

Orthodontic Soft Tissue Parameters: A Comparison of CBCT and 3dMD

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Abstract

Objectives: Orthodontists rely heavily on soft tissue analysis to determine esthetics and treatment stability. Although the reliability of three dimensional photography (3dMD) and cone beam computed tomography (CBCT) is established, little data exists comparing the soft tissue measurements between these two imaging modalities. The aim of this retrospective study is to compare the equivalence of soft tissue measurements between the 3dMD imaging system and the segmented skin surface derived from i-CAT CBCT. **Methods:** Seventy preexisting 3dMD extraoral photographs and CBCT scans taken within minutes of each other for the same subjects were superimposed using 3dMD Vultus software on soft tissue. Images were registered according to hard tissue planes in three dimensions. Following reliability studies, 28 soft tissue measurements were selected and recorded on both imaging modalities. The measures were then compared between the two images to analyze their equivalence. Intraclass correlation coefficients (all ICCs >.8) and Bland-Altman plots were used to assess the inter- / intra-examiner repeatability and agreement. Summary statistics were calculated for all measurements. To demonstrate equivalence of the two methods, the difference needed a 95% confidence interval contained entirely within the equivalence limits defined by repeatability results (twice the within-subject standard deviation of CBCT). **Results:** Statistically significant differences were reported for the following measurements: vermilion height (Ls-Li), mouth width (CH[R]-CH[L]), total facial width (Tr[R] – Tr[L]), mouth symmetry (Ch[R] to Sup. Facial Plane), ST Lip Thickness (LI to mand CI), and eye symmetry (Exoc R & L to Sup. Facial Plane). **Conclusions:** There are areas of non-equivalence between the two imaging methods. Differences are clinically acceptable from the orthodontic point of view.

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