Signs and Symptoms Associated to Otalgia in Temporomandibular Joint Dysfunction

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SUMMARY

Introduction: Otalgia is a symptom that can be caused by otological diseases, such as external otitis, otitis media, mastoiditis, as well as by nonotological factors. It is speculated that the temporomandibular disorder (TMD) is one of the most common causes of nonotological otalgia.

Objective: To evaluate the frequencie of signs and symptoms associated with otalgia and TMD.

Study design: Descriptive and transversal.

Method: This is a study involving a group of 21 patients all volunteers who accept participate, with complains of otalgia that were attended to at the otorhinolaryngology ambulatory of a public hospital. The volunteers were submitted to anamneses, otorhinolaryngologic examination, temporomandibular joint (TMJ) examination, tone audiometry, immittance audiometry, odontologic examination to confirm the diagnosis of TMD and answered to a questionnaire about signs and symptoms of TMD.

Results: Among the 21 volunteers with otalgia and TMD, we found a predominance of female gender. The most frequently associated symptoms were: articulation sound perception (95,2%), tinnitus (81%), hearing plenitude (independing on rest state or TMJ movimentation) (81%), sensation of snapping or locking of the jaw (52,4%), pain or difficulty to open the mouth (33,3%), dizziness (26,8%), difficulty to hear other people's voice (14,3%) and balance loss (9,5%). The number of normal exams in audiometric evaluation was larger in comparison to those with abnormalities.

Conclusion: The symptoms most frequently associated with otalgia and TMD were articulation sound perception, tinnitus and hearing plenitude.

Key words: otalgia, disorder, temporomandibular joint.

Introduction

Otalgia (ear pain) can arisen from otological causes such as middle or external ear otitis, mastoiditis as well as from non-otological causes such as dental conditions, tonsillitis, neoplasms, neuralgia (pain in a nerve) and temporomandibular articulation disorders (TMD) (1). It is thought that TMD is one of the most common causes of ear pain by a non-otological reason (2,3).

TMD is also named as craniomandibular disorder. It is a set of diseases which affect temporomandibular articulation (TMA) as well as external areas to articulations (1,4,5).

TMD symptoms can start with cracks or crackles, difficult when opening and closing mouth and pain, which can spread into different parts of head and neck, such as temporal, occipital, frontal, cervical, pre-auricular and auricular areas. Many patients complain of hearing symptoms associated to TMA dysfunction, and the most common are: ear pain, tinnitus, ear fullness, dizziness or vertigo and subjective hearing loss (6,7,8,9).

Different hypotheses have been arising in order to explain the correlation between hearing symptoms and temporomandibular alterations (1,5).

Embryological studies imply the existence of aspects that can grant the relation between hearing symptoms and TMD. Mandible and middle ear ossicules are both from the same embryological origin, in Meckel's cartilage. This can justify the several middle ear malformation associated to mandibular alterations as well as TMA anatomy and biomechanics, which are closely related with aural functions and structures (1).

The pressure which is produced by distal and posterior displacement of the mandible condylar over auriculotemporal nerve and ear structures, mainly over the ear tube, might be responsible for some signs and symptoms that characterize TMD. The most common of these signs and symptoms are ear fullness sensation, tinnitus, ear pain and vertigo with nystagmus. The group of all these muscle, articular and ear alterations was called Costen's Syndrome (10).

In 1962, in order to clear the causes or ear alterations, it was described a fine connection among neck, anterior process of malleus, capsule and meniscus of the TMA and sphenomandibular ligament, which was called cranial connection of tympanomandibular ligament. This one would be able to move the malleus during articular cartilage traction of the TMA (11). Another ligament described was the one that provides communication of the condyle and the disc of TMA articulation with the middle ear in the malleus, lateralwards to the cord nerve of the eardrum (9).

On the other hand, in 1992, it was assumed that ear pain can be pain from TMA itself in posterior position. The close position among articular and ear structures, phylogenetic inheritance and the course of innervation can puzzle patient when identifying the site of pain (4).

Other authors believe that pain be caused by hyperextension and hypercontraction by the lateral pterygoideus muscle, which lead to an increase in the tightness of the tensor muscle (hypertonia) of the eardrum. Such pain is almost reported in different areas and also far from the origin one (9).

The target of this study is to verify the frequency of possible signs and symptoms associated to otalgia from TMD, by having in mind the aspects towards TMD.

Method

18 (81%) volunteer women and 3 (19%) men aging from 18 to 65 years with otalgia and clinical diagnosis of TMD took part in the study. They were selected as assisted at an ENT service in a public hospital (Recife – PE – Brazil). They signed the Free and Clear Consent Term (Annex 1), approved by the Research Ethics Committee – Oswaldo Cruz Hospital (# 28058).

The criteria used to chose such volunteers were: ear pain complaint and signs and symptoms (in the clinical exam by an ENT professional) which would diagnose them as TMD dysfunction patients.

Patients with external and/or middle otitis or infection on superior air paths, even with TMD were not selected and the ones with TMD without otalgia.

Patients were submitted to anamnesis and ENT exam, TMA exam, preliminary tone audiometry and immitanciometry testing, besides answering a questionnaire on TMD signs and symptoms (Annex 2).

Anamneses and ENT exams were performed to confirm TMD diagnosis. Functional diagnosis was done in three stages: anamnesis, physical exam through manipulation and auscultation and complemental exams to occlusion analysis and imaging (12). As the current study is from a ENT viewpoint, the method applied for TMD diagnosis was not included.

Annex 1. Free and Clear Consent Term.

