

## Reasons reported by Craniomandibular Disorders and Bruxing Behavior Subjects for jutting the jaw forward.

Omar Franklin Molina<sup>1</sup> Bruno R Simião<sup>2</sup> Ricardo Marçal<sup>3</sup> Karla Regina Gama<sup>4</sup> Marjorie FA Andrade<sup>5</sup> Almir Borges Franco<sup>6</sup> Marcella Carreiro Sales<sup>7</sup>

<sup>1</sup>Division of Orofacial Pain UNIRG University School of Dentistry, Gurupi-TO, Brazil

<sup>2</sup>Division of Prosthodontics, UNIRG University School of Dentistry, Gurupi-TO, Brazil

<sup>3</sup>Division of Dental Materials UNIRG University Dental School, Gurupi-TO, Brazil

<sup>4</sup>Stomatology Division, UNIRG University Dental School, Gurupi-TO, Brazil

<sup>5</sup>Division of Pedodontics, UNIRG University Dental School, Gurupi-TO, Brazil

<sup>6</sup>Operative Dentistry Division, UNIRG University Dental School, Gurupi-TO, Brazil

<sup>7</sup>Division of Physical Therapy, UNIRG University, Gurupi-TO, Brazil.

### Abstract

**Introduction:** Jutting the jaw forward is the oral jaw behavior of consciously or unconsciously displacing the mandible anteriorly and/or laterally with no functional purposes that usually occurs together with other oral jaw behaviors. **Goals:** Determine the reasons reported by Craniomandibular Disorders and Bruxing behavior subjects for jutting the jaw forward. **Methods:** The clinical records of 45 Craniomandibular and Bruxing Behavior subjects presenting with the behavior of jutting the jaw forward were reviewed retrospectively. Self-reported questionnaires, clinical examination, biomechanical tests to determine signs and symptoms of Craniomandibular Disorder and Bruxing Behavior, presence and amount of bruxing behavior, types of oral jaw behaviors and questions about jutting the jaw forward were used to gather clinical data. Following data gathering, clinical and dental records were stored in a database for future studies. The first 45 dental and medical records from the database having information about oral jaw behaviors, more specifically, jutting the jaw forward, were retrieved and retrospectively examined in order to know about the reasons reported by such subjects to jut the jaw forward. **Outcome:** Based on subjects self-report most common reasons for jutting the jaw forward were to get relief from pain in the temporomandibular joint (14/45=31,1%); nervousness, anxiety and worry (10/45=22,2%), for unknown reasons (6/45=13,3%) to get some rest for the mandible (7/45=15,6%); to improve occlusal contact (4/45=8,9%) and other less frequent reasons (4/45=8,9%). **Conclusion:** Most common reasons for jutting the jaw forward reported by subjects in the current study were to get relief from pain and to get more comfort for the mandible, anxiety, nervousness and tenseness. Jutting the jaw forward occurred together with many other oral jaw behaviors.

**Key Words:** Craniomandibular Disorders. Bruxing Behavior. Oral Jaw Habits. Jutting the Jaw Forward. Pain. Anxiety.

Date of Submission: 01-08-2022

Date of Acceptance: 14-08-2022

### I. Introduction

**Craniomandibular Disorders (CMDs)** is a group of pathological conditions causing pain and dysfunction in the temporomandibular joints (TMJs) and adjacent masticatory muscles resulting in chronic recurrent pain and difficulties to perform normal jaw movements<sup>[1]</sup>. Signs, symptoms or disorders associated with CMDs include myofascial pain, a complain of pain, jaw muscle stiffness, jaw locking, difficulties to perform normal jaw movements, painful clicking and tenderness to palpation<sup>[2]</sup>. **Bruxing Behavior (BB)**, is a very complex motor, neurophysiological and behavioral disorder characterized by clenching, gnashing and grinding the teeth occurring both at daytime (daytime bruxism) and nighttime (sleep bruxism) usually associated with some type of mechanical trauma over the components of the masticatory system<sup>[3]</sup>. Even though many types of BB have been described and classified in the dental, medical and psychological literature, daytime, nighttime and mixed BB, centric and eccentric BB, mild, moderate, severe and very severe BB and BB with and without tension have been repetitively mentioned in the current literature<sup>[4]</sup>.

