

Jutting the jaw forward in different stages of temporomandibular joint internal derangements: A multiple comparison study.

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Abstract:

Introduction: Oral jaw habits including jutting the jaw forward are directly or indirectly related with pathological changes in the temporomandibular joints. There is scarcity of studies about this relationship.

Goals: Evaluate the frequency of jutting the jaw forward in a large sample of Craniomandibular disorders subjects with specific internal derangements of the TMJs.

Methods: Retrospective investigation of clinical charts of 543 subjects previously examined in the last sixteen years. Clinical examination, self-report, palpation of joint and masticatory muscles, questionnaires, criteria for Craniomandibular disorders, bruxing behavior, and biomechanical tests were used to determine the type of temporomandibular internal derangements. Subjects were allocated to different clinical subgroups with unilateral capsulitis (n=27), bilateral capsulitis (n=73), unilateral retrodiskal pain (n=94), bilateral retrodiskal pain (n=68), unilateral disk-attachment pain (n=112), bilateral disk-attachment pain (n=84), unilateral arthralgia (n=35), bilateral arthralgia (n=17), unilateral osteoarthritis (n=19) and bilateral osteoarthritis (n=14). A simple questionnaire was used to determine the presence and type of jutting the jaw forward. Fisher's exact test, Kruskal-Wallis statistics, X-squared for independence and trends were utilized to analyze data.

Results: We report data about jutting the jaw forward only in subgroups with bilateral TMJs-IDs. The frequency of jutting the jaw forward was about 182/543=33,5% in the Craniomandibular Disorder subgroup as compared with the control one, 8/30=26,6%, but the difference was not statistically significant: (Fisher's exact test p=0,55). The frequencies of jutting the jaw forward were higher but non significant in most subgroups as compared with the control one: bilateral capsulitis 30/73=41,1% versus control subgroup 8/30=26,6% (Fisher's exact test p=0,18); bilateral retrodiskal pain 27/68=39,7% versus control subgroup 8/30=26,6% (Fisher's exact test p=0,25); bilateral disk attachment pain 37/84=44% versus control subgroup 8/30=26,6% (p=0,12). The frequency of jutting the jaw forward in subjects with bilateral arthralgia (10/17=58,8%) was higher as compared with the control subgroup (8/30=26,6%) and the difference was statistically significant: Fisher's exact test (p=0,05). A statistically significant difference in the frequency of jutting the jaw forward was observed only when the subgroup unilateral capsulitis (7/27=25,9%) was compared with the bilateral arthralgia subgroup (10/17=58,8%): Fisher's exact test (p=0,05). When the frequency of jutting the jaw forward in subjects with unilateral internal derangements (78/287=27,2%) was compared with the frequency in those with bilateral internal derangements (104/256=40,6%), the difference was statistically significant: Fisher's exact test (p<0,001). When tests for independence and trends for jutting the jaw forward in subgroups with different internal derangements types were evaluated, X-squared statistics demonstrated that the subgroups were independent (p<0,02) whereas X-squared for trends (p=0,09) showed that there was no a trend for higher frequency of jutting the jaw forward with the severity of bilateral internal derangements.

Conclusion: The highest frequency of jutting the jaw forward was observed in bilateral arthralgia of the temporomandibular joint. CMDs subjects with internal derangements of the TMJ compared with the control group did not demonstrate a higher frequency of jutting the jaw forward. The frequency of jutting the jaw forward was higher in bilateral internal derangements of the TMJ. Because bilateral internal derangements of the Temporomandibular joint are associated with higher frequency of disk disorders, disk displacement is associated with higher frequency of jutting the jaw forward.

Keywords: Jutting the jaw forward. Temporomandibular Disorders. Internal derangements. Oral Jaw Habits.

I. Introduction

Craniomandibular Disorders (CMDs) are terms used to define a set of signs and symptoms occurring in the masticatory muscles, temporomandibular joints (TMJs), and/or adjacent anatomic structures usually of musculoskeletal origin. Such signs and symptoms include a complaint of facial and/or TMJ pain, joint noises, tenderness to palpation, difficulties to perform normal jaw movements and headache of musculoskeletal origin^[1]. Internal derangements of the TMJs (TMJs-IDs) are usually described as a set of conditions or disorders associated with damage or lesion to the anatomic structures of the joints being anterior disk displacement the most common form of TMJs-IDs. TMJs-IDs are usually caused by damage to internal structures within the joint, more specifically to the joint disc. A number of TMJs disorders have been described usually associated with trauma, leading to ongoing sign and symptoms of pain, disc displacement and abnormal mobility in the joints^[2].

