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Original articles

Temporomandibular disorder complaints in musicians

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ABSTRACT

Purpose: to investigate the occurrence of temporomandibular disorder complaints and associated factors in musicians, according to their instruments.

Methods: a cross-sectional, observational, analytical study with 48 adults, divided into three groups: string instrumentalists, wind instrumentalists, and control group. The ProDTMmulti questionnaire was applied. Statistical analysis was performed using Pearson's chi-square, Fisher's exact, and Kruskal-Wallis tests, setting the significance level at 5%.

Results: almost 40% of participants, spontaneously reported some temporomandibular disorder complaint. The control group had fewer complaints and harmful oral habits. Masticatory muscle fatigue was more frequent in the wind group than in the string one; noise in the temporomandibular joint was less frequent in controls than in the string group; and the unilateral masticatory pattern was more frequent in the wind group than in the others. The complaint of ear fullness was greater in the wind group. An association was found between temporomandibular disorder complaints and facial muscle pain, facial muscle pain during musical activity, facial muscle pain after musical activity, headache, and headache after musical practice.

Conclusion: spontaneous complaints of temporomandibular disorders were observed in 56.7% of wind and string musicians.

Keywords: Temporomandibular Joint Disorders; Facial Pain; Masticatory Muscles; Music; Speech, Language and Hearing Sciences

INTRODUCTION

The American Academy of Orofacial Pain (AAOP) defines temporomandibular disorder (TMD) as a set of disorders involving masticatory muscles, the temporomandibular joint (TMJ), and associated structures[1]. Its prevalence is higher in females in the age group between 21 and 40 years[2]. The 6th edition of AAOP's manual established new guidelines for diagnosing and classifying the different forms of TMD, divided into two large groups: muscular TMD and articular TMD, with their respective subdivisions[1].

The Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) – the main clinical and diagnostic assessment tool for TMDs – classifies TMDs into painful disorders (subdivided into myalgia, arthralgia, and headache attributed to TMD), intra-articular disorders (subdivided into disc displacement with reduction; disc displacement with reduction, with intermittent locking; disc displacement without reduction, with limited opening; disc displacement without reduction, without limited opening), and degenerative joint disease[3].

The effort to isolate a clear and universal cause of TMD has not been successful[4]. A recent study concluded that TMDs have a multifactorial origin and that several etiological factors can contribute to the appearance of signs and symptoms related to the stomatognathic system[4]. The symptoms most reported by patients with TMD are often pain in the face, TMJ, masticatory muscles, head, and/or ear region[1]. Otological manifestations (e.g., tinnitus, ear fullness, and vertigo) are also reported[1].

A 2018 bibliographic review aimed to summarize the changes in the stomatognathic system of musicians who played wind instruments and found frequent TMD-related musculoskeletal problems and hearing changes.[5] Wind and string musicians are highly susceptible to developing TMD, and this practice may not only trigger the disorder but also aggravate or perpetuate an existing problem[6].

Prolonged instrument practice can often lead professionals to exceed their physiological limits, due to the high level of performance required, the rigorous individual technique, and each musical instrument's specific shape, resulting in a high prevalence of musculoskeletal injuries[7]. TMD can temporarily or permanently limit the ability to play and practice musical wind instruments[8].

Wind instruments require a complex neuromuscular interaction between the lips, facial muscles, teeth, palate, tongue, and mouthpiece, involving each instrument's characteristics of production, direction, and intensity of the air column[8]. Musicians adapt their embouchure to the different instruments to perform music correctly, requiring specific articulation between the mouthpiece, lips, and respiratory system[8]. However, the shape of the embouchure and the time and frequency they play the instrument are related to some oral cavity, face, and posture disorders among musicians. Some musicians' anatomical characteristics facilitate playing, while others need compensatory mechanisms in the jaw and head and neck muscles[8].

Not unlike wind instruments, string ones (e.g., the violin, viola, and cello) require musical performance techniques that may damage orofacial structures, as their support fixes the instrument between the lower edge of the jaw and the left shoulder[9,10].

Thus, investigating TMD signs and symptoms related to musical activities may contribute to greater knowledge about the risk of wind and string instrument musicians developing TMDs. Hence, this study aimed to investigate the occurrence of TMD complaints and associated factors in musicians, according to each instrument's characteristics.

METHODS

This is an observational, cross-sectional, analytical study, approved by the Ethics Committee of the Universidade Federal de Minas Gerais, Brazil, under evaluation report no. 2.840.100 and CAAE: 95388918.4.0000.5149. The sample had 48 adults of both sexes, aged 18 to 69 years.

The inclusion criteria for the study were being 18 years or older, being a musician from the town of Brumadinho, Brazil, agreeing to participate in the research, and signing an informed consent form. The exclusion criterion was not completing the data collection protocols.

All six bands and the one string school registered at the Cultural Center of Brumadinho were contacted. The study volunteers were invited to participate in the research while rehearsing with their bands, without affecting their activities. Those who agreed to participate received an informed consent form and were included in the study after reading and signing it.

