A STUDY OF UPPER AIRWAY VOLUME AND AREA OF CONSTRICTION IN RELEVANCE TO SKELETAL PATTERN AMONG FILIPINO ADULT USING CONE BEAM COMPUTED TOMOGRAPHY

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ABSTRACT

BACKGROUND: **The role of the pharyngeal structure in the airway and adjacent structures in correlation to the relative growth and size of the soft tissues surrounding the craniofacial skeleton might contribute to airway impairment which results in increased airway resistance. Multiple studies have shown different points of view and opinion on the airway problems which are significantly related to different types of malocclusions and skeletal patterns.**

PURPOSE: **To measure and compare the upper airway area of constriction and airway volumes in Filipino subjects with different skeletal pattern using Cone Beam Computed Tomography.**

METHODS: **Cone Beam Computed Tomography images of 46 samples with different skeletal classifications (Skeletal class I=15, Skeletal class II=16 and skeletal class II=15) aged 18-55 years old were taken and 3D upper airway models were reconstructed using Ezdent-I software. Initial assessment with inclusion and exclusion criteria was followed including lateral cephalometric radiograph for the measurement of ANB prior to undergoing CBCT. Following the upper airway limit for image reconstruction , Dahlberg's formula for measurement error, cross-sectional linear measurement, areas, and volumetric variables of the upper airway were measured in the 3D airway model.**

RESULTS:

The controversy relating to the correlation of craniofacial complex and dental malocclusion to airway constriction has been intriguing and perplexing. Dahlberg's formula was achieved at 0.40mm error. Airway volume and area of constriction vary among patients with different skeletal pattern.

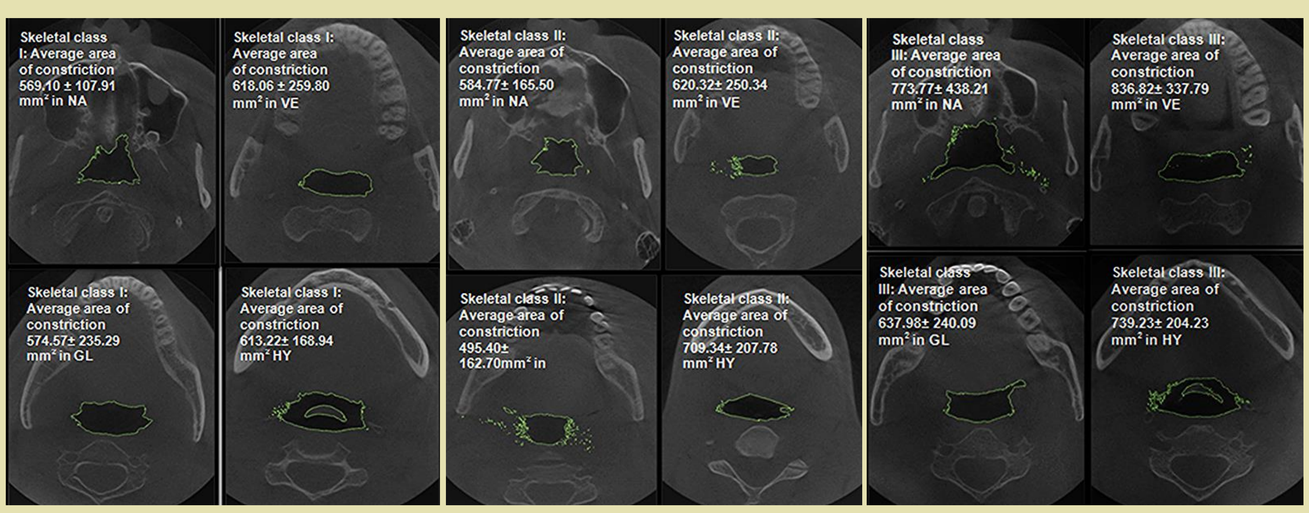

Figure 1: It shows that the mean area of constriction in all the parts of the pharynx is highest in skeletal class III. Skeletal class I has the lowest mean area of the nasopharynx (NA), velopharynx (VE), and hypopharynx (HY). Skeletal class II has the lowest mean glossopharynx area. The most constricted area of Filipino upper airway segment was seen at the oropharynx specifically at glossopharynx.

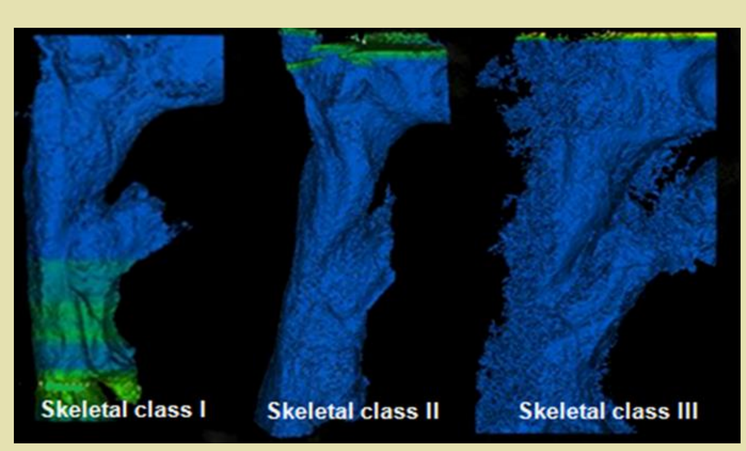

Figure 3: Analysis showed there is significant difference in the airway volume of the nasopharynx (NA) in skeletal class III with a p-value of *0.01364*.* The volume of nasopharynx (NA) for skeletal class I differ significantly with skeletal class III (p-value: 0.020). The volume of nasopharynx (NA) for skeletal class II differs significantly with skeletal class III (p-value: 0.037). No difference in area of constriction across the skeletal pattern was observed.