Destructive oral jaw habits (DOJH), constitute a complex set of oral behaviors observed in children, adolescents and even adults. These habits may have deleterious effects on growth and development and may adversely affect the masticatory muscles and TMJs^[3]. DOJH include finger sucking, oral breathing, atypical swallowing, nail biting, diurnal and nocturnal bruxing behavior (BB) and thrusting the jaw forward^[3]. Oral jaw habits constitute motor behaviors that are repeated regularly and tend to occur unconsciously being frequent etiological factors for signs and symptoms of CMDs^[4]. Thus, there may be an association between oral jaw habits and CMDs. Jutting the jaw forward is another oral jaw behavior thought to be present in children and adolescents according to self-reported questionnaires and consists of maintaining the lower jaw in an anterior and/or lateral position. It has been reported^[5] that oral jaw behaviors including jutting the jaw forward constitute risk factors in the development o CMDs including those of muscular origin..

Because when frequent and forceful DOJH may be deleterious for the masticatory muscles and TMJs, they may induce anatomic and inflammatory changes in the TMJs. Thus, there may be an association between jutting the jaw forward, CMDs and TMJs-ID. There is paucity of studies about the relationship between certain oral jaw behaviors and internal derangements of the TMJs. Consequently, this study was designed to:

1. Evaluate the frequency of jutting the jaw forward in a population of subjects presenting with CMDs;
2. Assess a possible relationship between bilateral TMJs-IDs and higher frequency of jutting the jaw forward;
3. Test the hypothesis that jutting the jaw forward is reported more frequently in bilateral and more advanced stages of TMJ-ID.

II. Material and Methods

Sample:

Clinical charts from CMDs patients evaluated in the last sixteen years were examined retrospectively. All subjects had been evaluated as follows: A set of comprehensive questionnaires, self-report, clinical examination of the TMJs and masticatory muscles, criteria for most internal derangements of the TMJs and BB were used in all patients referred to the Division of Orofacial Pain and TMDs at UNIRG University, School of Dentistry, Gurupi-TO, Brazil.. A simple questionnaire for DOJH including jutting/no jutting the jaw forward were used to gather data. Once all clinical charts were examined, subjects were allocated to subgroups demonstrating unilateral TMJ capsulitis (UCAP, n=27); bilateral capsulitis (BICAP, n=73); unilateral retrodiskal pain (URP n=94), bilateral retrodiskal pain (BIRP, n=68); unilateral disk-attachment pain (UDAP, n=112); bilateral disk-attachment pain (BIDAP, n=84); unilateral arthralgia (UART, n=35); bilateral arthralgia (BIART, n=17); unilateral TMJ osteoarthritis (UOA, n=19), bilateral TMJ osteoarthritis (BIOA, n=14). Once different subgroups were formed and classified, the total frequency of jutting the jaw forward in CMDs subjects and the frequency of the same habit in each subgroup of TMJs-IDs were evaluated and compared. Subjects were initially examined to gather more accurate data rather than for experimental purposes. Data were stored for future studies. Even so, subjects signed a formal consent allowing the researcher to use their material for research purposes. A control group (n=30) with no CMDs but some with BB was used in the current investigation. Such subjects were referred for evaluation in the same period of time.

Inclusion criteria for CMDs: A complaint of facial and or TMJ pain, tenderness to palpation of masticatory muscles and/or TMJs, joint noises, difficulties to perform normal jaw movements and headache referred from masticatory muscles and/ or TMJs.

Inclusion criteria for internal derangements of the TMJ: Presence of any of the TMJ inflammatory and/ or degenerative disorders described below, each with its own clinical and diagnostic characteristics.

For capsulitis of the TMJ: Pain on digital palpation of the TMJ during opening and closing, pain during border jaw opening, pain during sustained border lateral movements of the jaw to the opposite side as such movement causes stretch of the joint capsule.