The participants were divided into three groups: I) experimental group of string instrumentalists (EGS) (n = 12) – violin, cello, viola, and double bass (String School members at the Inhotim Institute); II) experimental group of wind instrumentalists (EGW) (n = 18) – clarinet, saxophone, tuba, trumpet, trombone, and

transverse flute (musicians registered in the inventory of the Cultural Center of Brumadinho); and III) control group (CG) (n = 18) – with other instrumentalists (keyboard, piano, conductor) and singers from the town (identified in the Cultural Center's inventory).

The same evaluator applied the questionnaire – developed by the researchers to investigate each musician's profile and rehearsal routine – and the Protocol for Determining Temporomandibular Disorder Signs and Symptoms for Multiprofessional Centers (ProDTMmulti, in Portuguese)[11,12]. The questionnaire verifies previous knowledge about TMD, time spent practicing music, time spent rehearsing and studying per week, type of musical instrument played, and harmful oral habits. The first part of the ProDTMmulti investigates the presence and location of TMD signs and symptoms (e.g., pain, discomfort, and noise). The second part analyzes the intensity of signs and symptoms on a scale from 0 to 10 in four situations: waking up, chewing, speaking, and resting.

Descriptive data analysis was performed using frequency distribution for categorical variables and measures of central tendency and dispersion for continuous variables. The Kolmogorov-Smirnov and Shapiro-Wilk tests were used to assess sample distribution. Pearson's chi-square, Fisher's exact, and Kruskal-Wallis tests were used for association analyses, setting the significance at p-values ≤ 0.05. The tests were chosen because the intensity and time variables did not have a normal distribution. SPSS software, version 25.0, was used for data entry, processing, and analysis.

RESULTS

The sample had 48 participants – 28 (58.3%) males and 20 (41.7%) females. Their mean age was 26±11 years, with a median of 22 years. Most of the sample had completed high school (41.7%), followed by incomplete higher education (29.2%), complete higher education (22.9%), incomplete high school (4.2%), and complete middle school (2.1%).

Table 1 presents the descriptive analysis of spontaneous complaints (from the identification part in ProDTMmulti) and the specification of these complaints (part 1 of ProDTMmulti). Almost 40% of the sample spontaneously reported some TMD complaint (sign/symptom), most frequently bilateral masseter pain, headache, and neck pain. There were no reports of swallowing or speech difficulties.

Table 1. Descriptive analysis of spontaneously reported complaints and their specifications, according to part 1 of the ProDTMmulti

Variables	N	%
Spontaneous TMD complaint		
Yes	19	39.6
No	29	60.4
Total	48	100.0
If so, what is the complaint?		
Left masseter pain	1	5.3
Neck pain and headache	1	5.3
Right TMJ clicking	1	5.3
Bilateral TMJ pain	2	10.5
Bilateral TMJ clicking	2	10.5
Left TMJ clicking	2	10.5
Headache	3	15.8
Neck pain	3	15.8
Bilateral masseter pain	4	21.0
Total	19	100.0
Facial muscle pain		
Yes	11	22.9
No	37	77.1
Total	48	100.0
If so, on which side?		
Right	1	9.1
Left	3	27.3
Both	7	63.6
Total	11	100.0
Site of muscle pain		
Masseter	10	90.9
Temporal	1	9.1
Total	11	100.0
Masticatory muscle fatigue		
Yes	6	12.5
No	42	87.5
Total	48	100.0
If so, on which side?		
Right	0	0.0
Left	0	0.0
Both	6	100.0
Total	6	100.0
Noise in the temporomandibular joint		
Yes	16	33.3
No	32	66.7
Total	48	100.0
If so, what type?		
Clicking on the left	2	12.5
Clicking on the right	2	12.5
Bilateral clicking	10	62.5
Bilateral crepitation	2	12.5
Total	16	100.0

Variables	N	%
Headache		
Ye	12	25.0
No	35	72.9
Total	47	97.9
Auditory symptoms		
Yes	13	27.1
No	35	72.9
Total	48	100.0
If so, which one?		
Ear fullness	4	30.8
Tinnitus	6	46.2
Pain and tinnitus	1	7.7
Ear fullness and tinnitus	2	15.4
Total	13	100.0
If so, where?		
On the right	2	15.4
On the left	2	15.4
Bilaterally	9	69.2
Total	13	100.0
Difficulties moving the mouth		
Yes	3	6.2
No	45	93.8
Total	48	100.0
If so, which one?		
Opening	1	33.3
Closing	0	0.0
Chewing	0	0.0
Yawning	2	66.7
Total	3	100.0
Masticatory pattern		
Unilateral	12	25.0
Bilateral	36	75.0
Total	48	100.0
Masticatory pattern before the problem		
Unilateral	0	0.0
Bilateral	19	100.0
Total	19	100.0
Swallowing difficulties		
Yes	0	0.0
No	48	100.0
Total	48	100.0
Speaking difficulties		
Yes	0	0.0
No	48	100.0
Total	48	100.0

Captions: N = number of individuals; % = relative frequency; TMD = temporomandibular disorder; TMJ = temporomandibular joint

The analysis of TMD complaints per sex showed a higher frequency of females (63.16%) (p = 0.015) than males (36.84%), whereas the age groups (18 to 29 years and 30 years or older) did not differ (p = 0.624). Fisher's exact test was used in both analyses.

The analysis of spontaneous complaints and their specification per group is presented in Table 2. The groups differed regarding the presence of spontaneous complaints of TMD, masticatory muscle fatigue, TMJ noise, and chewing.

