

## **Associations among upper airway structure, body position, and obesity in skeletal Class I male patients with obstructive sleep apnea.**

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Interactions between upper airway structure and posture in relation to obesity were studied in a sample of 61 adult Class I skeletal type male patients with obstructive sleep apnea (OSA) and 10 homologous control subjects. A pair of upright and supine lateral cephalometric films were taken for each subject. A Pearson correlation analysis identified significant  $r$  values for several demographic variables in patients with OSA such as apnea and hypopnea index, percentage of predicted neck circumference, minimum arterial oxygen saturation, and body mass index (BMI). The difference between cephalometric variables identified in upright and supine subjects was calculated. When patients with OSA changed their posture from upright to supine, significant correlations were observed between the cranial base to upper cervical column angle and the hypopharynx cross-sectional area and BMI. Moreover, the mandibular plane angle and the sella-nasion plane was significantly correlated with BMI. This occurred along with a significant positive correlation between the sella-nasion plane angle and BMI and a significant inverse correlation between the mandibular plane angle in reference to the absolute vertical and horizontal planes, with BMI after the positional change. Such correlations were not observed in control subjects. No correlations were observed between the variables related to the position of the hyoid bone with BMI in either patients with OSA or control subjects after the change in posture. On the basis of these findings, we propose that when patients with OSA change their body position from upright to supine (1) the patient's neck is more extended, and (2) the hyoid bone moves more anterosuperiorly in conjunction with an upward and forward rotation of the mandible. This change in craniofacial structure may be a compensatory geometrical change in the upper airway to secure its patency.

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