For retrodiskal pain of the TMJ: TMJ pain during sustained clenching of the teeth in the maximal intercuspal position, TMJ pain during manipulation of the lower jaw in the centric relation position, pain induced during clenching in the maximal intercuspal position is alleviated rapidly when biting against cotton rolls placed over the posterior lower teeth, pain during lateral movement of the lower jaw to the affected side, absence of periods of jaw locking according to patient's report.

For disk-attachment pain: Unilateral or bilateral reciprocal clicking, patient's report of periods of intermittent locking of the lower jaw, patient's report of progressive decrease in jaw opening, no report of joint pain described as burning.

For arthralgia of the TMJ: Patient's age 39 years or older, a report of chronic unilateral or bilateral TMJ pain, a history of previous and different stages of internal derangement, TMJ pain described as aching, dull and burning.

For Osteoarthritis of the TMJ: Patient is usually about 45 years old or older, a history of chronic TMJ pain, pain occurring more frequently at the end of the working day, patient's report of crepitation of the TMJ during opening or closing the mouth, bony alterations based on tomographic and/o MRI examination.

Inclusion criteria for jutting the jaw forward: Patient's report of periods of transient or sustained jutting the jaw forward and/o forward and laterally during the day with or without tooth contact on anterior teeth. The habit was graded as being present never rarely, occasionally, frequently and very frequently

Exclusion criteria for experimental subjects and control ones: Severe psychiatric or psychological disorders, cognitive impairment, difficulties to respond properly to questionnaires, severe motor disorders including Parkinson Disease, speech difficulties and presence of rheumatoid arthritis affecting the temporomandibular joints.

III. Statistical analysis

Fisher's exact test, Kruskal-Wallis test and X-squared for independence and trends were used to analyze data in the current study.

IV. Results

This investigation evaluated a sample of 543 CMDs subjects. Mean ages in the UCAP, BICAP, URP, BIRP, UDAP, BIDAP, UART, BIART, UOA and BIOA were about 38,4 (SD=14,1, range=20-73); 32,4 (SD=10,4, range=17-59); 34,6 (S=12,4, range=17=63); 31 (SD=12,5, range=11-60); 34,7 (SD=11,3, range=17-56); 32,7 (SD=10,4, range=17-51); 39,8 (SD=13,4, range=21-75); 44,4 (SD=10,3, range=19-61); 42,8 (SD=10,8, range=22-65); 45,8 (SD=8,0, range=22-59), respectively. Mean age in the control or reference subgroup was about 31,4 (SD=16, range=13-73). There was a statistically significant difference when age was contrasted in the aforementioned subgroups (Kruskal-Wallis and Dunn's statistics ($p < 0,0001$): BICAP versus BIART ($p < 0,05$); BICAP versus BIOA ($p < 0,05$); BIRP versus BIART ($p < 0,01$); BIRP versus UOA ($p < 0,05$); BIRP versus BIOA ($p < 0,01$); BIDAP versus BIART ($p < 0,05$); BIDAP versus UOA ($p < 0,05$); BIDAP versus BIOA ($p < 0,05$); BIART versus CON ($p < 0,05$); UOA versus Con ($p < 0,05$); BIOA versus CON ($p < 0,05$). Females were overrepresented in all CMDs subgroups which is a characteristics of CMDs subgroups. There were 25 females (92,6%) and 2 males (7,4%) in the UCAP subgroup; 67 females (91,%) and 6 males (8,2%) in the BICAP subgroup; 88 females (93,6%) and 6 males (6,4%) in the URP subgroup; 58 females (85,3%) and 10 males (14,7%) in the BIRP subgroup; 100 females (89,3%) and 12 males (10,7%) in the UDAP subgroup; 83 females (98,8%) and 1 male (1,2%) in the BIDAP subgroup; 34 females (97,1%) and 1 male (2,9%) in the UART subgroup; 16 females (94,1%) and 1 male (5,9%) in the BIART subgroup; 19 females (100%) in the UOA subgroup and 14 females (100%) in the BIOA subgroup. See Table 1 for further details.

Twenty-seven subjects =5%; 73=13,4%; 94=17,3%; 68=12,5%; 112=20,6%; 84=15,5%; 35=6,4%; 17=3,1%; 19=3,5% and 14=2,6%, demonstrated characteristics of unilateral capsulitis (UCAP), bilateral capsulitis (BICAP), unilateral retrodiskal pain (URP), bilateral retrodiskal pain (BIRP), unilateral disk-attachment pain (UDAP), bilateral disk-attachment pain (BIDAP), unilateral arthralgia (UART), bilateral arthralgia (BIART), unilateral osteoarthritis (UOA) and bilateral osteoarthritis, (BIOA) respectively. See Table 2 for additional details.