Table 2. Differences in temporomandibular disorder complaints between groups of musicians

Variables	Group			p-value[1]
	EGS (n=12) N (%)	EGW (n=18) N (%)	CG (n=18) N (%)	
Spontaneous TMD complaint				
Yes	7 (58.3)	10 (55.6)	2 (11.1)	0.007*
No	5 (41.7)	8 (44.4)	16 (88.9)	
Total	12 (100.0)	18 (100.0)	18 (100.0)	
Facial muscle pain				
Yes	4 (33.3)	6 (33.3)	1 (5.6)	0.086
No	8 (66.7)	12 (66.7)	17 (94.4)	
Total	12 (100.0)	18 (100.0)	18 (100.0)	
Site of muscle pain				
Masseter	3 (75.0)	6 (100.0)	1 (100.0)	0.382
Temporal	1 (25.0)	0 (0.0)	0 (0.0)	
Total	4 (100.0)	6 (100.0)	1 (100.0)	
Masticatory muscle fatigue				
Yes	0 (0.0)	5 (27.8)	1 (5.6)	0.042*
No	12 (100.0)	13 (72.2)	17 (94.4)	
Total	12 (100.0)	18 (100.0)	18 (100.0)	
TMJ noise				
Yes	6 (50.0)	8 (44.4)	2 (11.1)	0.039*
No	6 (50.0)	10 (55.6)	16 (88.9)	
Total	12 (100.0)	18 (100.0)	19 (100.0)	
Headache				
Yes	3 (25.0)	7 (41.2)	2 (11.1)	0.125
No	9 (75.0)	10 (58.8)	16 (88.9)	
Total	12 (100.0)	17 (100.0)	18 (100.0)	
Auditory symptoms				
Yes	4 (33.3)	7 (38.9)	2 (11.1)	0.147
No	8 (66.7)	11 (61.1)	16 (88.9)	
Total	12 (100.0)	18 (100.0)	18 (100.0)	
Difficulties moving the mouth				
Yes	0 (0.0)	2 (11.1)	1 (5.6)	0.463
No	12 (100.0)	16 (88.9)	17 (94.4)	
Total	12 (100.0)	18 (100.0)	18 (100.0)	
Masticatory pattern				
Unilateral	0 (0.0)	10 (55.6)	2 (11.1)	0.001*
Bilateral	12 (100.0)	8 (44.4)	6 (88.9)	
Total	12 (100.0)	18 (100.0)	18 (100.0)	

[1] Pearson's chi-square test

Captions: N = number of individuals; % = relative frequency; EGS = experimental group with string instrumentalists; EGW = experimental group with wind instrumentalists; CG = control group; TMD = temporomandibular disorder; TMJ = temporomandibular joint; * = p≤0.05

Table 3 presents the data indicating between which groups the differences shown in Table 2 occurred. Spontaneous complaints of TMD were more frequent in the EGS and EGW than the CG; masticatory muscle fatigue was more frequent in the EGW than the EGS; TMJ noise was more frequent in the EGS than the CG; and unilateral masticatory pattern was more frequent in the EGW than the CG and EGS.

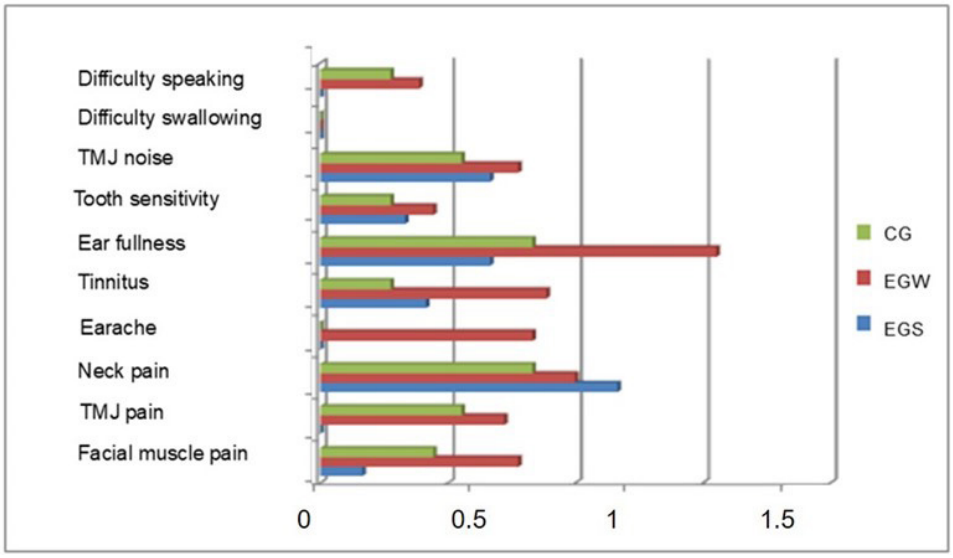
Table 3. Association between temporomandibular disorder complaints and paired groups of musicians

