

Articles of the Month - August 2020

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Dental arch form and interdental widths evaluation in adult Caucasian patients with obstructive sleep apnea syndrome

Giuliano Irlandese ¹, Alberto De Stefani ¹, Luca Mezzofranco ¹, Francesca Milano ², Massimiliano Di Giosia ³, Giovanni Bruno ¹, Antonio Gracco ¹

Abstract

Objective: To evaluate the hypothesis that dental arch form and inter-canine, inter-premolar, and inter-molar widths differ between OSAS patients and non-snoring, non-apneic controls.

Methods: Dental digital models from 64 OSAS patients and 64 control subjects were used to obtain dental arch forms and to compare them between the two groups. Arch forms were extracted from the lower arch models using a professional graphics program and an orthodontic digital template. Through an orthodontic software, inter-molar, inter-premolar, and inter-canine widths were measured for both upper and lower arches.

Results: The dental arch forms distribution differed between OSAS patients and controls. OSAS patients had reduced inter-canine, inter-premolar, and inter-molar widths for both arches compared to controls.

Discussion: These results suggest that OSAS patients have narrower and more tapered arches than controls. Dental arch morphology and interdental widths differ between OSAS and control groups, supporting the hypothesis that they are an etiological factor.

EADSM comment:

Interesting study, which is in line with findings in children with sleep related breathing problems, who often have posterior cross bites.

Effectiveness of different mandibular advancement device designs in obstructive sleep apnea therapy: a systematic review of randomized controlled trials with meta-analysis

Maria Lavinia Bartolucci ¹, Francesco Bortolotti ¹, Giulia Corazza ², Serena Incerti Parenti ¹, Corrado Paganelli ², Giulio Alessandri Bonetti ¹

Abstract

Background: Mandibular advancement devices (MADs) are used to treat patients with obstructive sleep apnea (OSA). To date, there are no data that identify the most effective MAD design for apnea-hypopnea index (AHI) reduction.

Objectives: The purpose of this systematic review is to investigate the effectiveness of different MAD designs in AHI reduction and oxygen saturation improvement in OSA patients.

Search methods: An electronic search was performed in MEDLINE, Cochrane Database, Scopus, Web of Knowledge and LILACS.

Selection criteria: Randomized controlled trials (RCTs) investigating the reduction of AHI on adult patients wearing MAD for OSA were included.

Data collection and analysis: the quality of evidence was evaluated using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) and the risk of bias by the Cochrane Collaboration's tool for assessing risk of bias in randomized controlled trial. The success rate of each study was computed: [(mean baseline AHI-mean AHI after treatment)/mean baseline AHI].

Results: fifty RCTs were included. The risk of bias resulted with some concerns in most of the studies. The GRADE scores indicated that the quality of evidence was very low. The meta-analysis showed a success rate with mono-bloc and duo-bloc MADs respectively of 0.821[0.722-0.887] and 0.547[0.443-0.637]. The mono-bloc compared with duo-bloc better improved the minimum oxygen saturation (10.048[7.733-12.363] and 3.357[2.290-4.423] respectively).

Conclusions: there is a very low quality body of evidence that mono-bloc MADs are more effective in reducing AHI and improving minimum oxygen saturation compared with duo-bloc MADs. Registration: the study protocol was registered on PROSPERO (n. CRD42019118084).

EADSM comment:

Comprehensive meta-analysis of the important question about device design. This article highlights the need for more sophisticated subdivisions of devices than just into mon-blocks and biblocks. Most importantly, the appliances must be evaluated regarding their possibilities to stabilize the jaw into the decided position. For instance, appliances that allow mouth opening have been found to be inferior in terms of apnea reduction.

Mandibular movement analysis by means of a kinematic model applied to the design of oral appliances for the treatment of obstructive sleep apnea

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Abstract

Background: Mandibular advancement devices (MADs) are one of the treatment options used for the obstructive sleep apnea syndrome (OSAS). At present, MADs are designed with standard titration systems, without considering each patient's anatomical characteristics of the temporomandibular joint and mandible shape. The main objective of this study is to evaluate if a variability in mandibular morphology will influence the displacement of the jaw with a MAD. Such knowledge will be of help to find optimal mandibular positions with MAD even when opening the mouth.

Methods: By using a mandibular movement model, the movement patterns of different points on the chin have been analyzed. The influence of different skeletal mandibular shapes on these movements have also been studied. The results show differences in the movement patterns of the lower front teeth depending on its distance to the center of the condyle, with a more horizontal direction in those in which there is a greater distance.

Results: Variations in mandibular morphology imply differences in movement patterns of the analyzed points of the mandible. Consequently, MADs should be designed according to each patient's anatomy to avoid mandibular retrusion in those areas that may narrow the upper airways.

Conclusions: This study may help to understand why not all patients move their lower jaws forwards equally with the same degree of mandibular protrusion measured in relation to the teeth. These results might also partially explain why airway obstruction is more severe in certain untreated sleep apnea subjects than in others when opening their mouth during sleep.

EADSM comment:

Very interesting analysis regarding the influence of jaw and facial morphology on the possibilities to move the mandible forward in order to really increase upper airway dimensions.