Regarding frequency of jutting the jaw forward in the whole group of 543 CMDs subjects, it was found that 182/543=33,5% CMDs subjects reported the presence of such oral jaw behavior. The frequency of jutting the jaw forward was higher in the CMDs group (182/543=33,5%) as compared with the control subgroup (8/30=26,6%). However, the difference was not statistically significant (Fisher's exact test $p=0,55$). The frequencies of jutting the jaw forward were about 7/27=25,9%; 30/73=41,1%; 23/94=24,5%; 27/68=39,7%; 33/112=29,5%; 37/84=44%; 12/35=34,3%; 10/17=58,8%; 3/19=15,8% and 0/14=0%, in the

UCAP, BICAP, URP, BIRP, UDAP, BIDAP, UART, BIART, UOA and BIOA subgroups, respectively. A statistically significant difference was observed only when the subgroups UCAP and BIART were contrasted (Fisher's exact test $p=0,05$). The frequencies of jutting the jaw forward were higher in some subgroups with CMDs as compared with the control one: Bilateral capsulitis 30/73=41,1% versus control subgroup 8/30=26,6 ($p=0,18$); bilateral retrodiskal pain 27/68=39,7% versus control subgroup 8/30=26,6% ($p=0,25$); bilateral disk-attachment pain 37/84=44% versus control subgroup 8/30=26,6% ($p=0,12$); bilateral arthralgia 10/17=58,8% versus control subgroup 8/30=26,6% ($p=0,05$). See Table 2 for further details.

The frequency of jutting the jaw forward in all subjects presenting with unilateral internal derangements of the TMJ ($n=287$) was about 78/287=27,2% as compared with the frequency of 104/256=40,6% in subjects presenting with bilateral derangements of the TMJ ($n=256$): Fisher's exact test ($p<0,001$). Thus, jutting the jaw forward was observed more frequently in the CMDs subgroup with bilateral than with unilateral TMJs-IDs. See Table 3 for further details.

Because the samples in both the unilateral osteoarthritic and in the bilateral osteoarthritic subgroups were small, these subgroup were excluded when evaluating independence and trends. Thus, we evaluated independence and trends in frequency of jutting the jaw forward from the unilateral capsulitis subgroup to the bilateral capsulitis, unilateral retrodiskal, bilateral retrodiskal, unilateral, disk-attachment pain, bilateral disk-attachment pain and unilateral and bilateral arthralgia subgroups. Because Chi-squared for independence ($p=0,02$) and Chi-squared for trends ($p=0,09$), we can say that regarding frequency of jutting the jaw forward, the subgroups were different or independent, but there was no a trend for a higher frequency of jutting the jaw forward with the severity of TMJs-IDs. See Table 3 for additional details.

V. Discussion

The frequency of jutting the jaw forward was very high in CMDs subjects with TMJs-IDs as compared with the control subgroup. Even though this difference was not statistically significant, this outcome does not invalidate the role of oral jaw behaviors including jutting the jaw forward in the etiology and perpetuation of signs and symptoms of CMDs. This is so, as the etiology of CMDs is multi-factorial. Thus, the combination of some oral jaw behaviors may be more destructive to the components of the masticatory system including the TMJs. Further, a combination of frequent and intense oral jaw behaviors may deleteriously overload the TMJs and adjacent masticatory muscles. Because a higher frequency of jutting the jaw forward (182/543=33,5%) was observed in the CMDs group as compared with the control group (8/30=26,6%), and a previous investigation^[6] reported a frequency of 22.3% in the CMDs group as compared with 7.7% in the control one, there are reasons to believe that the behavior can be found in clinical and non clinical populations, but they produce different clinical effects on the components of the masticatory system.. Congruent with the above data and assumption, Schiffman, Friction and Haley^[7] reported a prevalence of 28,8% of jutting the jaw forward. The lower frequency they reported is likely to be associated with the nonclinical population they evaluated. The higher frequency of jutting the jaw forward we observed in the CMDs subgroup in the current study is in line with one investigation^[6] reporting a higher frequency of such behavior in the experimental subgroup and a lower frequency in the control non CMDs one. In the current study we report a frequency of jutting the jaw forward of about 33,5% in a clinical population of 543 subjects with signs and symptoms of CMDs and TMJs-IDs. Winocur and colleagues^[8], reported a lower prevalence (14,3%) of "jaw play". This lower prevalence may be explained by the fact that they assessed a nonclinical population of adolescent girls.