Variables	Groups			Groups			Groups		
	EGS (n=12) N (%)	EGW (n=18) N (%)	p-value[1]	EGS (n=12) N (%)	CG (n=18) N (%)	p-value[1]	EGW (n=18) N (%)	CG (n=18) N (%)	p-value[1]
Spontaneous TMD complaints									
Yes	7 (58.3)	10 (55.6)		7 (58.3)	2 (11.1)		10 (55.6)	2 (11.1)	
No	5 (41.7)	8 (44.4)	0.088	5 (41.7)	16 (88.9)	0.013*	8 (44.4)	16 (88.9)	0.012*
Total	12 (100.0)	18 (100.0)		12 (100.0)	18 (100.0)		18 (100.0)	18 (100.0)	
Masticatory muscle fatigue									
Yes	0 (0.0)	5 (27.8)		0 (0.0)	1 (5.6)		5 (27.8)	1 (5.6)	
No	12 (100.0)	13 (72.2)	0.046*	12 (100.0)	17 (94.4)	1.000	13 (72.2)	17 (94.4)	0.177
Total	12 (100.0)	18 (100.0)		12 (100.0)	18 (100.0)		18 (100.0)	18 (100.0)	
TMJ noise									
Yes	6 (50.0)	8 (44.4)		6 (50.0)	2 (11.1)		8 (44.4)	2 (11.1)	
No	6 (50.0)	10 (55.6)	0.765	6 (50.0)	16 (88.9)	0.034*	10 (55.6)	16 (88.9)	0.060
Total	12 (100.0)	18 (100.0)		12 (100.0)	19 (100.0)		18 (100.0)	19 (100.0)	
Masticatory pattern									
Unilateral	0 (0.0)	10 (55.6)		0 (0.0)	2 (11.1)		10 (55.6)	2 (11.1)	
Bilateral	12 (100.0)	8 (44.4)	0.002*	12 (100.0)	16 (88.9)	0.503	8 (44.4)	16 (88.9)	0.012*
Total	12 (100.0)	18 (100.0)		12 (100.0)	18 (100.0)		18 (100.0)	18 (100.0)	

[1] Pearson's chi-square test

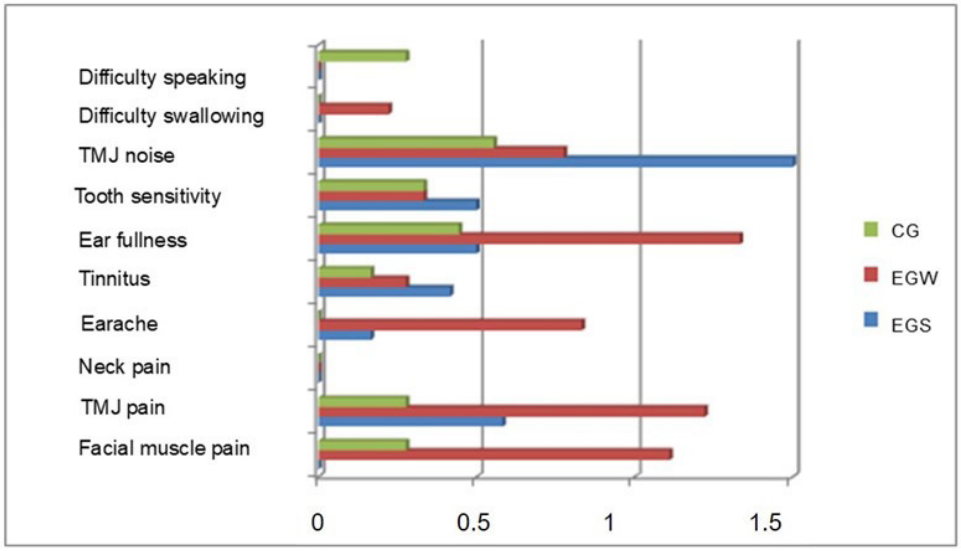
Captions: N = number of individuals; % = relative frequency; EGS = experimental group with string instrumentalists; EGW = experimental group with wind instrumentalists; CG = control group; TMD = temporomandibular disorder; TMJ = temporomandibular joint; * = $p \leq 0.05$

Figures 1, 2, 3, and 4 show the mean intensity of symptoms in different situations – waking up, chewing, speaking, and resting, respectively. Symptoms did not differ between groups when waking up, chewing, and speaking, whereas only ear fullness when resting was significantly different ($p = 0.033$), with a higher mean in the EGW.



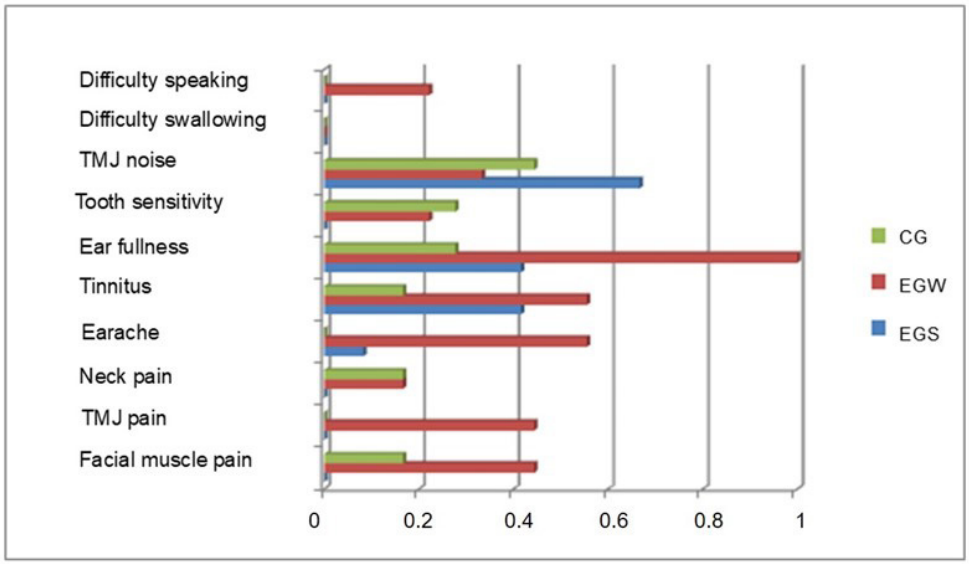
Captions: EGS = experimental group with string instrumentalists (n = 12); EGW = experimental group with wind instrumentalists (n = 18); CG = control group (n = 18); TMD = temporomandibular disorder; TMJ = temporomandibular joint.

