

Comparison of effectivity of enoral-cutaneous and cutaneous submental EMS of the mylohyoideus muscle - influence on therapy in obstructive sleep apnea?

Arwed Ludwig¹, Oliver Monzavifar²

¹ Department of Cranio-Maxillofacial Surgery, University of Goettingen,
Robert-Koch-Str. 40, D-37075 Goettingen

² Dental Surgery, Ellernstr. 41a, D-30175 Hannover

Introduction

The electromyostimulation (EMS) of the mylohyoid muscle for sleep-induced apnea syndrome becomes of increasing importance. It therefore was of interest, whether a varied placement of the electrodes had any influence on the effectivity of muscle stimulation.

Material and method

In 20 healthy probands (median age 42 years) the EMS was applied by use of the apparatus BMR PolyStim 262 (Bio-Medical Research Company). The training parameters in all probands have previously been determined: stimulation 2 x daily 20 minutes over a time period of 4 weeks. In 10 probands, a cutaneous application of 2 adhesive electrodes was done in the submandibular and submental area only. In the other 10 cases, an electrode was applied intraorally the other was applied cutaneously in the submental area. As measuring parameters for evaluation of effectivity of the stimulation, the force of the tongue muscles was measured by the polysensographical system SensOral (SensoMedical Company) whereas the thickness and the volume of the geniohyoid muscle was measured by 3D-ultrasound.

Results

In the group with cutaneous stimulation only, no significant increase of the tongue force nor an increase of thickness or volumetric changes of the M. geniohyoideus have been found. In opposite, in the group of intraoral-cutaneous EMS an increase of lingual force with a median of 31 % and simultaneous increase of thickness and increase of the initial volume of 8 % could be diagnosed. In all probands the M. geniohyoideus was sonographically found to be sharply differentiated from the other muscles. Moreover, in cutaneous submental stimulation, undesired stimulations of the N. facialis sometimes occurred.

Conclusions

The combined EMS in opposite to the submental cutaneous EMS technique showed a good training effect on the tongue muscles. Therefore the intraoral-cutaneous EMS should be preferred for therapy of obstructive sleep apnea.

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