

A Method for Evaluating the Mechanical Stress on Mandibular Advancement Devices

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Abstract : Snoring, the lay term for obstructive breathing during sleep, is one of the most prevalent of obnoxious human habits. Loud snoring usually makes others feel noisy and uncomfortable. Snoring also influences the sleep quality of snorers' bed partners, because of the noise they do not get to sleep easily. Snoring causes the reduce of sleep quality leading to several medical problems, such as excessive daytime sleepiness, high blood pressure, increased risk for cardiovascular disease and cerebral vascular accident, and etc. There are many non-prescription devices offered for sale on the market, but very limited data are available to support a beneficial effect of these devices on snoring and use in treating obstructive sleep apnea (OSA). Mandibular advancement devices (MADs), also termed as the Mandibular reposition devices (MRDs) are removable devices which are worn at night during sleep. Most devices require dental impression, bite registration, and fabrication by a dental laboratory. Those devices are fixed to upper and lower teeth and are adjusted to advance the mandible. The amount of protrusion is adjusted to meet the therapeutic requirements, comfort, and tolerance. Many devices have a fixed degree of advancement. Some are adjustable in a limited degree. This study focuses on the stress analysis of Mandibular Advancement Devices (MADs), which are considered as a standard treatment of snoring that promoted by American Academy of Sleep Medicine (AASM). This paper proposes a new MAD design, and the finite element analysis (FEA) is introduced to precede the stress simulation for this MAD.

Keywords : finite element analysis, mandibular advancement devices, mechanical stress, snoring

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