Noteworthy to mention is that the frequency of such a behavior is high in control and/or in nonclinical populations and probably reflects that other factors inherent in jutting the jaw forward can be observed in clinical as compared with non clinical populations, for instance, greater frequency and intensity of jutting the jaw forward, more intense or severe BB, anxiety and depression and so forth. This difference may explain clinical signs and symptoms (facial pain, TMJs-IDs, headache) and seeking CMD treatment in CMD patients versus no relevant signs and symptoms in control individuals. Congruent with this point of view, one investigation^[9] indicates that prolonged protrusion of the mandible or jutting the jaw forward may lead to facial pain. Further, Molina and coworkers^[6] evaluated a large sample of CMD and BB subjects and reported that the frequency of jutting the jaw forward was much higher in the severe BB subgroup. Their investigation indicated that the frequency of the behavior increased from the mild (17,6%) and moderate (15%) to the severer BB subgroup (33%). This difference in frequency may also represent more intense motor anxiety concentrated in the oral structures in the more severe BB subgroup. Such anxiety type may somehow increase the probability of a higher frequency of both BB and jutting the jaw forward.

Oral jaw habits should be considered as only one of many possible destructive etiologic agents causing inflammatory and mechanical changes in the components of the TMJ. In this regard, Israel^[2] asserts that acute or chronic trauma to the joint may cause failure of intra-articular tissues and loss of structure and function. Patients with excessive joint overload from mandibular parafunctions including jutting the jaw

forward may present with disc displacement and inflammation around the joint disc. If oral parafunctional behaviors are not neutralized, they may result in failure when attempting to reposition the joint disc^[2]. Oral parafunctional behaviors including jutting the jaw forward are reported in both CMDs and control subgroups. However, persistent and severe parafunctional jaw habits may be more determinant in overloading the intra-articular tissues^[2], beyond their capacity for repair and healing. Oral parafunctions and many other disorders and/or mechanisms are responsible for the development of pain, inflammation and disk displacement^[10]. It may be that a combination of various oral jaw behaviors including jutting the jaw forward, their frequency and intensity rather than their presence is more destructive over the internal components of the TMJ. In this regard, one investigation^[3] indicates that oral jaw behavior are more destructive because they become unconscious, are repetitive or frequent and occur in combinations. Winocur and colleagues^[8] evaluated oral habits and TMDs in a large sample of high school girls. They found a high prevalence of gum chewing as well as a positive, statistical and significant association between jutting the jaw forward/laterally and TMJ disturbances including reported joint noises, catching of the joint and joint tension.

Oral jaw habits that occur more frequently, are intense, long-lasting and occur in combination with other predisposing factors, result in moderate or severe damage to the components of the masticatory system including the TMJs^[6]. Application of considerable forces on the jaw caused by different forms of trauma (severe BB, oral jaw habits, jutting the jaw forward), may represent significant trauma on the TMJs and masticatory muscles^[11]. Because the frequency of jutting the jaw forward was higher in CMDs subjects with bilateral than unilateral TMJs-IDs, it is likely that this difference is explained by more intense pain, more severe disk displacement and more intense and chronic inflammation present in bilateral TMJ internal derangements. Severer pain, more intense and chronic inflammation, and bilateral disorders are more likely to be related to more chronic disorders which may progress to more severe displacement and deterioration of the joint disk. This assumption is in line with one investigation^[13] about changes in disk status in reducing and nonreducing anterior disk displacement of the TMJs, reporting that with time the disk continued to be more anteriorly displaced, tended to deteriorate and that there was more progress to more advanced TMJ-ID in cases where the disk was more displaced, for instance, in cases of disk displacement without reduction. These pathological changes prompt patients to protrude the jaw in order to attain more comfort, less strain in muscles and joints^[6] and probably to seek more congruency between the mandibular condyle and the joint disc. This assumption is consonant with patients self-report that one of the reasons to protrude the lower jaw is to provide more comfort, less strain to muscles and TMJs and even to reduce joint noises. Further, bilateral TMJ disorders are more likely to be related with more chronic TMJ pain and inflammation.

