Frenulectomy of the tongue and the influence of rehabilitation exercises on the sEMG activity of masticatory muscles

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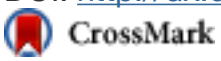
Received: July 19, 2013; Received in revised form: April 6, 2015; Accepted: April 7, 2015; Published Online: April 22, 2015

Altmetric 1

DOI: http://dx.doi.org/10.1016/j.jelekin.2015.04.003 |



Article Info

Abstract

This study aimed to assess by surface electromyography (sEMG) the changes in sub-mental, orbicularis oris, and masticatory muscle activity after a lingual frenulectomy. Rehabilitation exercises in subjects with ankyloglossia, characterized by Class I malocclusion, were assessed as well. A total of 24 subjects were selected. Thirteen subjects (mean age 7 ± 2.5 years) with Class I malocclusion and ankyloglossia were treated with lingual frenulectomy and rehabilitation exercises, while 11 subjects (mean age 7 ± 0.8 years) with normal occlusion and normal lingual frenulum were used as controls. The inclusion criteria for both groups were the presence of mixed dentition and no previous orthodontic treatment.

The sEMG recordings were taken at the time of the first visit (T0), and after 1 (T1) and 6 months (T2) for the treated group. Recordings were taken at the same time for the control group. Due to the noise inherent with the sEMG recording, special attention was paid to obtain reproducible and standardized recordings. The tested muscles were the masseter, anterior temporalis, upper and lower orbicularis oris, and sub-mental muscles. The sEMG recordings were performed at rest, while kissing, swallowing, opening the mouth, clenching the teeth and during protrusion of the mandible. These recordings were made by placing electrodes in the area of muscle contraction.

At T0, the treated group showed different sEMG activity of the muscles with respect to the control group, with significant differences at rest and during some test tasks ($p < 0.05$). In the treated group, an increase in sEMG potentials was observed for the masseter muscle, from T0 to T2, during maximal voluntary clenching. During swallowing and kissing, the masseter and sub-mental muscles showed a significant increase in their

sEMG potentials from T0 to T2. During the protrusion of the mandible, the masseter and anterior temporalis significantly decreased their sEMG activity, while the sub-mental area increased significantly.
No significant change was observed in the control group during the follow-up.
The sEMG potentials of treated patients at T2 reached about the same values as those of the control group at T2. At T0 and T1 the differences between the two groups were more diffused, suggesting a clinical improvement of muscular functions after treatment. Lingual frenulectomy and rehabilitation exercises seem to affect the function of the orofacial muscles. Improvement in muscle sEMG potentials after treatment was demonstrated by sEMG, which can be considered the correct method to monitor this intervention.

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