European Journal of Therapeutics
pISSN: 2564-7784
eISSN: 2564-7040

Eur J Ther. 2025;31(2):128-131.
https://doi.org/10.58600/eurjther2662

Letter to Editor

Novel Tool For Assessing Tinnitus in Association with Temporomandibular Disorders

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Received: 2025-03-18 **Accepted:** 2025-04-07 **Published Online:** 2025-04-30

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ABSTRACT

Temporomandibular Disorder (TMD) encompasses a range of conditions affecting the temporomandibular joint and associated structures, often leading to orofacial pain and functional limitations. Concurrently, tinnitus, characterized by auditory perceptions without external stimuli, exhibits subjective manifestations primarily linked to neuroplastic changes in the central auditory system, termed somatosensory tinnitus. The prevalence of tinnitus increases with age and exhibits a bidirectional relationship with TMD, with females showing a higher prevalence. Recent studies have emphasized the need for integrated approaches in evaluating and managing these comorbid conditions. This study proposes a questionnaire as a tool aiming at assessing tinnitus associated with TMD and orofacial pain, addressing tinnitus characteristics, impact on daily activities, medical history, and psychological factors. It aligns with multidisciplinary guidelines emphasizing comprehensive evaluation and treatment strategies for tinnitus related with TMD.

Keywords: tinnitus, temporomandibular disorders, questionary, diagnostic criteria, otologic symptoms.

Dear Editor,

Temporomandibular Disorder (TMD) is a group of conditions that affects the temporomandibular joint, masticatory muscles, and associated structures, resulting in orofacial pain, mandibular dysfunction, and other associated symptoms. Tinnitus, an auditory phenomenon perceived in the absence of external stimuli, manifests in various forms, ranging from sounds like crickets and wind to more complex combinations [1]. Although objective in some cases, audible to external observers, it is primarily subjective in most patients, perceived only by the individual. Studies indicate that subjective tinnitus arises from neuroplastic changes in the central auditory system, aiming to compensate for reduced sensory input by increasing the excitability of central auditory neurons, termed somatosensory tinnitus [2].

Approximately two-thirds of patients can modulate tinnitus intensity and pitch through the somatosensory system, involving muscle contractions in the neck, head, or jaw. Additionally, spinal disorders and TMD are often associated with tinnitus [3]. The annual incidence of tinnitus is approximately 1%, with 14% of adults experiencing some form of tinnitus, and 2% having a severe form. While tinnitus prevalence does not differ by gender, it is associated with increasing age, with any form of tinnitus present in 10% of young adults, 14% of middle-aged adults, and 24% of older adults [4].

When associating otologic symptoms, orofacial pain, and TMD using RDC/TMD as a diagnostic tool, females exhibit a higher prevalence than males, with a proportion of 78.54% to 21.45%, respectively. Regarding age groups, the highest prevalence of otologic symptoms occurs in the 41 to 50 age group (37%), followed by the 51 to 60 age group (32%). Findings indicate that the prevalence of otologic symptoms (tinnitus, hearing loss, dizziness, ear fullness, and imbalance) is 87%, regardless of gender and age [5].

Considering the interrelationship between tinnitus, TMD, and orofacial pain, this study proposes a concise questionnaire on tinnitus associated with TMD and orofacial pain. The questionnaire is presented with a pertinent literature to justify each assessment and correlation with clinical guidelines for TMD diagnosis (Table1).

Table 1. Questionary of Correlation Between Tinnitus and Tmd

At the beginning of the questionnaire, personal data such as full name, age, gender, profession, and appointment date are included.

