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Effects of biomimetic oral appliance therapy in adults with obstructive sleep apnea

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Biomimetic oral appliance therapy (BOAT) differs from conventional mandibular advancement devices (MADs) that are currently deployed for the management of mild and moderate cases of obstructive sleep apnea (OSA). For example, BOAT attempts to avoid unwanted tooth movements, temporo-mandibular joint issues and undesired facial profile changes that may be associated with long-term MAD use. In addition, in contrast to continuous positive airway pressure (CPAP), BOAT aims to remodel the upper airway through midfacial redevelopment followed by mandibular correction, which may resolve OSA in adults, and possibly avoid long-term CPAP therapy. In this investigation, we test the hypothesis that excessive daytime sleepiness in adults with mild to moderate OSA can be addressed without primary mandibular advancement or CPAP using BOAT. In this pilot study, we included 13 consecutive adults aged >21yrs. that had been diagnosed with mild to moderate OSA, following an overnight sleep study that had been interpreted by a board certified sleep physician. Prior to treatment each subject that participated in this pilot study completed an Epworth Sleepiness Scale (ESS) questionnaire. Each subject was then treated by a general dentist (FL) with advanced training in dental sleep medicine. At each monthly follow-up visit, examination for progress and adjustments of the devices was performed to optimize their efficacy. Post-treatment, each subject completed a follow-up ESS questionnaire. The mean ESS scores of the study sample was calculated prior to and after BOAT. The findings were subjected to statistical analysis, using paired t-tests. There were 7 females and 6 males that participated in this preliminary study. The mean age of the sample was 50yrs. \pm 12. Prior to treatment the mean ESS score of the study subjects was 8.2 ± 6 . A further follow ESS questionnaire was done at a mean of 29.3 mos. \pm 21.5 after BOAT. At this time, the mean ESS score decreased significantly ($p < 0.05$) to a value of 4.2 ± 3.6 after BOAT, which represents a fall in the mean ESS score by 51.4% for the study sample. We conclude that BOAT may be a useful method of managing adults with OSA who are seeking an alternative to long-term CPAP and MAD use. Although ESS is a discriminating test of daytime sleepiness, further data on the specificity and sensitivity of these initial findings will be obtained using overnight sleep studies in a larger sample size in long-term future studies.

Biography

Dave Singh was born, educated and trained in England, UK. He holds three doctorates (from the universities of Newcastle, Bristol and Dundee, UK). He is a member of the World Association of Sleep Medicine and World Federation of Orthodontists. He has about 200 publications in the medical, dental and orthodontic literature. Previously, he was Visiting Professor at University of Michigan and University of Hawaii, USA. In addition, at the Center of Craniofacial Disorders, UPR, he led a NIH-NIDCR funded program of research. Currently, he is the CEO of BioModeling Solutions, Inc, and holds several US and international patents.

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