The MORA device is used in CMDs patients with disk displacement without reduction and sometimes in patients with disk displacement with reduction. Using this device, the mandible is kept in an anterior or protrusive position. According to a classic study, the use of the device promotes greater strength and satisfaction^[12]. It is the anterior lower jaw position induced with the MORA that is important to provide comfort for the patient. This anterior or protruded position is adopted by patients in order to have more comfort and less strain and tension in the TMJs. Jutting the jaw forward was observed more frequently in bilateral than in unilateral TMJs-IDs. Bilateral case are those with more advanced disk derangements, deformation and displacement in the TMJs. Because more advanced cases are characterized by more deteriorated joint disk (both in shape and position)^[13] patients who jut the jaw forward seek a more comfortable joint position o prevent pain, tension an joint noises.

Even though jutting the jaw forward is biomechanically different and less traumatic as compared to a jaw thrust maneuver induced for surgical reasons, one investigation^[11] reported that jaw thrusting to insert an oral airway for effective ventilation may cause dislocation of the TMJ. The practical meaning of this information is that joint pain, inflammation and disk displacement may encourage some CMDs patients to protrude the jaw which in turn further contribute to deteriorate the disk and other internal TMJ structures. Bilateral TMJ disorders are more likely to be related to more intense pain, more advanced stages of disk displacement and severer inflammation, thus encouraging patients to protrude the jaw in order to relieve pain, inflammation and establish a jaw position of "comfort". Congruent with this assumption is one investigation^[10] in which researchers demonstrated that bilateral TMJs-IDs were correlated with higher frequency of bilateral pain referred to the ears as a result of more intense pain, inflammation and presence of central excitatory effects. Winocur and colleagues^[8] evaluated a group of 323 girls 15-16 years old and reported that "jaw play" was associated with pain in the ear area during mandibular function at rest, a feeling of tiredness of the jaw while chewing, joint noises, catch and jaw locking. They concluded that "jaw play" was the most destructive oral jaw behavior in TMDs.

3.The highest frequency of jutting the jaw forward was observed in CMDs subjects presenting with signs and symptoms of bilateral arthralgia.

Arthralgia of the TMJ is considered by some as a more advanced, pre-osteoarthritic stage of TMJs-IDs very likely to be associated with severer pain, inflammation and severer disk displacement in which minor

osteoarthritic changes are more likely to be observed. Consequently, consciously or unconsciously many TMJs-IDs patients protrude the jaw to relieve their pain, feel more comfortable and establish a jaw position with less strain to muscle and joints. It may also be that bilateral joint disorders in more advanced stages of TMJs-IDs, make it impossible for patients to have a comfortable and more physiologic dental-muscle and mandibular condyle-joint relationship. More advanced stages of TMJs-IDs are related with severe degenerative changes, adhesions, sub-chondral bone changes and disc perforation^[2]. Intra-articular disorders are usually caused by severe damage to anatomic components of the TMJ as a result of trauma, thus, resulting in pain, instability and abnormal jaw mobility^[2].

TMJ arthralgia is a more advanced clinical disk derangement probably a IV or V Wilkes sub-stage. An internal derangement like this is more likely to be related with severer pain and disk displacement. Such pathological condition may induce positional changes in the mandible so as to decrease strain in the joint. Supporting this point of view, one investigation^[14] asserts that Wilkes stage IV internal TMJ derangement is associated with chronic pain, more serious jaw functional obstacles, restricted movement due to articular disc displacement, mild to moderate disc deformity and severe posterior band hypertrophy. In these dysfunctional conditions, patients are more likely to jut the jaw forward to decrease strain, pain and inflammation as an attempt to establish a more functional position of the condyle with the mandibular fossae and/or with the joint disk.

The more advanced a TMJ-ID is, the more intense pain and inflammation, greater deformation of the joint disk and thus, more significant interference with jaw movements. Thus, many CMDs patients may opt to jut the jaw forward to ameliorate pain and prevent interference of the joint disk. In many patients with advanced internal TMJ derangements, the joint disk is displaced anteriorly and sometimes medially, thus interfering with normal jaw movements. Congruent with this assumptions, Kurita and coworkers^[15] reported that permanently displaced disk are more likely to be present in arthralgia and Osteoarthritis of the TMJs.

