

Degree of chronic orofacial pain associated to the practice of musical instruments in orchestra's participants

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ABSTRACT

Objective: The practice of playing musical instruments can affect structures of the head, neck, mouth, and the masticatory system. The aim of this study was to obtain information regarding the prevalence of orofacial pain in musicians according to the type of instrument they play, by applying a specific questionnaire.

Materials and Methods: One hundred and seventeen musicians of Sao Paulo state's orchestras participated in this study. They answered an anamnesis questionnaire with 20 questions regarding their personal data, type of instrument played, hours of daily practice, and presence or absence of orofacial pain according to the Chronic Pain Grade Classification (CPGC). Musicians were divided into two groups in accordance with the risk of affecting TMJ: RG (risk group, including violin, viola, vocalist, trombone, tuba, clarinet and saxophone); CG (control group, other instruments). They received an informative brochure about the subject. Data obtained from the questionnaire were submitted to descriptive statistics, Pearson's correlation analysis and Z-test for difference between two proportions.

Results: The participants were from 15 to 62 years old. Pain degree showed positive correlation for reported symptoms ($P = 0.002$) and hour/day practice ($P = 0.030$). Regarding the prevalence of pain degree, data were, for RG: Grade 0 (54.5%), Grade 1 (30.3%), and Grade ≥ 2 (15.1%). For CG, Grade 0 (84.4%), Grade 1 (8.9%), and Grade ≥ 2 (6.6%). Z-test showed positive difference between groups ($P = 0.0001$).

Conclusion: It was concluded that the musicians of risk group presented higher prevalence of orofacial pain than control (non-risk) group.

Key words: Dysfunction, musicians, orofacial pain, TMJ

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Temporomandibular disorders (TMD) comprises both muscular and temporomandibular joint (TMJ) problems and present multifactorial causes, which could be related to postural alterations and orofacial musculature dysfunction, which are considered as initiator factors for TMD.^[1,2]

The stress related to the high performance of musicians' professional activities, such as musicians of symphonic

orchestra, is frequently reported as a perpetuating factor for TMD.^[3] In addition to this, the practice of playing some musical instruments could affect structures of head, neck, and mouth area, besides the masticatory system due to both the musicians' permanence in harmful postures for long time-periods and to the excessive inter-occlusal pressures during the activity.^[4,5] Alterations in the positions of anterior teeth and the development of either overbite or posterior crossbite could also occur after constant and prolonged practice of some musical instruments, especially the wind instruments.^[4] The frequent practice of musical instruments could trigger the development of orofacial pain or be a predisposition factor for musicians to develop TMD.^[6]

It is important to emphasize that each musical instrument is played in a different way; consequently, they have specific influences on the orofacial structures. Therefore, temporomandibular disorders have seemed to be more prevalent in musicians who play trumpet, trombone, tube, viola, violin, and vocalist.^[6]

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The majority of the scientific researches available observed the orofacial physical alterations suffered by musicians, but had not emphasized information regarding orofacial pain. Thus, the aim of this study was to verify the prevalence of orofacial pain in musicians by means of a questionnaire, elaborated in accordance to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD).

The null hypothesis is that the orofacial pain prevalence and the degree of chronic pain in musicians of orchestras would not depend on the professional daily practice or the type of musical instrument played.

MATERIALS AND METHODS

The project received previous consent from the Research Ethics Committee 073/2008, São Jose dos Campos Faculty of Dentistry, Paulista State University. The musicians who participated in the research signed the Consent Term according to the Guidelines and Regulatory Norms of Research Involving Human Beings of the Brazilian Health Council (Resolution 196/96).

A brochure was given to the participants to clarify some doubts about TMD. The brochure had the following information: definition of TMD, symptoms related to it and factors that could cause orofacial pain (such as repetitive efforts and inappropriate postural positions, as those, which occur during the musician professional activity). In addition, the University health care service was available for clinical evaluation and treatment of musicians' orofacial pain. This could include the confection of myorelaxing splints, physiotherapy and professional orientation.

Anamnesis questionnaires were applied to 117 participants of orchestras of São Paulo state to verify the presence of orofacial pain, besides the possibility of studying its potential trigger factors. The questionnaire comprised 20 objective questions divided into two parts. The first part was composed of questions regarding the participants profile (gender, age, race, and civil status) and the anamnesis for obtaining the following information: Type of instrument played, since when the instrument practice had been started (in years), what the amount of time of daily practice was (in hours), presence or absence of symptoms which denoted stress (anxiety, insomnia, irritability, sadness, and difficulty on concentrating), TMD treatment – if the musician had sought any professional for performing TMD treatment, and if had carried out activities for either avoiding or treating orofacial pain (moist heat, acupuncture, and muscular stretching). These questions aimed to provide additional information, which could show the relationship between the presence and absence of orofacial pain.

