.8% physical and/or SA. In this case, researchers included physical abuse and evaluated only more chronic cases which may have contributed to a higher frequency of both SA and/or physical abuse. One investigation [29], evaluated orofacial pain patients and reported a frequency of 68.9% of abuse, however, such researchers included physical abuse and the survey was anonimous which may have yielded a higher frequency of both physical and SA reports. It may be that many orofacial pain patients are not willing to report SA as many of them are reluctant to reveal past experiences. Germaine to this issue is one investigation [30], in which researchers reported that only 10% of a large sample of orofacial pain patients reported a history of SA incidents.

The frequency of 19.8% SA history reported in the current study is in line with one study estimating that 15% to 20% of women have been victims of childhood sexual abuse; however, prevalence's of any kind of abuse tend to be the highest among patients in pain clinics [31]. Because a high frequency of SA was reported by subjects in the two control groups, this outcome is in agreement with one investigation [28], reporting a frequency of 33.3% SA or physical abuse history. These researchers found no significant difference in SA/physical abuse history when comparing the experimental with the control group, thus, providing support to the findings in the current study.

In the current study and using the Beck Depression Inventory (BDI), we found a mean of depression of about 14.7 in the subgroup presenting with CMD^+ BB^+ SA^+ history and this mean decreased in the subgroups CMD^+ $BB^+SA^-$and in the CMD^-SA^- subgroup. The outcome reported in the current study is not surprising as there is a relationship between depression and history of childhood SA [9]. Pathological anxiety and depression are adult life consequences of childhood SA [24]. Somatization is a common disorder in temporomandibular joint disorder patients and one investigation [32], reported that SA in females increased the risk of medically unexplained symptoms, including pelvic, jaw and facial pain. The outcome in the current study concurs with one research[27], indicating that orofacial pain patients with abuse history reported significantly higher leves of depression. In a similar investigation [33], researchers reported that CMD patients with SA history report less depressive symptoms as compared to CMD patients with a history of physical abuse. Patients with SA history present an array of psychological and or psychiatric disorders including anger, depression and anxiety [6].

Data from the current study demonstrate that the mean in somatization was higher in the $CMD^+BB^+SA^+$ history as compared to the other two control groups. Childhood SA has been correlated with a number of

psychiatric disorders including sexual problems and excessive somatic concerns and headaches [7]. Sexually traumatized patients report a significantly higher number of somatoform symptoms and higher overall somatoform symptom severity [34]. When feelings are frightening, conflicted or deemed unacceptable, they generate anxiety and defence mechanisms. Abused children may have feelings of love mixed with rage, guilt about the rage and these conflicted and antagonistic feelings may set the stage for the development of psychosomatic symptoms [35]. A history of child SA is correlated with a number of psychiatric and psychological disorders including depression, self-destructiveness and somatization [9]. Orofacial pain patients presenting with SA history usually report higher levels of anxiety, depression and somatic symptoms [27]. The outcome in the current investigation is in accordance with one study [36], which did not assess SA; however, researchers reported higher scores in somatization in dental students with CMD as compared to those without. Trauma, Parafunctional habits, third molar extraction, somatization and female gender have been identified as risk factors for myofascial pain and CMD [37]. In the current study, most patients in the experimental group were females, and one investigation [38], reported that medically unexplained physical symptoms and disorders in women with childhood sexual abuse history are widely interpreted as somatization, which is the expression of emotional pain in the form of physical complaints.

Data in the current investigation demonstrate that scores in dissociation were higher in the $CMD^{+}BB^{+}SA^{+}$ history as compared to the $CMD^{+}BB^{+}SA^{-}$history and to CMD^{-} and SA^{-} history patients. Because in previous studies [19, 20, 36], CMD^{+} and BB^{+} individuals have been considered as somatically disturbed and a SA history in childhood or adolescence is usually associated with somatic, dissociative and other psychiatric disorders, the outcome in this investigation is in accordance with one review of the literature [39) indicating that there is a connection between chronic CMD, coexisting psychopathology and childhood physical, sexual and psychological abuse. Early sexual trauma and dissociative disorders are causally related and sexual trauma causes repeated overuse of dissociation which with time becomes an automatic defence mechanism [7].

Most CMD^{+} and BB^{+} with SA^{+} history were chronic pain patients. Recent evidence indicates that a SA history is more frequently reported among chronic pain populations [28]. One investigation [24]. Evaluated a group of females with sexual abuse histories and reported a variety of psychosomatic disorders, marked obsessive traits and dissociation. One research [40], evaluated populations of patients presenting facial pain, myofascial pain or fibromyalgia. Researchers used the Childhood Traumatic Events Scale and reported that all pain groups had a history of abuse exceeding 48%. One investigation [10], evaluated college students and a clinical sample of multiple personality disorder subjects. Researchers concluded that dissociation, depression and victimization are associated with childhood trauma or abuse.

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