Figure 1. Mean intensity of symptoms when waking up



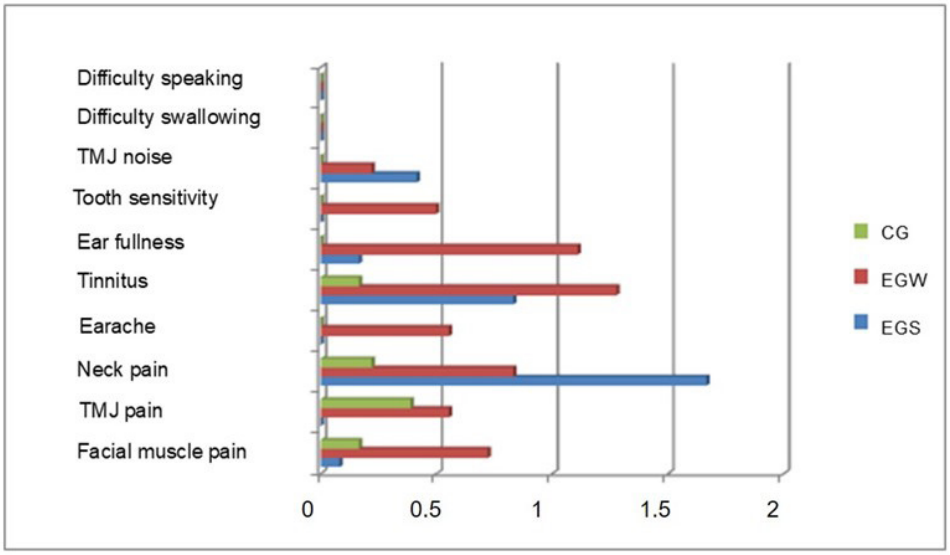
Captions: EGS = experimental group with string instrumentalists (n = 12); EGW = experimental group with wind instrumentalists (n = 18); CG = control group (n = 18); TMD = temporomandibular disorder; TMJ = temporomandibular joint.

Figure 2. Mean intensity of symptoms when chewing



Captions: EGS = experimental group with string instrumentalists (n = 12); EGW = experimental group with wind instrumentalists (n = 18); CG = control group (n = 18); TMD = temporomandibular disorder; TMJ = temporomandibular joint.

Figure 3. Mean intensity of symptoms when speaking



Captions: EGS = experimental group with string instrumentalists (n = 12); EGW = experimental group with wind instrumentalists (n = 18); CG = control group (n = 18); TMD = temporomandibular disorder; TMJ = temporomandibular joint.

Figure 4. Mean intensity of symptoms when resting

A weekly study routine (individually and in group) with a mean of 11.33±11.09 hours per week and a mean of 12±10.77 years of musical practice was observed in this study sample. The mean time, shown in Table 4, was greater in the EGS, while the EGW had a greater time of group rehearsals.

Table 4. Comparison between groups concerning time of musical practice

Variables	Groups	Mean	SD	Median	Minimum	Maximum	p-value[1]
Time of practice in musical activities (years)	EGS (n=12)	8.1	4.0	8.0	2.0	15.0	0.256
	EGW (n=18)	11.8	10.2	9.5	1.0	40.0	
	CG (n=18)	14.8	13.7	13.0	1.0	62.0	
Study time/week (hours)	EGS (n=12)	11.3	7.2	10.0	2.0	28.0	0.001*
	EGW (n=18)	6.8	8.2	3.0	1.0	25.0	
	CG (n=18)	3.8	9.1	1.0	1.0	40.0	
Group rehearsal/week (hours)	EGS (n=12)	5.2	7.9	3.0	2.0	30.0	≤0.001*
	EGW (n=18)	6.1	6.2	4.0	1.0	29.0	
	CG (n=18)	2.6	1.2	2.0	1.0	4.0	

[1] Kruskal-Wallis test
Captions: SD = standard deviation; n = absolute frequency; EGS = experimental group with string instrumentalists; EGW = experimental group with wind instrumentalists; CG = control group; * = $p \leq 0.05$

The wind instrument played most frequently by the EGW was the saxophone (12.5%), followed by the clarinet (6.3%), trombone (6.3%), trumpet (4.2%), tuba (4.2%), transverse flute (2.1%), and euphonium (2.1%). The instrument played most often by the EGS was the viola (8.3%), followed by the violin (6.3%), cello (6.3%), and double bass (4.2%). The most frequent activity in the CG was singing (20.8%), followed by the guitar (8.3%), keyboard (4.2%), and percussion (4.2%).