The second part of the questionnaire was elaborated to obtain the Chronic Pain Grade Classification (CPGC) of the

subject, based on the version of Pereira *et al.*, (2004)^[7] of the RDC/TMD. The presence or absence of facial pain, maxillary bones, cheeks, temples, and pain around the ear or in the ear in the previous months was questioned. In addition, it was asked to the participants to classify the intensity of both their previous pain and their pain at the moment of the interview, in a scale from zero (without pain) to 10 (worst imaginable pain). In this part of the questionnaire, it was also aimed to investigate the interference of orofacial pain on both the work and leisure daily activities.

Musicians were divided into two groups in accordance to the risk of affecting TMJ: RG (violin, viola, vocalist, trombone, tuba, clarinet, and saxophone); CG (other instruments).

Statistical analysis

The data were then evaluated to obtain their percentages and distribution for descriptive analysis of the factors. It was also performed the calculation for obtaining the Chronic Pain Grade Classification, based on Pereira *et al.*, (2004)^[7] Pearson's correlation analysis and Z-test for difference between two proportions ($\alpha = 5\%$) to evaluate the relationship between some predisposing factors and orofacial pain.

RESULTS

One hundred and seventeen professional musicians of three orchestras of Sao Paulo state participated in this study by answering the anamnesis questionnaire, which had been given to the participants previously to the orchestra's rehearsal.

Participants' profile

The participants, aging from 15 to 62 years, played different types of instruments divided in RG (72 musicians) and CG (45 musicians). From the descriptive data analysis, it was possible to observe that the majority of the participants of this research were caucasian (68%), single (63%), and male (72%). The mean time of daily practice of the studied population was 4 hours, and the participants had, in average, 11 years of instrument practice. A great number of the musicians (46%) showed at least one of the following stress symptoms: Anxiety, insomnia, excessive tiredness during the day, irritability, sadness periods or concentration difficulty.

Prevalence of Chronic Pain (CP)

The prevalence of Chronic Pain (CP) was 45.4% to RG and 15.6% to CG and the frequency of CP grade can be seen in Table 1.

In Table 2, it is evidenced the meantime of daily practice and the time, in years, of instrument practice according to the CP grade.

Pearson's correlation analysis performed at MINITAB Release Program, version 15.1.1.0. (Minitab Inc), showed

moderate positive correlation for CP grade and the time of daily practice (0.20; $P = 0.03$) and for the relationship between number of stress-symptoms and orofacial pain (0.28; $P = 0.002$) [Table 3].

Z-test for difference between two proportions showed positive difference between groups ($P = 0.0001$) when grade 0 was analyzed [Table 4].

All the participants who had presented orofacial pain stated that they had sought for specialist care, mostly dentists, followed by other health professionals, such as doctors and physiotherapists.

DISCUSSION

RDC/TMD was developed for studying the conditions related to Temporomandibular Dysfunction (TMD) and has been largely accepted as a research instrument.^[8] The RDC/TMD is divided into two parts: (1) Findings that correspond to physical conditions and (2) research about the

psychosocial profile of people suspect of presenting TMD, both analyses were subject of the present study.^[9]

The main classes of musical instruments are wind (tube, trumpet, clarinet, and saxophone), percussion (timpani, cymbals, and tambour), and chord (viola, violin, guitar, and electric guitar),^[5] and each one has its particularities and needs specific postures for practicing. Playing wind instruments is a complex neuromuscular task, because several groups of facial muscles should execute an activity at the same time for producing an appropriate air vibration. This activity, thus, demands an abnormal mouth effort that could possibly initiate TMD.^[5,10]

Temporomandibular Dysfunctions (TMDs) are functional alterations that damage the normal functions as mastication, deglutition, and speech and can be followed by pain in the mouth and face (Orofacial Pain). Pain during mastication has been a classic sign of TMD, as well as limitation in mouth opening. Besides affecting the face and head area, the disease can cause pain in the neck and shoulders, tiredness, irritability, and concentration difficulty. Among the factors related to TMD appearance, it could be cited the bruxism, teeth clenching, face's traumas, postural abnormalities, sleep disorders, stress, anxiety, depression, and some general health disorders. Therefore, repetitive efforts with the mouth or inappropriate postural positions, such as those that would occur during musicians' professional activity, could initiate or maintain TMD.

