Content available at: https://www.ipinnovative.com/open-access-journals

Journal of Contemporary Orthodontics

Journal homepage: https://www.jco-ios.org/

Guest Editorial

Are we missing something in TMD???

Umarevathi Gopalakrishnan[1]*

[1]Dept. of Orthodontics and Dentofacial Orthopedics, Sri Venkateswara Dental College, Chennai, Tamil Nadu, India.

Received: 22-01-2025; **Accepted:** 14-04-2025; **Available Online**: 27-05-2025

When it comes to any biological and physical sciences, until the findings are more explored and gained deeper insights, all myths may continue to remain facts. As far as occlusion and Temporomandibular joint disorders (TMD) are considered, there have been many a lot of myths some of which continue to remain. This joint has always been considered in association with occlusion unlike many other joints adding to the ambiguity. Most of the systematic reviews[1-3] available in literature remain inconclusive regarding the role of occlusion in the etiology of TMD whereas the systematic reviews on parafunction,[4-6] especially bruxism, review that parafunction has a positive role in the etiology of TMD. With this being the evidence on occlusion, an interesting systematic review by Campos et al[7] have concluded that the overall combined prevalence of TMD in musicians was approximately 53.9%, and that musicians who practice for longer period had a greater prevalence of TMD. Any form of longer muscular activity lays an additional burden causing potential damage to the musculoskeletal system.[8-10] This thought was shared by Madeliene[11] who has shown that static low level and repetitive muscle loads are important causes for musculoskeletal disorders. The above evidence enforces the importance on the duration of muscular loading on the development of TMDs. The loading of the temporomandibular joint happens through the muscles of the orofacial system in the form of mastication, speech, swallowing, respiration and various other functions of the orofacial system like singing, playing wind instruments, etc. The teeth serve as the end platform of one aspect of this loading which is mastication. The total contact time of teeth during chewing and swallowing has been calculated to be 17.5 minutes[12] per day. This is the total duration per day which loads the joint in occlusion/malocclusion excluding the parafunctional loading. The rest of the loading happens by means other than occlusion. Yet the teeth in their occluding form have been given wider consideration in the etiology of TMD.

The Resting Tonus

If we are to consider the duration, the longest duration of loading for the temporomandibular joint (TMJ) will be happening at the rest position of mandible. The muscles in a living individual never rest! The skeletal muscles of our body, being attached to a movable bony element, remain a wonderfully coordinated system of balance and function. Complete rest of a particular muscle is not possible since the muscles must maintain balance throughout the system in the form of their agonizing and antagonizing functions. Then how do the muscles go through this fatiguing process? It's by their all or none phenomena wherein certain fibers of a muscle group will be in full contraction and certain fibers in full relaxation to maintain the partial contraction needed for the balance with the entire system. In mandible, which is suspended by only muscles and ligaments, this resting becomes a little more critical. There always must be a balance between the depressor and elevator muscles, with an additional demand being laid by the gravitational pull, respiratory requirements, head posture, etc. The development of this rest position of the mandible can be ensured by the development of freeway space. We don't have the liberty of

*Corresponding author: Umarevathi Gopalakrishnan
Email: umarevathigopalakrishnan@gmail.com

https://doi.org/10.18231/j.jco.2025.021

confirming the resting state by the development of a space in any other skeletal system. When we analyze the muscular loading at rest in TMD patients, the meta-analysis by Alana et al[13] has shown that temporalis and masseter muscle had a significant and consistent increased activity during rest compared to healthy individuals. They also report an increased activity of suprahyoid muscles at rest though with less evidence. Asymmetric muscular activity during rest position in TMD cases has also been reported by a few studies.[14-16] In some studies, the Lateral pterygoid (LM) was quoted to be inactive during the rest position of the mandible[17-19] in healthy individuals. The activity of LM in rest position in TMD patients has not been addressed in literature despite it being considered the most important muscle from the etiological perspective of TMD. As per the highest level of evidence[13], there is a definite muscular imbalance during rest position in TMD patients which is not influenced by occlusion since resting position is independent of the presence or absence of teeth.[20] How far this resting muscular imbalance can affect the TMJ is a factor which has to be addressed since it is happening for the longest possible duration. Since bone responds to the functional demands as suggested by the functional matrix theory, studies analyzing more on the functional, structural or psychological demands that tends to increase the muscular activity at rest are the actual way forward to address the TMDs, at least a section of them that involves somatic pain apart from the ones associated with neuropathic/neuroplastic/neuroimmune pain. The systematic evidence that muscular therapy has proven effectiveness in TMD[21] reinforces this further. Duration of loading is a key factor that should be considered. Future studies should be planned considering that duration of loading can play a significant role in the etiology of TMDs and start assessing the factors related to rest position muscular tonicities and imbalance rather than solely restricting to occlusal factors.

