



FOUR WEEKS OF BIOFEEDBACK CONTROLLED MUSCLE ENDURANCE TRAINING AND TEMPOROMANDIBULAR DYSFUNCTION: A PILOT STUDY OF A RANDOMIZED CONTROL TRIAL

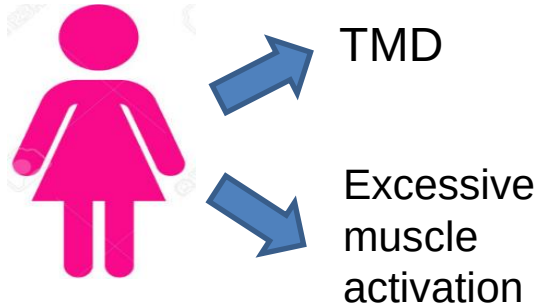
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BACKGROUND/RATIONALE



Treatment:

- ✓ Measures for pain and teeth protection
- ✓ Endurance exercise to provide relief and functionality

PURPOSE

To verify the impact of 4-week training protocol on pain, muscle activation, time until fatigue and bite force in women with TMD.



METHODS

INSTRUMENT, RANDOMIZATION AND VARIABLES

- RDC/TMD
- 15 women
 - Control group (CG, n=8)
 - Experimental group (EG, n=7)
- Variables:
 - Temporal and masseter activation (sEMG)
 - Pain (VAS and PPT)
 - Bite force (strain gauge)
 - Time until fatigue

PROCEDURE AND STATISTICS

- During a fatiguing biting task
- 75% of maximum isometric contraction, controlled by biofeedback.
- The Mann-Whitney and the Wilcoxon tests were used to analyze differences

RESULTS

- ✓ Decreased VAS in both groups
- ✓ PPT assessments on the right side and the time until fatigue showed higher values for EG, compared with CG.
- ✓ Compared with CG and to itself at baseline, the EG showed lower bilateral masseter activation.
- ✓ No differences were observed on bite force

CONCLUSIONS

Pain variables were improved, and the masseter muscle showed greater efficiency by performing the same amount of force with less activation and a higher time until fatigue.

REFERENCES

1. ADAM, Alexander; DE LUCA, Carlo J. Firing rates of motor units in human vastus lateralis muscle during fatiguing isometric contractions. **Journal of Applied Physiology**, v. 99, n. 1, p. 268-280, 2005.
2. ARMIJO-OLIVO, Susan *et al.* Effectiveness of manual therapy and therapeutic exercise for temporomandibular disorders: systematic review and meta-analysis. **Physical therapy**, 2015.
3. BARBOSA, Amanda Matias *et al.* Confiabilidade e validade de um dispositivo de célula de carga para avaliação da força de preensão palmar. **Fisioter. Pesqui.**, São Paulo, v. 22, n. 4, p. 378-385, Dec. 2015
4. BIJUR Polly E. *et al.* Reliability of the Visual Analog Scale for Measurement of Acute Pain. **Academic Emergency Medicine**, v. 8, n.12. December 2001
5. CARRARA, Simone Vieira *et al.* Termo do 1º consenso em disfunção temporomandibular e dor orofacial. Dental Press **Journal of Orthodontics**, v. 15, n. 3, p. 114-120, 2010.
6. CELAKIL, Tamer *et al.* Effect of high-frequency bio-oxidative ozone therapy for masticatory muscle pain: a double-blind randomized clinical trial. **Journal of Oral Rehabilitation**, 2017.
7. CHAVES, Thaís Cristina; DE OLIVEIRA, Anamaria Siriani; GROSSI, Débora Bevilacqua. Principais instrumentos para avaliação da disfunção temporomandibular, parte II: critérios diagnósticos; uma contribuição para a prática clínica e de pesquisa. **Fisioterapia e Pesquisa**, v. 15, n. 1, p. 101-106, 2008.
8. CZLUSNIAK Gilsane Raquel *et al.* Produção de conhecimento acerca do uso da eletromiografia de superfície: contribuições para a fonoaudiologia. **Publicatio UEPG: Ciências Biológicas e da Saúde**, v.19, n.1, p. 47-64, jan./jun. 2013
9. DE-PEDRO-HERRÁEZ M, Mesa-Jiménez J, Fernández-de-las-Peñas C, dela-Hoz-Aizpurua JL. Myogenic temporomandibular disorders: Clinical systemic comorbidities in a female population sample. **Med Oral Patol Oral Cir Bucal**. 1;21 (6):e784-92 Nov 2016.
10. FARELLA M., PALUMBO A., MILANI S., AVECONO S., GALLO L.M., MICHELOTTI A. Synergist coactivation and substitution pattern of the human masseter and temporalis muscles during sustained static contractions. **Clin Neurophysiol**. 2009;120(1):190-7.
11. FARELLA MA, Michelotti A, Bocchino T, Cimino R, Laino AMH, Steenks MH. Effects of orthognathic surgery for class III malocclusion on signs and symptoms of temporomandibular disorders and on pressure pain thresholds of the jaw muscles. **Int J Maxillofac Oral Surg**. 2007, 2(1):101-110.
12. FERREIRA, Claudia Lúcia Pimenta *et al.* Patients with myogenic temporomandibular disorders have reduced oxygen extraction in the masseter muscle. **Clinical Oral Investigations**, p. 1-10, 2016.
13. HE S *et al.* Validation of the Tampa Scale for Kinesiophobia for Temporomandibular Disorders (TSK-TMD) in patients with painful TMD. **The Journal of Headache and Pain** 17:109, 2016
14. ISSELEÉ, Hans *et al.* Short-term reproducibility of pressure pain thresholds in masticatory muscles measured with a new algometer. **Journal of orofacial pain**, v. 12, n. 3, 1998.
15. LIU, Z. J. *et al.* Electromyographic examination of jaw muscles in relation to symptoms and occlusion of patients with temporomandibular joint disorders. **Journal of oral rehabilitation**, v. 26, n. 1, p. 33-47, 1999.
16. MICHELOTTI A, Farella M, Tedesco A, Cimino R, Martina R. Changes in pressure-pain thresholds of the jaw muscles during a natural stressful condition in a group of symptom-free subjects. **Journal of Orofacial Pain** 2000; 14: 279–285.
17. PEHLING, Jason *et al.* Interexaminer reliability and clinical validity of the temporomandibular index: a new outcome measure for temporomandibular disorders. **Journal of orofacial pain**, v. 16, n. 4, 2002.
18. RIES, Lilian Gerdi Kittel *et al.* Efeito do tempo de contração e repouso na atividade dos músculos masseter e temporal anterior em indivíduos com DTM. In: **CoDAS**. 2016. p. 155-162.
19. STEGENGA, Boudewijn *et al.* Assessment of mandibular function impairment associated with temporomandibular joint osteoarthritis and internal derangement. **Journal of orofacial pain**, v. 7, n. 2, 1993.
20. VIANA, Maíra de Oliveira *et al.* Avaliação de sinais e sintomas da disfunção temporomandibular e sua relação com a postura cervical. **Rev. odontol. UNESP**, Araraquara, v. 44, n. 3, p. 125-130, June 2015

THANK YOU

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