**Oral Jaw Habits** including jutting the jaw forward constitute abnormal and repetitive motor oral behaviors which tend to occur unconsciously and constitute frequent etiological factors for masticatory muscles tension, and signs and symptoms of CMDs<sup>[5]</sup>. Parafunctional activities of the masticatory system may be observed in children, young and adults and may be responsible for the development of signs and symptoms of

CMDs<sup>[6]</sup>. Oral jaw habits become deleterious or harmful to the masticatory system when such activities exceed an individual's physiological tolerance in the system that cause breakdown an/or negatively affect some components of the masticatory system<sup>[7]</sup>. One common and complex oral jaw behavior is jutting the jaw forward. This behavior can be reported by children, adolescents and even adults and consists of displacing the jaw forward and laterally with or without tooth contact<sup>[8]</sup>. Even though, this behavior have been reported by some researchers in literature reviews and or experimental studies, there is little information about its effects in the masticatory system, variants and reasons to perform the behavior. Because it has been found that this behavior is related to TMJ pathology but there is scarcity of studies about jutting the jaw forward, this investigation was designed to:

1. Evaluate the reasons reported by CMDs and BB individuals to perform the habit of jutting the jaw forward.
2. Discuss most common reported reasons to jut the jaw forward and use the current literature to explain the association between the behavior and the mechanisms.

## **II. Methods**

Patients referred consecutively to the Division of Occlusion, CMDs and Orofacial Pain (OFP) to Gurupi University School of Dentistry, are usually evaluated following a rigid yet comprehensive protocol described as follows: Analysis of the description of the chief complaint, palpation of the TMJs and masticatory muscles, analysis of jaw movements, use of self-report, questionnaires and clinical examination to evaluate presence and type of BB, biomechanical tests to assess presence and type of TMJs internal derangements (TMJs-ID), recording signs and symptoms of CMDs, questionnaires to evaluate type of headache, and use of psychological tests to evaluate depression, anxiety, somatization, emotional, sexual and physical abuse. A very specific questionnaire to evaluate most current oral jaw habits including jutting the jaw forward is also used in all subjects referred to the OFP Unit. Patients are informed about the use of a comprehensive evaluation and psychological tests and they are also informed about the future use of their data for reasons of investigation. They are also informed about the benefits of any investigation for the society and sciences in general. Anonymity of data is guaranteed for all patients.

Once comprehensive evaluation is completed the clinical records are stored in a database for future use in clinical investigations. In the last 10 years we evaluated approximately 300 hundreds individuals presenting with a pain complaint in the masticatory system. In the last two months, data from the database were evaluated and the first 45 medical and dental records presenting information about jutting the jaw forward were retrieved and evaluated systematically in order to know about the reasons for jutting the jaw forward according to subjects self-report. Because it is not common for jutting the jaw forward to be reported among controls subjects with no CMDs and no BB, a control subgroup was not used and was not considered necessary in the current evaluation. The control group was constituted by 33 subjects with no BB and no CMDs and were evaluated consecutively over the same period of time.

Criteria for CMDs: A complain of pain in the masticatory system, presence of joint noises, impaired jaw movements, tenderness to palpation of the masticatory muscles and headache of musculoskeletal origin.

Criteria for BB: Self-report of catching herself or himself clenching (daytime) or grinding the teeth (nighttime bruxism), relatives or friends's report of having observed the patient clenching or grinding the teeth at night or during the day, patients' report of awakening in the morning with the jaw locked, pain on awakening in the morning, fatigue of the masseter muscles on awakening in the morning and /or during the day.

Criteria for jutting the jaw forward: Patients' self report of displacing the mandible forward and/or laterally. The brief questionnaire used to gather information about jutting the jaw forward also gathered information from patients and controls about the reasons for jutting the jaw forward.

Exclusion criteria: Individuals presenting with psychological, psychiatric and/or cognitive disorders, those presenting with some form of epilepsy including but not restricted to Parkinson Disease, and those with severe motor and/or cognitive difficulties unable to respond properly to questionnaires were neither stored in the database nor included in the current investigation.

## **III. Statistical Analysis**

No statistical analysis was carried out in the current investigation.

## **IV. Outcome**

This investigation evaluated a group of 45 subjects with CMDs and BB referred consecutively over a period of four years to an University-based Orofacial Pain Unit. Mean age in the whole group was about 33,4 years (SD=13,4, range=15-73. There were 42 females and 3 males in this group. Most common reasons to jut the jaw forward according to a self-reported questionnaires were the following: to get more relief for TMJ pain (n=14/45=31,1%); because he or she was nervous, anxious or tense (10/45=22,2%); he or she did not know the reason (6/45=13,3%); to get some rest for the mandible (7/45=15,6%); to get more comfort and/or

improve closing or occluding the teeth (4/45=8,9%), for other reasons including to improve joint noises, curiosity and/or to distract himself or herself (4/45=8,9%). Five out of 33 individuals in the control (non CMDs non BB), reported that they jut the jaw forward in order to get better contact with the teeth.

