



G. Dave Singh

BioModeling Solutions LLC. , USA

Changes in 3D nasal volume after biomimetic oral appliance therapy in adults

Introduction: Although continuous positive airway pressure (CPAP) is recommended as the first line of treatment for obstructive sleep apnea, patient compliance is often the limiting factor in terms of treatment success. Poor compliance may be a consequence of nasal obstruction, which requires higher CPAP pressures to overcome nasal resistance. Indeed, if the nasal airway volume could be increased, patient compliance with CPAP might be improved. Therefore, in this preliminary study we investigated 3D changes in nasal volume, to test the null hypothesis that nasal cavity volume cannot be changed in non-growing adults.

Methods: After obtaining informed consent, we undertook 3D cone-beam computerized axial scans of 11 consecutive, adult patients (mean age 37.9 yrs) prior to and after biomimetic, oral appliance therapy. These cases had all been diagnosed with midfacial underdevelopment. The mean treatment time was 18.4 months \pm 2.5. Volumetric reconstruction of the nasal cavity was undertaken between the anterior and posterior nasal spines, extending superiorly from the palatine process of the maxilla and the palatine bone to the cribriform plate of the ethmoid bone. Next, the nasal cavity volume was calculated in all cases. The findings were subjected to statistical analysis, using paired t-tests.

Results: The mean nasal cavity volume was 41.9 cm³ \pm 12.1 prior to treatment. After oral appliance therapy, the mean nasal cavity volume increased to 44.0 cm³ \pm 12.1 (p = 0.022).

Conclusions: These data support the notion that nasal cavity volume can be changed in non-growing adults. Therefore, use of a biomimetic oral appliance prior to, or in conjunction with, CPAP therapy might potentially improve CPAP compliance in adults diagnosed with obstructive sleep apnea by increasing the nasal cavity volume and decreasing nasal airflow resistance.

Biography

G. Dave Singh was born, educated and trained in England. He is currently Chairman of BioModeling Solutions, USA. Previously, he was a Visiting Professor in Orthodontics (Malaysia and Indonesia), Associate Professor at the University of Puerto Rico, USA, and Director of Continuing Education, SMILE Foundation, USA. He has been published extensively in the orthodontic and dental literature, and has co-authored several books. He is also Senior Instructor/Consultant/Fellow of the International Association for Orthodontics; Academic Fellow of the World Federation of Orthodontists; and a Member of the American Academy of Dental Sleep Medicine.

info@biomodelings.com