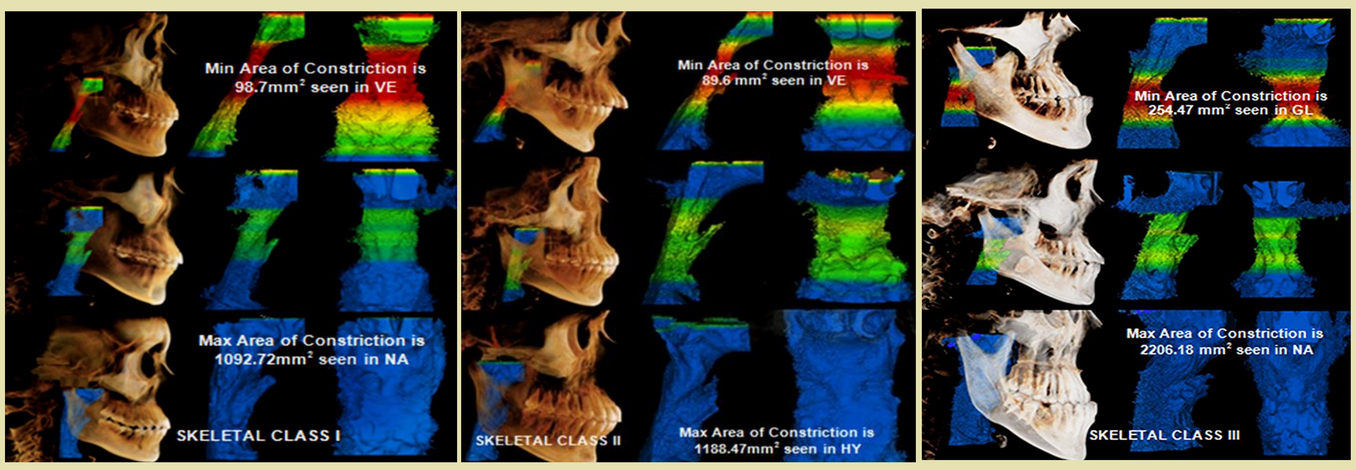

Figure 2: The mean volume of the nasopharynx (NA), velopharynx(VE), and glossopharynx (GL), are highest in skeletal class III while hypopharynx(HY) has highest mean value in skeletal class II . Skeletal class I has the lowest mean volume of the nasopharynx, glossopharynx, and hypopharynx, while skeletal class II has the lowest mean velopharynx area. Males have a higher mean value in area of constriction and volume than females.

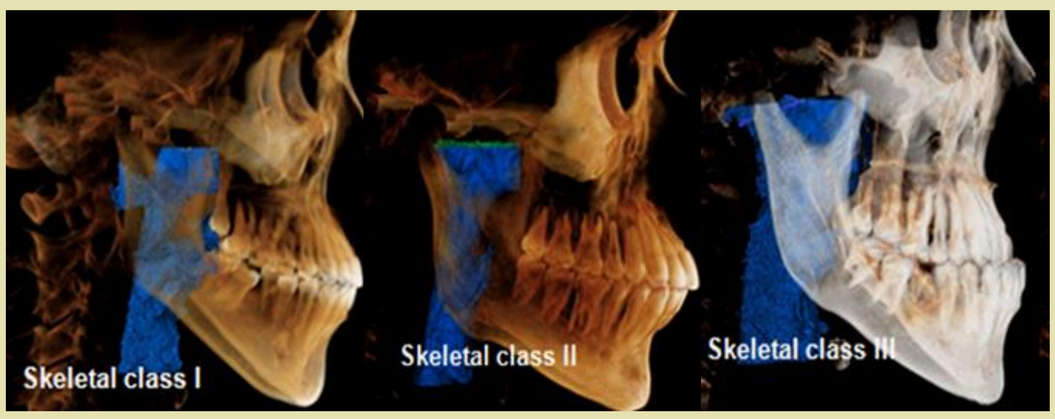

Figure 4: Class III has a significantly higher mean nasopharynx (NA) volume than both class I and class II. This implies that the anatomical volumes of the nasopharynx seen in skeletal class III are wider than the two. It entails that the area of nasopharynx volume in skeletal class III might have the possibility not to experience breathing disorder.

Conclusion: **The morphology of the upper airway cannot be truthfully represented with sagittal or axial linear measurements independently or with volume alone to signify or correlate to the skeletal pattern. Filipino patients with skeletal class III have higher mean value of upper airway volume and area of constriction as compared to skeletal class II and skeletal class I. Skeletal class III has wider Upper Pharyngeal airway than class II and class I.**