## V. Discussion

**1.A variety of reasons** for jutting the jaw forward were reported by CMDs and BB subjects. Unilateral or bilateral pain in the TMJs, to be tense, nervous and anxious, to decrease tension in the joint and muscles, to improve tooth contact and position of the mandibular head on the mandibular fossa, to decrease joint noises and to more comfortably open the mandible, were reported by CMDs and BB patients in the current investigation. This means that a jaw habit that essentially seems to be innocuous, is related to a number of **physical and psychological factors**. In the current investigation we observed that CMDs and BB individuals reported the presence of “groups” of parafunctional behaviors (oral jaw habits) which varied greatly from one individual to another. It may be that psychological factors plus a group of parafunctional behaviors are more capable of compressing the joint tissues and stretching the jaw muscles causing pain and inflammation. This assumption is strongly reinforced by one investigation<sup>19</sup> reporting that a combination of oral jaw habits including chewing gum, playing with the jaws and other oral jaw habits cause pain and inflammation and this can be demonstrated by palpation of muscles and joints. Findings in the current study are further reinforced by one investigation<sup>10</sup> asserting that CMDs and BB subjects may present many other additional habits which concur to increase masticatory muscle activity or muscle tension, thus leading to CMDs signs and symptoms.

Patients reported that one of the reasons for jutting the jaw forward was to **alleviate TMJ pain**. It may be that in many patients, a combination of oral jaw behaviors remain asymptomatic. However, once the threshold for pain is lowered, TMJ pain and other disorders including jaw muscle fatigue, impaired jaw movements, jutting the jaw forward, and muscle tension develop. Thus, the patient feels more comfortable protruding the jaw and once the behavior is adopted it may become unconscious in many individuals. Supporting this point of view, researchers in one investigation<sup>11</sup> assert that parafunctional behaviors usually remain asymptomatic. However, when the physiological tolerance is surpassed, the system begins to deteriorate in those tissues with the lowest structural tolerance for tissue damage. Thus, when such deterioration manifests in the form of muscle and or TMJ inflammation and pain, the habit of jutting the jaw develops as a compensatory mechanism to get more comfort in the system. All patients in the current investigation reported a combination of oral jaw behaviors being cheek, tongue, nail, and lip biting, teeth clenching and grinding, gum chewing and jutting the jaw forward the most frequently mentioned behaviors. Thus, these observations are strongly supported by another investigation<sup>12</sup> reporting that the combination of some oral jaw behaviors may be more destructive to the components of the masticatory system as they may deleteriously overload the TMJs and masticatory muscles. Thus, a combination of oral jaw habits including jutting the jaw forward may cause a number of signs and symptoms of muscle and joint dysfunction including headache. In experimental investigations<sup>13</sup> researchers reported that oral jaw behaviors are one of the most common causes of localized head and facial pain. A combination of oral jaw habits may result in the exertion of abnormal forces on the teeth, dental arches and muscles thus, causing pain and inflammation in the masticatory tissues including muscles and joints. Prolonged protrusion of the mandible or jutting the jaw forward may lead to facial pain<sup>14</sup>. Winocur and associates<sup>6</sup> evaluated the prevalence of oral jaw habits and symptoms of TMJ dysfunction in adolescents. Researchers reported that although jaw play was not reported frequently by the groups of adolescents, the behavior was significantly associated with pain in the ear and TMJ. Daytime and nighttime BB and other oral jaw habits including jutting the jaw forward may be related to deterioration of the TMJs and the greater the number of parafunctional jaw habits a subject has, the higher the risk of severe TMJ deterioration, pain and inflammation<sup>15</sup>. Thus, it makes sense that many subjects in the current investigation reported the habit of jutting the jaw forward because of pain and discomfort as most CMDs and BB subjects present for the first initial consultation with a complaint of facial and/or TMJ pain. Jaw play or jutting the jaw forward is carried out to relieve tension, inflammation and pain in the TMJ due to internal derangements. However, the behavior has the potential to initiate a pathologic cycle which can be described as follows: Pain and discomfort develop in the TMJs and adjacent masticatory muscles >>>>jutting the jaw>>>>increased muscle tension>>>>pain and inflammation<sup>16</sup>.