Conflict of Interest

None.

References

1. Mohlin B, Axelsson S, Paulin G, Pietilä T, Bondemark L, Brattström V. TMD in Relation to Malocclusion and Orthodontic Treatment: A Systematic Review. *The Angle Orthod*. 2007;77(3):542–8.
2. Manfredini D, Lombardo L, Siciliani G. Temporomandibular disorders and dental occlusion. A systematic review of association studies: end of an era? *J Oral Rehabil*. 2017;44(11):908-923.
3. Gesch D, Bernhardt O, Kirbschus A. Association of malocclusion and functional occlusion with temporomandibular disorders (TMD) in adults: a systematic review of population-based studies. Quintessence Int. (Berlin, Germany: 1985). 2004;35(3):211–21.
4. Lekaviciute R, Kriauciunas A. Relationship Between Occlusal Factors and Temporomandibular Disorders: A Systematic Literature Review. *Cureus.* 2024;16(2): e54130
5. Warzocha J, Gadomska-Krasny J, Mrowiec J. Etiologic Factors of Temporomandibular Disorders: A Systematic Review of Literature Containing Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) and Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) from 2018 to 2022. *Healthcare (Basel)*. 2024;12(5):575.
6. Oliveira Reis L, Ribeiro RA, Martins CC, Devito KL. Association between bruxism and temporomandibular disorders in children: A systematic review and meta-analysis. *Int J Paediatric Dent*. 2019;29(5):585–95.
7. Campos LGN, Pedrosa BH, Cavalcanti RVA, Stechman-Neto J, Gadotti IC, de Araujo CM, Taveira KVM. Prevalence of temporomandibular disorders in musicians: A systematic review and meta-analysis. *J Oral Rehabil.* 2021;48(5):632-42.
8. Palla S, Farella M. Masticatory muscle pain. In: Mense S, Gerwin RD, eds. Muscle Pain: Diagnosis and Treatment. Springer-Verlag; 2010:193-227.
9. Michelotti A, Cioffi I, Festa P, Scala G, Farella M. Oral parafunctions as risk factors for diagnostic TMD subgroups. *J Oral Rehabil*. 2010;37(3):157-62.
10. Ohrbach R, Bair E, Fillingim RB. Clinical orofacial characteristics associated with risk of first-onset TMD: the OPPERA prospective cohort study. *J Pain*. 2013;14(12):33-50
11. Madeleine P. On functional motor adaptations: from the quantification of motor strategies to the prevention of musculoskeletal disorders in the neck-shoulder region. *Acta Physiol (Oxf)*. 2010;199(679):1-46.
12. L kumar. Biomechanics and clinical implications of complete edentulous state. *J Clin Gerontol Geriat* .2014;5:101-4
13. Dinsdale A, Liang Z, Thomas L, Treleaven J. Is jaw muscle activity impaired in adults with persistent temporomandibular disorders? A systematic review and meta-analysis. *J Oral Rehabil*. 2021;48(4):487-516.
14. Ries LGK, Graciosa MD, Medeiros DLD. Influence of craniomandibular and cervical pain on the activity of masticatory muscles in individuals with temporomandibular disorder. *CoDAS*. 2014;26(5):389-94.
15. Mapelli A, Zanandrea Machado BC, Giglio LD, Sforza C, De Felicio CM. Reorganization of muscle activity in patients with chronic temporomandibular disorders. *Arch Oral Biol.* 2016;72:164-71
16. Kittel Ries LG, Alves MC, Bérzin F. Asymmetric activation of temporalis, masseter, and sternocleidomastoid muscles in temporomandibular disorder patients. *Cranio.* 2008;26(1):59-64.
17. Murray GM, Phanachet I, Uchida S, Whittle T. The role of the human lateral pterygoid muscle in the control of horizontal jaw movements. *J Orofac Pain,* 2001;15(4):279-303.
18. Phanachet I, Whittle T, Wanigaratne K, Murray GM. Functional properties of single motor units in inferior head of human lateral pterygoid muscle: task relations and thresholds. *J Neurophysiol* 2001;86(5):2204-18.
19. Phanachet I, Whittle T, Wanigaratne K, Klineberg IJ, Sessle BJ, Murray GM. Functional heterogeneity in the superior head of the human lateral pterygoid. *J Dent Res*. 2003;82(2):106-111.
20. Thompson Jr. The rest position of the mandible and its significance to dental science. *J Am Dent Assoc*. 1946;33:151-80.
21. Armijo-Olivo S, Pitance L, Singh V, Neto F, Thie N, Michelotti A. Effectiveness of manual therapy and therapeutic exercise for temporomandibular disorders: systematic review and meta-analysis. *Physical Ther*. 2016;96(1):9-25.

Cite this article: Gopalakrishnan U, Are we missing something in TMD???. *J Contemp Orthod* 2025;9(2):144-5.