Lastly, the EGS ($p = 0.001$) and EGW ($p \leq 0.001$) had harmful oral habits more often than the CG. There was no association between the types of harmful habits and the different groups of musicians ($p > 0.05$).

It is important to highlight that 91.67% of participants reported having no prior knowledge about TMD.

DISCUSSION

This study found that string and wind instrument players had more TMD complaints and reported more harmful oral habits than the CG. Musicians are susceptible to developing TMD. Musical practice can trigger and aggravate the disorder and somatize other existing factors[6]. These damages can cause health problems capable of significantly interfering with the musician's ability and performance, even ending their career[7]. Therefore, thorough medical surveys should identify predisposing factors that increase the risk of TMD, initiating factors that trigger TMD, and perpetuating factors that interfere with the control of the disorder[13].

It was found that most of the study sample had only completed high school. Education is associated with acquiring organized information and, consequently, health literacy (i.e., the apprehension and application of health-related knowledge)[14], which could lead to different perceptions of TMD. Therefore, the town's musicians should receive specific training about musculoskeletal issues and TMD.

Almost 40% of participants spontaneously reported some TMD complaint (sign/symptom). The most prevalent was bilateral masseter pain, followed by headache and neck pain. The literature indicates that musicians often report orofacial pain due to excessive neuromuscular wear[15]. The reported symptoms were pain in the face, TMJ, masticatory muscles, head and/or ear region[2].

TMD complaints were more present in the EGW and EGS than the CG, which may be related to face and neck positioning adjustments necessary to perform musical techniques. These may overload the TMJ and orofacial and neck muscles. Another study indicates a high prevalence of TMD in wind instrument players, since the jaw protrusion (necessary for the instrument embouchure) may require excessive TMJ forces, overloading the structures related to it[16]. This may justify the finding that masticatory muscle fatigue was

the most frequent symptom in the EGW, in contrast with the EGS.

According to the literature, string instrumentalists are also prone to having TMD signs and symptoms, such as pain in the masseter and temporal muscles and, specifically, in the right TMJ region, due to the pressure on the jaw and masticatory muscles when holding the instrument for long periods[17]. It is important to point out that the guitar is likewise a string instrument, but it does not require face and neck positioning adjustments, as do the others. This is why it was part of the sample but belonged to the CG. Among string instruments, the violin and viola playing techniques have the greatest potential for damage to the orofacial structures[18].

No difference was found between the groups when asked specifically in Part 1 of ProDTMmulti about the presence of facial muscle pain. However, 63.6% of participants reported bilateral facial muscle pain, and 90.9% reported masseter muscle pain. Tinnitus was the auditory/otological symptom most cited in this study, corroborating the literature[2,19,20]. Regarding mouth movements, the most frequently cited sign/symptom was difficulty yawning. In another study[21], 14% of patients cited limited mouth opening, which can make yawning kinematics difficult, since yawning requires a certain amount of mouth opening amplitude.

The groups differed regarding complaints of TMJ noise and chewing, whereas the study sample reported no swallowing or speaking difficulties. A study mentioned that TMD and harmful oral habits interfere with the stomatognathic system functioning, which can affect breathing, chewing, swallowing, and speaking[22].

Epidemiological investigations have identified TMJ noise as a frequent TMD symptom and clinical sign[21]. The authors of another study found that TMD is related to pain, TMJ noise, and limited condyle movements when opening and closing the mouth[22].

In this study sample, spontaneous complaints of TMD occurred more often among women. According to the literature, the occurrence of TMD is higher in females and in the age group between 21 and 40 years[4]. Ligament laxity and hormonal changes are suggested as possible explanations for the high incidence of women with TMD[15].

It was found in part 2 of the ProDTMmulti that only ear fullness at rest differed between the groups, being greater in the EGW. A study[8] verified that 42.9% of its total sample reported ear fullness – of which 11.1% were wind instrument players and 31.8% were string instrument players. The authors mention that 54.5% (string instrument players) reported TMJ noise. Although the present study did not find an association for this variable, TMJ noise when chewing had the highest mean intensity among symptoms, in the EGS. At rest, the symptom with the highest mean intensity was neck pain, also in the EGS, which may be related to their positioning during musical activity. In a previous study, 35.3% of the group with violists and violinists had neck and shoulder pain[23]. Violists and violinists tend to experience more neck, shoulder, elbow, and forearm pain than pianists[23].

Wind and string instrumentalists had a higher incidence of harmful oral habits than the CG. A study demonstrated a positive association between harmful oral habits and TMD signs and symptoms[24]. Musicians are exposed to situations of emotional stress and anxiety, generated by self-discipline and competitiveness in the workplace, which are risk factors for bruxism and TMD[25]. These factors make musicians susceptible to developing TMJ and orofacial muscle disorders. A study[26] found a significant association between TMD symptoms and the following habits: chewing gum, clenching teeth, placing the hand on the chin, biting the tongue, biting the lips, unilateral chewing, sleeping on one side, and chewing ice and/or lollipops. In the present study sample, however, no association was found between the different groups and types of habits.