2.Many subjects in the current investigation reported they engaged in jutting the jaw forward when they were **nervous, anxious or worried**. It may be that CMDs and **BB individuals have a psychological profile characterized by somatization, anxiety or psychological tension and greater reactivity to stressful situations**. Many of such individuals use the masticatory apparatus to vent out their somatic anxiety in the form of motor behaviors, including diurnal, nocturnal BB and jutting the jaw forward. These psychological and dysfunctional profile is reinforced by one investigation<sup>17</sup> indicating that there is a direct association between oral parafunctional behaviors and hyperactivity of the masticatory muscles, difficulties to respond properly to daily life stressors, emotional disturbance and anxiety disorders

Nervousness, anxiety and worry were descriptors used by many patients to explain the behavior of jutting the jaw forward. Thus, findings in the current investigation are also in line with another study<sup>[18]</sup> reporting that the etiology of CMDs and BB is multifactorial and includes the presence of oral jaw habits. CMDs and BB Individuals as a group are characterized by higher scores in hypochondriasis, hysteria/depression<sup>[18]</sup> and vulnerability to stress. It has been accepted in the psychological and psychiatric literature that anxiety is a characteristics of hysteria. Anxiety, depression, somatization and pain in multiple sites are more likely to be detected in the most severe cases of CMDs and BB<sup>[19]</sup>, probably in those presenting with multiple oral jaw habits including jutting the jaw forward.

Thus, if one or a combination of these characteristics is or are present, CMDs and BB subjects may respond with the development of oral jaw behaviors including jutting the jaw forward. Supporting this point of view, one study<sup>[20]</sup> indicates that anxiety can be directly correlated with maladaptive motor function including oral jaw habits resulting in pain in the masticatory system. Nocturnal BB and/ or thrusting the jaw forward over and over again may be caused by stress, anxiety and or social withdrawal<sup>[21]</sup>.

## VI. Conclusion

In the current investigation most common reasons for jutting the jaw forward reported by CMDs and BB subjects, from higher to lower frequency included the following: to alleviate pain, discomfort and or tension in the TMJ; because of nervousness, anxiety, and or tenseness; for unknown reasons; to get more rest for the mandible and finally to better occlude the teeth. These findings are in line with the so common clinical observation that a complaint of muscle and or TMJ pain is the main reason for seeking a specialist in the field of CMDs and Orofacial Pain. Because patients also reported tenseness, nervousness and anxiety as major reasons to protrude the lower jaw, such observation is also in accordance with the fact the CMDs and BB individuals have been described as anxious, tense, nervous and unable to cope with stressful situations of the daily life to which they respond with pain, muscle hyperactivity and parafunctional behaviors including jutting the jaw forward. Further studies are needed to delineate a more precise role of jutting the jaw forward in pain, inflammation and displacement of the TMJ disk. Such task seems to be an enormous challenge for the researcher as oral jaw habits occur as a group and all of the them have deleterious effects in the muscles and TMJs of the stomatognathic apparatus.

