

Effects of a Non-Mandibular Advancement Device in Adults with Severe Obstructive Sleep Apnea

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Introduction: Mandibular repositioning devices (MRD) have been deployed for the management of mild, moderate and even severe cases of OSA, but there are some concerns regarding unwanted tooth movements, temporo-mandibular joint issues and facial profile changes using that approach. Biomimetic oral appliance therapy (BOAT) differs from conventional MRD therapy as it aims to correct the nasal airway through midfacial redevelopment followed by mandibular correction, which aims to improve the oropharyngeal airway in adults. In this investigation, we test the hypothesis that severe OSA can be addressed without primary mandibular advancement using BOAT.

Methods: In this preliminary study, we included 8 consecutive adults aged > 21yrs that had been diagnosed with severe OSA, following an overnight sleep study that had been interpreted by a Board certified sleep physician. Each subject that participated in this pilot study had failed to comply with CPAP therapy, and was treated under medical supervision by a dentist with advanced training in dental sleep medicine. At each monthly follow-up visit, examination for progress and adjustments of the devices were performed to optimize their efficacy. The mean apnea-hypopnea index (AHI) of the study sample was calculated prior to and after BOAT. The findings were subjected to statistical analysis, using paired t-tests.

Results: There were 5 females and 3 males that were included in this preliminary study. The mean age of the sample was approx. 60.2 yrs. \pm 5.6. Prior to treatment the mean AHI of the study subjects was 46.6 ± 12.9 . A further follow sleep study was done at a mean of 10.4 mos. \pm 2.6. At this time, the AHI decreased significantly ($P < 0.001$) to a mean value of 13.9 ± 10.5 after BOAT, which represents a fall in the mean AHI by 70% for the study sample. Indeed, three subjects had an AHI of between 3.1 to 5.1 with no appliance in the mouth when the posttreatment sleep studies were done.

Conclusions: BOAT may be a useful method of managing severe cases of OSA in adults, and may represent an alternative to CPAP and MRD therapy. However, long-term follow up using a larger sample size is needed to reach more definitive conclusions on these initial findings.