The greatest part of the musicians that presented orofacial pain was in RG which is in agreement with other studies.^[9,11-13] This high prevalence of orofacial pain in these musicians can be related to the posture needed to play chord instruments, which greatly need to be handled between the shoulder and the inferior border of the mandible.^[6,14] The mandibular posture required for classical singing or practicing blowing instruments, such as trombone and trumpet, could also contribute to the presence of orofacial pain.

Rieder (1976) observed degenerative alterations on TMJ by the practice of chord instruments (violin and viola).^[12] The authors suggested that inappropriate posture maintained for a long time could lead to microtraumas on musicians' TMJ, causing the remodeling of the joint in some cases.

Some wind instruments have still been the most probable initiating factor of TMD due to the protrusion of the mandible and the execution of compensatory movements by the muscles because of anatomic limitations of the orofacial structures.^[4] Gualtier (1979) observed a higher prevalence of crackle and click sounds in trombone and tube players when compared to a population of non-musicians.^[15]

Orchestras' vocalists were also included on this study, since the effort for producing a pleasant sound with voice is

Table 1: Profile of the musicians interviewed according to the Chronic Pain Grade Classification (CPGC)

Variable	Group	Grade 0		Grade 1		Grade > 2		Total	
		n	%	n	%	n	%	n	%
n of subjects		78	66	24	20	15	14	117	100
Gender	M	60	71.4	14	16.7	10	11.9	84	100
	F	18	54.5	10	30.3	5	15.2	33	100
Groups	Risk	44	55.5	20	27.8	12	16.7	72	100
	Control	38	84.4	4	8.9	3	6.7	45	100

Table 2: Mean and standard deviation of the daily-time and life-time practice of the instrument

	Mean ± Standard Deviation			
	Degree 0	Degree 1	Degree 2	Degree 3
Daily-time practice (hours)	4.0 ± 2.0	4.3 ± 1.8	5.4 ± 2.9	6.0 ± 0.0
Life-time practice (years)	12 ± 7.0	10.5 ± 16.1	11.3 ± 7.2	15.0 ± 0.0

Table 3: Pearson correlation (P value) of a) Gender, b) Age, c) Study in years, d) Hour per day, and e) Symptom frequency with Pain Degree

	Gender	Age	Study (years)	Hours day	Symptom frequency
Pain degree	$P = 0.213$	$P = 0.606$	$P = 0.030^*$	$P = 0.635$	$P = 0.002^*$

*Show positive correlation.

Table 4: Test for two proportions RG × CG (Grade 0)

	Partial n (Total n)%	
RG	40 (72)	55.5
CG	38 (45)	84.4

Fisher's exact test: P value = 0.001

similar to the effort done for playing musical instruments. Based on this thought, the vocalists submit their TMJs to several unnatural positions, aiming to achieve the desirable result during singing, which could lead to TMD development.^[10]

In this study, the CP grade showed a tendency to increase according to the hours spent on daily practice. Winocur *et al.*, (2009) observed that for amateur musicians, a rehearsal time lower than 90 minutes per day was not significant to change dental and skeletal structures.^[9] However, professional musicians generally play for long periods of time, more than 3 hours per day, which could be harmful to the orofacial system, therefore, demanding supervision by the dentist or other health professionals.

In this study, musicians who played percussion instruments, violoncello, double bass, flute, clarinet, saxophone, oboe and bassoon showed low prevalence of orofacial pain. Such outcome was already expected since these instruments have been related to the presence of other illnesses, regardless TMD.^[4,6]

The present research showed the relationship between the practice of musical instruments and the possibility of developing chronic orofacial pain, in disagreement with previous studies.^[6] With the information of this study, dentists should attempt to the orofacial problems that can be presented by musicians, therefore they would be able to improve the quality of their diagnoses and to adequate the treatment to an individualized form, based on each musicians' individual conditions.

Therefore, a mutual comprehension between the dentist and the musician would be necessary for suitable and appropriate treatment. In addition, it could be important for dentists to know which the musician position is during the practice of the instrument for observing the influence of the posture on the presence of orofacial problems.

Besides that, it is worth noting the role that dentist would play in the elaboration of strategies that would allow the musicians access to information on orofacial problems, which could be fundamental in the prevention of the disease establishment. With this objective, orientation booklets on orofacial pain and TMD were distributed to all this study's participants.

Some of the unanswered questions related to demand for treatment of TMD in musicians might be answered by means of a randomized clinical trial approach.

It was concluded that the musicians who were considered part of risk group (violin, viola, vocalist, trombone, tuba, clarinet and saxophone practitioners) had higher prevalence of orofacial pain and higher degree of pain than non-risk group (other instruments), what suggest more demand for treatment of TMD.

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