We require your permission to make use of the obtained data from the ENT evaluation in the scientific study of SIGNS AND SYMPTOMS ASSOCIATED TO OTALGIA IN TEMPOROMANDIBULAR JOINT DYSFUNCTION, and in other studies from this. It is believed that this study will help volunteers, who were assisted and diagnosed, by prescribing the most suitable therapy when needed.

You will be able to ask questions in any moment during the process, besides canceling your permission with no damages. You will not be charged and no names will be revealed.

If you have any further questions, you can contact Luiz Alberto Alves Mota, phone: (+55 81) 3222.7060.

We will be at your disposal regarding the topic.

I, ..., holder of the

ID number, agree on the terms of this research and authorize the usage of data from my ENT evaluation to the accomplishment of this study.

Recife (date).....

.....
Volunteer signature

.....
Witness

.....
Witness

.....
Researcher

Annex 2. Questionnaire.

Name: .....
Age: .....years Gender ( ) M ( ) F
Birth date: .....
1 – How long have you been through ear pain?
2 – Do you have difficulty, pain or both when opening your mouth?
( ) Yes ( ) No
3 – Have you ever experience sensation of jaw stiffness?
( ) Yes ( ) No
4 – Do you notice any noise on your jaw articulations?
( ) Yes ( ) No
5 – Have you ever had otitis?
( ) Yes ( ) No
6 - Have you ever had infections on superior air paths?
( ) Yes ( ) No
7 – Do you experience any of the following symptoms?
( ) Sensation of blocked ear
( ) Imbalance
( ) Tinnitus
( ) Difficulty in walking
( ) Difficulty in hearing people
( ) Dizziness

Tone audiometry aimed to achieve auditory thresholds through air and bone paths, and for this evaluation, an Interacoustics AC40 was used. Airpath-through audiometry was performed in the frequencies of 250, 500, 1K, 2K, 3K, 4K, 6K and 8K Hz in one of the ears. In the other ear if results were higher than 25 dBNA, then a bone-path-through audiometry would occur. In this type of evaluation, it was valid the auditory threshold in frequencies from 500 to 4K Hz.

According to *Conselho Federal de Fonoaudiologia* (13) (Federal Phonoaudiology Committee) 25 dBNA is the normal considered classification in minimum hearing capacity in all tested frequencies. The activity and integrity of the middle ear and the path of the stapedial reflex were analysed through immitanciometry testing. *Interacoustics* AZ7 gadget was used in order to perform tympanometric measures and also stapedial reflex researches. In case alterations showed any disorder in the middle ear, patient would not be part of the study.

According to Jerger, individuals would be considered in normal condition if presented with tympanometric curve 'A', characterized by a maximum peak of O (zero) daPa of pressure. The presence of stapedial reflex was essential to consider a middle ear normal (14).

All volunteers were sent to dental treatment after evaluating results of the audiological exam and TMD diagnosis.

RESULTS

All volunteers presented TMD dental diagnosis, and female:male gender ratio was 6:1.

Otalgia sings and symptoms reported by patients in decreasing order, displayed in table 1, were: perception of articulated sound, tinnitus, ear fullness sensation (regardless rest state or motion of TMA), sensation of jaw stiffness (noticed of not by the observer), pain or difficulty to open the mouth, dizziness, difficulty in hearing and imbalance (reported by the patients or noticed by the observer).

In the audiological evaluation, 18 (85.7%) cases were in normal condition. They presented the following signs and symptoms: perception of articulated sound,

tinnitus and ear fullness, pain or difficulty to open the mouth, sensation of jaw stiffness, difficulty in hearing and imbalance (Table 2) and 3 (14.3%) cases presented sensorin

Discussion

Although gender and age were not compared, predominance of otalgia in TMD female patients prevailed. This might be due to a higher degree of emotional stress by women, what reduces the level of physiological intolerance and increases muscle hyperactivity, by causing functional discomfort (7,15,16,17).

Articulated noise (95.2%) is not necessarily associated to TMD, as such noise can occur in non-symptom articular disease so-called adapted TMD.

In this study tinnitus predominance (81%) is important and agrees with others (18), however it is necessary special care when studying such data as subjective tinnitus is not only caused by TMD, but also from inner ear diseases or central nervous system with or without hearing loss (11).

Ear fullness and dizziness can be explained by distal and posteriorward condylar displacement, what directly pressures the auriculotemporal nerve over ear structures and mainly ear tube (10).

Regarding audiological evaluation, most results within normal standards propose that otological symptoms do necessarily not expose outer, middle and inner ear conditions evaluated in the clinical and audiological exam (16). Sensorineural hearing loss, which can assigned to presbyacusis (17), was evident in the three evaluations.

At last, TMD is often associated to ENT symptoms, requiring interdisciplinary follow-up in order to soothe them (6,11,18-22).

Conclusion

The most common otological symptoms related to TMD were: articulated sound perception, tinnitus and ear fullness.

Table 1. Frequencies of otalgia signs and symptoms in TMD patients

Signs and Symptoms	f	f%
Crackels in TMA	20	95,2
Tinnitus	17	81.0
Ear fullness	17	81.0
Stiff jaw	11	52.4
Pain or difficulty to open the mouth	07	33.3
Dizziness	05	26.8
Difficulty in hearing	03	14.3
Imbalance	02	9.5

Table 2. Frequencies of otalgia signs and symptoms in TMD patients with audiological exam in normal condition

Signs and Symptoms	f	f%
Crackels in TMA	17	94.4
Tinnitus	15	83.3
Ear fullness	15	83.3
Stiff jaw	13	72.2
Pain or difficulty to open the mouth	09	50.0
Dizziness	03	16.6
Difficulty in hearing	02	11.1
Imbalance	02	11.1

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