Moreover, 91.67% of this sample reported having no prior knowledge about TMD. This data may be due to the level of knowledge about the disorder and its diagnosis and treatment. Since this is a susceptible group, it is important to disseminate knowledge about the subject to this population. Therefore, it is important to train the musicians of Brumadinho, regarding the possible impacts of musical practice on the TMJ and associated structures. There is an evident need to pay more attention to TMD, due to its high prevalence in the study population[6]. Professionals who work with these disorders must know this condition and develop a multidisciplinary approach to the management of these patients[27].

A recent study found that musicians who use their instruments daily and for a long time may have a greater chance of developing TMD[28]. Another study observed an asymmetrical pattern between the temperature of the temporal muscle and the TMJ region during the thermographic evaluation of wind and string instrument musicians[29].

The study's limitations include its small sample size, justified by the serious accident that occurred in the town, making it necessary to interrupt data collection. Another limitation was the lack of sample standardization regarding the individual and group study time, which may have confused the study results.

Researches with larger and uniform samples are suggested, especially addressing the years of musical activity practice, including clinical and instrumental TMJ assessment in musicians and TMD analysis involving different wind instruments.

CONCLUSION

Wind and string musicians from Brumadinho, MG, Brazil, had TMD complaints and reported harmful oral habits – 56.7% of wind and string instrumentalists had spontaneous complaints. Women had a higher incidence of complaints than men. Unilateral masticatory pattern and ear fullness, at rest, were the most observed signs among wind instrumentalists. The sample reported no knowledge of TMD.

REFERENCES

1. De Leeuw R. Dor orofacial: guia de avaliação, diagnóstico e tratamento. 4ª ed. São Paulo: Quintessence; 2010.
2. Henrique VL, Pacheco KCM, Aguiar IHA e, Brito WC de O, Silva PLP da, Batista AUD et al. Prevalência de sintomas de disfunção temporomandibular, fatores associados e impacto sobre a qualidade de vida em usuários da rede de atenção primária à saúde. Res Soc Dev. 2023;11(1):e13911124560. https://doi.org/10.33448/rsd-v11i1.24560
3. Ohrbach R, editor. Diagnostic criteria for temporomandibular disorders: Assessment instruments. Version 15 May 2016. [Critérios de Diagnóstico para Desordens Temporomandibulares: Protocolo Clínico e Instrumentos de Avaliação: Brazilian Portuguese Version 25 May 2016] Pereira Jr. FJ, Gonçalves DAG, Trans. http://www.rdc-tmdinternational.org Accessed on may 03 2024
4. Leonardi GM, Kieling BL, Reis GES, Leonardi BB, Sydney PBH, Bonotto D. Prevalência de dor orofacial em músicos de instrumento de sopro. BrJP. 2020;3(1):48-52. https://doi.org/10.5935/2595-0118.20200011
5. Rodríguez ET, Espinosa IA, Fernández JN, Morales JDT, Ramis CL. Instrumentos de viento y su relación con el sistema estomatognático. Odontol Sanmarquina. 2018;21(4):308-11. http://dx.doi.org/10.15381/os.v21i4.15559
6. Neto JM, Almeida C, Bradasch ER, Corteletti LCB, SIlvério KL, Pontes MMA et al. Ocorrência de sinais e sintomas de disfunção temporomandibular em músicos. Rev Soc Bras Fonoaudiol. 2009;14(3):362-6. http://dx.doi.org/10.1590/s1516-80342009000300012
7. Farias AL, Ferreira VA. Temáticas de prevenção de lesões musculoesqueléticas em estudantes de música. Orfeu. 2023;8(2):1-31. https://doi.org/10.5965/2525530408022023e0206
8. Bulhosa JF. Impactos oro-faciais associados à utilização de instrumentos musicais. Rev Port Estomatol Med Dent Cir Maxilofac. 2012;53(2):108-16. http://dx.doi.org/10.1016/j.rpemd.2011.11.001
9. Jang JY, Kwon JS, Lee DH, Kim ST. Clinical signs and subjective symptoms of temporomandibular disorders in instrumentalists. Yonsei Med J. 2016;57(6):1500-7. https://doi.org/10.3349/ymj.2016.57.6.1500 PMID: 27593881.
10. Baadjou VA, Roussel NA, Verbunt JA, Smeets RJ, de Bie RA. Systematic review: Risk factors for musculoskeletal disorders in musicians. Occup Med. 2016;66(8):614-22. http://dx.doi.org/10.21091/mppa.2007.2011 PMID: 27138935.
11. Felício CM, Mazzetto MO, Silva MA, Bataglion C, Hotta TH. A preliminary protocol for multi-professional centers for the determination of signs and symptoms of temporomandibular disorders. Cranio. 2006;24(4):258-64. http://dx.doi.org/10.1179/crn.2006.041 PMID: 17086855.
12. Felício CM, Melchior MO, Silva MA. Clinical validity of the protocol for multi-professional centers for the determination of signs and symptoms of temporomandibular disorders. Part II. Cranio. 2009;27(1):62-7. http://dx.doi.org/10.1179/crn.2009.010 PMID: 19241801.
13. Okeson JP. Etiologia e identificação dos distúrbios funcionais no sistema mastigatório. In: Tratamento das desordens temporomandibulares e oclusão. 4ª ed. São Paulo: Artes Médicas; 2000. p. 117-272.
14. Marques SRL, Lemos SMA. Letramento em Saúde e fatores associados em adultos usuários da atenção primária. Trab Educ Saúde. 2018;16(2):535-9. http://dx.doi.org/10.1590/1981-7746-sol00109
15. Nair R, Tanikawa C, Ferreira JN. Orofacial pain, musical performance and associated coping behaviors, psychological distress and disability among Asian young adults. J. Clin. Med. 2023;12(4):1271-82. http://dx.doi.org/10.3390/jcm12041271 PMID: 36835807.
16. Głowacka A, Matthews-Kozanecka M, Kawala M, Kawala B. The impact of the long-term playing of musical instruments on the stomatognathic system: Review. Adv Clin Exp Med. 2014;23(1):143-6. http://dx.doi.org/10.17219/acem/37038 PMID: 24596017.
17. Amorim MI, Jorge AI. Association between temporomandibular disorders and music performance anxiety in violinists. Occup Med (Lond). 2016;66(7):558-63. http://dx.doi.org/10.1093/occmed/kqw080 PMID: 27405486.
18. Steinmetz A, Ridder PH, Reichelt A. Cranio mandibular dysfunction and violin playing: Prevalence and the influence of oral splints on head and neck muscles in violinists. Med Probl Perform Art. 2006;21(4):183-9. http://doi.org/10.21091/mppa.2006.4038
19. Donnarumma MDC, Muzilli CA, Ferreira C, Nemr K. Disfunções temporomandibulares: sinais, sintomas e abordagem multidisciplinar. Rev. CEFAC. 2010;12(5):788-94. http://dx.doi.org/10.1590/s1516-18462010005000085
20. Zocoli R, Mota EM, Sommavilla A, Perin RL. Manifestações otológicas nos distúrbios da articulação temporomandibular. ACM Arq Catarin Med. 2007;6(1):90-5. LILACS | ID: lil-463490.
21. Faria RF, Volkweis MR, Wagner JCB, Galeazzi S. Prevalência de patologias intracapsulares da ATM diagnosticadas por ressonância magnética. Rev Cir Traumatol Buco-maxilo-fac. 2010;10(1):103-08. LILACS | ID: lil-550986.

