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Obstructive Sleep Apnea and Mandibular Cortical Thickness: A Retrospective Study

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Abstract

Purpose: To evaluate the cortical thickness of the mandible on dental panoramic radiographs of children diagnosed with obstructive sleep apnea (OSA) and children with no reported sleep disorders. Mandibular cortical thickness has been strongly linked to skeletal bone density.

Methods: Mandibular cortical thickness measurements were retrospectively assessed using mandibular cortical width index (MCW) and Panoramic mandibular index (PMI) obtained from panoramic images of 27 OSA PSG diagnosed children between 2009 and 2016. Following a matching process based on age and sex, 81 children with no reported sleep disorders (controls) were selected. Factorial analysis of variance was used to compare MCW and PMI measurements between the 2 groups.

Results: ICC results for reliability assessment were found to be excellent (ICC values were above 0.9). No significant differences were found based on sex ($p>0.05$), therefore both sexes were evaluated together. An increase in MCW and PMI values associated to aging in OSA (MCW, $R=0.72$, $p<0.01$; MCI, $R=0.55$, $p<0.01$) and control children (MCW, $R=0.66$, $p<0.01$; MCI, $R=0.57$, $p<0.01$) was identified. MCW and PMI mean values were significantly lower in OSA children (MCW=3.1±0.06mm; PMI=0.32±0.04) compared to control children (MCW=3.6±0.06mm; PMI=0.38±0.05).

Conclusions: Findings of this study indicate that children with OSA have thinner mandibular cortex (based on MCW and PMI measurements) compared to children with no reported sleep disorders. This study represents the first clinical evidence suggesting that children with OSA are at higher risk to develop bone disease (such as osteopenia and osteoporosis) in the future.