VI. Conclusion

In this current investigation we evaluated frequency of jutting the jaw forward in a large sample of CMDs subject with TMJs-IDs. We also assessed frequency of the behavior in most known TMJs-IDs as well as the frequency in unilateral and bilateral TMJs-IDs. To the extent of our knowledge, we report for the first time in the dental and medical literature a high frequency of jutting the jaw forward in CMDs subjects and controls. We also report a higher frequency of the behavior in bilateral arthralgia of the TMJs and in bilateral TMJs-ID than in unilateral ones. New studies using the same criteria and a large sample of CMDs with TMJs-IDs should be carried out to further validate findings in the current investigation. Similar studies should evaluate the relationship between mechanisms, frequency and intensity of jutting the jaw forward and their effects on disc displacement.

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Table 1: Social and demographic data in CMDs subjects (n=543) and controls no CMDs (n=30).

GENRE	UCAP n=27	BICAP n=73	URP n= 94	BIRP n=68	UDAP n=112	BIDAP n=84	UART n=35	BIART n=17	UOA n=19	BIOA n=14	CON n=30
Females	25	67	88	58	100	83	34	16	19	14	19
Males	2	6	6	10	12	1	1	1	0	0	11
Total	27	73	94	68	112	84	35	17	19	14	30
AGE											
Mean*	38,4	32,4	34,6	31	34,7	32,7	39,8	44,4	42,8	45,8	31,4
SD	14,1	10,4	12,4	12,5	11,3	10,4	13,4	10,3	10,8	8,0	16
Range	20-73	17-59	17-63	11-60	17-56	17-51	21-75	19-61	22-65	22-59	13-73

*Kruskal-Wallis statistics $p < 0,0001$: BICAP versus BIART ($p < 0,05$); BICAP versus BIOA ($p < 0,05$); BIRP versus BIART ($p < 0,01$); BIRP versus UOA ($p < 0,01$); BIRP versus BIOA ($p < 0,01$); BIDAP versus IART ($p < 0,05$); BIDAP versus UOA ($p < 0,05$); BIART versus CON ($p < 0,05$); UOA versus CON ($p < 0,05$); BIOA versus CON ($p < 0,05$).

Table 2: Frequencies of some TMJs-IDs in the total sample of 543 CMDs individuals and jutting the jaw forward (n=182) in each category of TMJs-IDs..

FREQUENCIES OF TMJs-IDs	JUTTING THE JAW FORWARD						
	n=543		IN TMJs-IDs SUBGROUPS		CONTROL		
	n	%	n	%	n	%	
ALL	543		100		182	33,5**	8/30=26,6*
UCAP	27		5**		7/27	25,9	
BICAP*	73		13,4**		30/73	41,1	
URP	94		17,3**		23/94	24,5	
BIRP*	68		12,5**		27/68	39,7	
UDAP	112		20,6**		33/112	29,5	
BIDAT*	84		15,5**		37/84	44	
UART	35		6,4**		12/35	34,3	
BIART*	17		3,1**		10/17	58,8	
UOA	19		3,5**		3/19	15,8	
BIOA	14		2,6**		0/14	0	
TOTALS	543		100		182		

* Fisher's exact test: All TMJs-IDs versus Controls ($p=0,55$), non significant
 BICAP subgroup versus controls ($p=0,18$), non significant
 BIRP subgroup versus Controls ($p=0,25$), nonsignificant
 BIDAP subgroup versus controls ($p=0,12$), non significant
 BIART subgroup versus controls ($p=0,05$).

** X-squared for independence of TMJs-IDs subgroups ($p < 0,02$), for trends ($p=0,09$).

Table 3: Comparison of the frequency of jutting the jaw forward in bilateral versus unilateral TMJ-IDs.

TMJs-IDs	FREQUENCIES OF JUTTING THE JAW FORWARD		
	n	%	
	Bilateral	256	104
Unilateral	287	78	27,2 ***
TOTALS	543	182	

*** Fisher's exact test ($p < 0,001$), a very statistically significant difference in frequency

Omar Franklin Molina, et. al. "Jutting the jaw forward in different stages of temporomandibular joint internal derangements: A multiple comparison study." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(7), 2020, pp. 32-38.