1. Since when have you noticed the tinnitus?
2. Have you noticed any recent changes in intensity?
3. Tinnitus Characteristics:
- *How would you describe the sound of the tinnitus?*
- *Is the tinnitus continuous or intermittent?*
- *Any association with specific activities or past events?*

4. Intensity and Discomfort:
- *On a scale of 0 to 10, what would be the intensity of your tinnitus?*
- *How does tinnitus affect your daily activities?*

5. General Medical History:
- *What medications are you currently taking?*
- *Have there been any recent changes in your medication?*

6. Noise Exposure / Work Environment, Hobbies:
- *Do you work or engage in noisy environments regularly?*
- *Do you use ear protection in loud noise situations?*

7. Auditory History / Family History of Hearing Loss:
- *Does any family member have a history of hearing loss?*
- *Have you had previous hearing tests?*

8. Stress and Anxiety:
- *How has your stress level been recently?*
- *Do you regularly experience anxiety situations?*

9. Psychological Considerations:
- *Does tinnitus impact your quality of life?*
- *How do you emotionally cope with tinnitus?*

10. Conclusion: Summary of the main collected information

Is there any additional information you would like to share about your tinnitus or other auditory symptoms such as ear fullness, ear pain, itching, or any other symptoms you would like to report?

DISCUSSION

Tinnitus, a prevalent audiological condition, poses challenges in both diagnosis and management. Recent guidelines underscore the importance of a multidisciplinary approach involving diagnostics, assessment, and treatment for tinnitus. [6] This approach aligns with the Tinnitus Holistic Simplified Classification (THoSC) proposed by Cianfrone *et al.* [7], emphasizing the need for a comprehensive evaluation.

Described as auditory perception without external stimuli, is often subjective and linked to neuroplastic changes in the central auditory system [2]. These alterations, termed somatosensory tinnitus, underscore the complex interplay between sensory processing and perception in individuals with TMD and orofacial pain. Approximately two-thirds of patients can modulate tinnitus intensity through somatosensory mechanisms, such as muscle contractions in the neck, head, or jaw, indicating a close association between TMD and tinnitus [3].

The prevalence of tinnitus varies across age groups, with an increasing trend associated with older age [4]. Moreover, studies using the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) have shown a higher prevalence of otologic symptoms and TMD in females, emphasizing gender-related differences in symptom manifestation [5].

Recent studies have highlighted a correlation between subjective

tinnitus, cervical spine disorders, and TMD, emphasizing the need for integrated approaches in their evaluation and management [5]. This association underscores the importance of addressing both tinnitus and TMD in clinical practice to improve patient outcomes and quality of life.

Didier *et al.* [8] highlighted a common association between somatosensory tinnitus and TMD, suggesting a potential link through somatosensory mechanisms. This relationship was evaluated using the Tinnitus Handicap Inventory (THI) and Axis II of the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), indicating a significant impact of TMD on tinnitus severity [9].

Radiological imaging studies, such as computed tomography (CT), have been employed to evaluate the relationship between TMD and tinnitus [10]. CT findings may provide insights into anatomical abnormalities contributing to tinnitus, enhancing diagnostic precision and treatment planning. The possibility of evaluating any intra-articular pathology in the presence of tinnitus may provide an interesting diagnostic tool, that when aligned with clinical findings, will facilitate the patient assessment and closing of a correct diagnosis for the tinnitus.

The questionnaire's development, based on clinical guidelines for TMD diagnosis, may help the evaluation of symptoms associating tinnitus with TMD. By incorporating questions about tinnitus characteristics, onset, impact on daily activities, medical history, noise exposure, stress levels, and psychological coping, the questionnaire provides a holistic framework for patient assessment.

Yours Sincerely,

Funding: This article was not supported by any grant.

Competing Interests: There are no conflict of interest.

Authors Contribution: All authors contributed equally to this manuscript. All authors read and approved the final manuscript.

During the preparation of this work the authors used ChatGPT to translate parts of the manuscript. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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How to Cite;

Metello Neves LB, Correia Lima B, Grillo R, Melhem-Elias F (2025) Novel Tool For Assessing Tinnitus in Association with Temporomandibular Disorders. Eur J Ther. 31(2):128-131. https://doi.org/10.58600/eurjther2662