## References

- [1]. Al Hayek SO, Al-Thunayan MF, AlGhaihab AM, AlReshaid RM, Omair A. Assessing stress associated with temporomandibular joint disorder through Fonseca's anamnestic index among the Saudi physicians. *Cin Exp Dent Res* 2019; 5: 52-58.
- [2]. Cooper BC, Kleinberg I. Examination of a large patient population for the presence of symptoms and signs of temporomandibular disorders. *Cranio* 2007; 25: 114-26.
- [3]. The Academy of Prosthodontics. The Glossary of Prosthodontic Terms. *J Prosth Dent* 2005; 94: 10-29.
- [4]. Molina OF, Gaio DC, Cury MD, Giménez SR, Salomão EC, Pinesci E. Uma análise crítica dos sistemas de classificação sobre o bruxismo. *JBA* 2002; 2: 61-69.
- [5]. Shah AF, Batra M, Sudeep CB, Gupta M, Kumar K. Oral habits and their implications. *Annals Medicus* 2014; 1: 179-86.
- [6]. Winocur E. Oral habits and their association with signs and symptoms of temporomandibular disorders in adolescent girls: a gender comparison. *Oral Medicine* 2006; 102: 482-87.
- [7]. Emodi A, Eli I, Friedman-Rubin P, Goldsmith C, Reiter S, Winocur E. Bruxism, oral parafunctions, anamnestic and clinical findings of temporomandibular disorders in children. *JOR* 2012; 39: 126-35.
- [8]. Simião BR, Molina OF, Peixoto MS, César EW, Fregonesi MA, Franco AB, Sobreiro MA. Frequency of jutting the jaw forward in subjects with different bruxing behavior types and craniomandibular disorders. *IOSR J Dental Medical Sciences* 2020; 19: 19-23.
- [9]. Gavish A, Halachmi M, Winocur E, Gazit E. Oral jaw behaviors and their association with signs and symptoms of temporomandibular disorders in adolescent girls. *J Oral Rehab* 2000; 27: 22-32.
- [10]. Molina OF, dos Santos J, Mazzetto M, Nelson S, Nowlin T, Mainieri ET. Oral jaw behaviors in TMD and bruxism: A comparison study by severity of bruxism. *Cranio* 2001; 19: 114-22.
- [11]. Cortese SG, Biondi AM. Relación de disfunciones y hábitos parafuncionales orales con trastornos temporomandibulares em niños y adolescentes. *Arch Argent Pediatr* 2009; 107: 134-38.
- [12]. Molina OF, Rank R, Ogawa WN, Simião BR, Rezende J, Marçal R, Abreu CM. Jutting the jaw forward in different stages of temporomandibular joint internal derangements: A multiple comparison study. *IOSR J Dent Med Sci* 2020; 19: 32-38.
- [13]. Villarosa GA, Moss RA. Oral behavioral patterns as factors contributing to the development of head and facial pain. *J Prost Dent* 1985; 54: 427-30.
- [14]. Scott DS, Lundeen TF. Myofascial pain involving the masticatory muscles. An experimental model. *Pain* 1980; 8: 207-15.
- [15]. Yamada K, Hanada K, Fukui T. Condylar bony change and self-reported parafunctional habits in prospective orthognathic surgery patients with temporomandibular disorders. *Oral Maxillofac Surg* 2001; 92: 265-71.
- [16]. Bove SR, Guimarães AS, Smith RL. Caracterização dos pacientes de um ambulatório de disfunção temporomandibular e dor orofacial. *Rev Latino – AM Enfermagem* 2005; 13: 686-91.
- [17]. Almutairi AF, Albeshier N, Aljohani M, Alsinani M, Turkistani O, Salam M. Association of oral parafunctional habits with anxiety and the big-five personality traits in the Saudi adult population. *The Saudi Dental Journal* 2021; 33: 90-98.
- [18]. Atsu SS, Güner S, Palulu N, Bulut AC, Kürkcüoğlu I. Oral parafunctions, personality traits, anxiety and their association with signs and symptoms of temporomandibular disorders in the adolescents. *African Health Sciences* 2019; 19: 1801-
- [19]. Molina OF, Santos ZC, Simião BR, Marchezan RF, e Silva N, Gama KR. A comprehensive method to classify subgroups of bruxers in temporomandibular disorders individuals: frequency, clinical and psychological implications. *RSBO* 2013; 10: 11-9.
- [20]. Schwartz SM, Gramling SE, Grayson R. Stress induced oral behaviors and facial pain. *Int J Stress Management* 2001; 8: 35-47.

- [21]. Machado E, Dal Fabbro C, Cunali PA, Kaizer OB. Prevalence of sleep bruxism in children. A systematic review. Dental Press J Orthod 2014; 19: 54-61.

Table 1: Social and Demographic data in 45 CMDs and BB subjects reporting jutting the jaw forward.

AGE	CMDs=45	Controls=33
Mean	33,4	32,0
SD	13,4	12,3
Range	15-73	16-68
GENRE		
Females	42=93,3%	30=90,9%
Males	3 =6,7%	3 = 9,1%
Total	45=100%	33=100%

Table 2: Most common reasons reported by 45 CMDs and BB subjects for jutting the jaw forward and 5 subjects in the Control group.

Reasons for jutting the Jaw forward	CMDs=45		Controls=33	
	n	%	n	%
Alleviate TMJ pain	14	31,1	0	0
Anxiety, nervousness, tenseness	10	22,2	0	0
Unknown reasons	6	13,3	0	0
Get rest for the jaw	7	15,6	0	0
To better occlude the teeth	4	8,9	5	15,2
Other reasons	4	8,9	0	0
TOTALS	45	100	5	15,2

Omar Franklin Molina, et. al. "Reasons reported by Craniomandibular Disorders and Bruxing Behavior Subjects for jutting the jaw forward.." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(08), 2022, pp. 21-25.