

Response to Letter by Dr. Santana-Penin

Dear Editor,

Thanks for giving us the opportunity to comment on the interesting letter by Drs. Santana-Mora and Santana-Penin concerning our recent paper in Pain Medicine [1]. The letter touches upon some arguments that are worthy to be discussed, and has merits in pointing out the need for designing further studies on the electromyographic (EMG) properties of jaw muscles. We thank the authors for their interest in our work.

On the other hand, unfortunately, we should point out that most of their comments are not exact or are not directly pertinent to our paper. In particular, the possibility that type II error occurred was very unlikely, given the very small between-group (painful vs non-painful muscles) differences we found in our study sample. Contrarily to what has been stated by Drs. Santana-Mora and Santana-Penin, we reported an a priori calculation of the needed sample size, suggesting that our study had more than 80% power to detect a 50% difference in EMG activity of painful and non-painful muscles. Effect sizes of lower magnitude, even if they could be statistically significant in larger sized samples, are not clinically relevant. So, enlarging the sample without keeping in mind the clinical meaning of the difference to detect is not the correct approach to determine the clinical correlates of an instrumental study.

Indeed, the final goal of each research adopting instruments for use in the clinical setting is to assess the correlation between an instrumental sign and a clinical sign or symptom [2,3]. As clinical researchers, we cannot ever forget that the usefulness of an instrumental finding lies in its capability to add clinically useful information on the reasons for which patients come to our observation [4]. Keeping this in mind, we would like to remind those colleagues working in the field of EMG research that searching for some complex torque or asymmetry indexes for the sole purpose of reporting or describing minor differences between patients, the relevance of which at the individual level is far from being demonstrated, is unlikely to be a productive strategy to increase our clinical skills for patients' management.

As for dental occlusion, its role as a potential factor influencing the EMG recordings has been addressed in our paper by adopting normalized/standardized values of EMG activity, as currently suggested in the research settings [5]. There is no doubt that excessive loads are the main risk factor for temporomandibular disorders (TMD), as thoroughly discussed in the mainstream literature on bruxism [6]; but, once again, we would like to point out that, independent of its possible role as the battleground

through which the bruxism forces are transferred to the joints via the jaw muscles, dental occlusion plays a much more secondary role in the pathophysiology of TMD pain [7].

Based on the above comments, we would like to underline that researchers having a very specialized field of interest, as in the case of EMG recordings of jaw muscles, should take into account for the overall literature and available knowledge on TMD pathophysiology when designing their studies. In this contemporary era, much attention should be put on the therapeutic and social efficacy of any prescription of medical procedures [8]; so, it is fundamental that we perform as many clinically meaningful researches as possible. For this reason, we adopted a simple strategy by introducing our investigations with a simple clinical research question. In the case of the paper under discussion, it sounded like "in patients with myofascial pain, are there any differences in the surface EMG activity of muscles of the painful and non-painful sides that can be detected by commercially available devices?" and the answer was definitely "no." Table 2 of our paper, showing the high variability of findings at the individual level, was even more explicative than any statistics to underline this finding. Clinically, this means that factors unrelated to EMG-detectable signals (e.g., central mediation mechanisms) might be involved in the maintenance of muscle pain.

In conclusion, it is not surprising that Drs. Santana-Mora and Santana-Penin expected different findings, as it is a common experience that, once pain occurred, muscles can adapt in several different modes, and a decreased, even, or increased EMG activity at rest can be detected [9,10]. As clinical researchers, we must do everything possible to study physiology better than we have so far, before introducing any indexes, markers, or hypotheses in the clinical management of TMD patients.

DANIELE MANFREDINI, DDS, PhD, and
LUCA GUARDA-NARDINI, MD, DDS

*Temporomandibular Disorders Clinic, Department of
Maxillofacial Surgery, University of Padova, Padua, Italy*

References

- 1 Manfredini D, Cocilovo F, Stellini E, Favero L, Guarda-Nardini L. Surface electromyography findings in unilateral myofascial pain patients: Comparison of painful vs non-painful sides. *Pain Med* 2013;14:1848–53.
- 2 Perinetti G. Dental occlusion and body posture: No detectable correlation. *Gait Posture* 2006;24:165–8.

Manfredini and Guarda-Nardini

- 3 Manfredini D, Guarda-Nardini L. Agreement between research diagnostic criteria for temporomandibular disorders and magnetic resonance diagnoses of temporomandibular disc displacement in a patient population. *Int J Oral Maxillofac Surg* 2008;37:612–6.
- 4 Manfredini D, Castroflorio T, Perinetti G, Guarda-Nardini L. Dental occlusion, body posture, and temporomandibular disorders: Where we are now and where we are heading for. *J Oral Rehabil* 2012;39:463–71.
- 5 Ferrario VF, Sforza C, Colombo A, Ciusa V. An electromyographic investigation of masticatory muscles symmetry in normo-occlusion subjects. *J Oral Rehabil* 2000;27:33–40.
- 6 Manfredini D, Lobbezoo F. Relationship between bruxism and temporomandibular disorders: A systematic review of literature from 1998 to 2008. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2010;109:e26–50.
- 7 Türp JC, Schindler H. The dental occlusion as a suspected cause for TMDs: Epidemiological and etiological considerations. *J Oral Rehabil* 2012;39:502–12.
- 8 Fryback DG, Thornbury JR. The efficacy of diagnostic imaging. *Med Decis Making* 1991;11:88–94.
- 9 Minami I, Ahkter R, Albersen I, et al. Masseter motor unit recruitment is altered in experimental jaw muscle pain. *J Dent Res* 2013;92:143–8.
- 10 Manfredini D, Cocilovo F, Favero L, et al. Surface electromyography of jaw muscles and kinesiographic recordings: Diagnostic accuracy for myofascial pain. *J Oral Rehabil* 2011;38:791–9.