22. Stegenga B, Schouten H. Mandibular pain and movement disorders, focusing on the temporomandibular joint. Ned Tijdschr Tandheelkd. 2007;114(1):41-6. PMID: 17274243.

23. Hagberg M, Thiringer G, Brandström L. Incidence of tinnitus, impaired hearing and musculoskeletal disorders among students enrolled in academic music education: A retrospective cohort study. Int Arch Occup Environ Health. 2005;78:575-83. http://dx.doi.org/10.1007/s00420-005-0621-y PMID: 16028091.

24. Barreto BR, Drumond CL, Carolino R de A, Oliveira Júnior JK de. Prevalência de disfunção temporomandibular e ansiedade em estudantes universitários. Arch Health Invest. 2021;10(9):1386-91. https://doi.org/10.21270/archi.v10i9.5401

25. Nedelcut S, Leucuta DC, Dumitrascu DL. Lifestyle and psychosocial factors in musicians. Clujul Med. 2018;91(3):312-6. http://dx.doi.org/10.15386/cjmed-959 PMID: 30093810; PMCID: PMC6082614.

26. Paulino MR, Moreira VG, Lemos GA, Silva PLP, Bonan PRF, Batista AUD. Prevalência de sinais e sintomas de disfunção temporomandibular em estudantes pré-vestibulandos: associação de fatores emocionais, hábitos parafuncionais e impacto na qualidade de vida. Ciênc saúde coletiva. 2018;23(1):173-86. http://dx.doi.org/10.1590/1413-81232018231.18952015 PMID: 29267822.

27. Costa Guimarães RC, Carvalho MBC de, Silva RCD da, Arantes APF, Silva FL da, Giovani AR. Prevalência e características da disfunção temporomandibular de pacientes de uma clínica escola de Odontologia. Rev da Fac de Odontologia. 2023;26(2):191-7. https://doi.org/10.5335/rfo.v26i2.13466

28. Campos LGN, Pedrosa BH, Cavalcanti RVA, Stechman-Neto J, Gadotti IC, de Araujo CM et al. Prevalence of temporomandibular disorders in musicians: A systematic review and meta-analysis. J Oral Rehabil. 2021;48(5):632-42. https://doi.org/10.1111/joor.13150 PMID: 33474771.

29. Clemente MP, Mendes J, Vardasca R, Moreira A, Branco CA, Ferreira AP et al. Infrared thermography of the crânio-cervico-mandibular complex in wind and string instrumentalists. Int Arch Occup Environ Health. 2020;93(5):645-58. https://doi.org/10.1007/s00420-020-01517-6 PMID: 32020282.

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AFV; YCT: Data analysis; Supervision; Writing - Review & editing.

RET: Supervision; Writing - Review & editing.

ARM: Conceptualization; Formal analysis; Methodology; Supervision; Writing - Review & editing.

Data sharing statement:

Deidentified participant data can be shared upon request via e-mail to the corresponding author, for up to 5 years after publication of this article.