Mandibular Alveolar Bone Remodeling Following Maximum Incisor Retraction

Objectives: The objective of this study is to evaluate changes in mandibular alveolar bone width following maximum incisor retraction.

Methods: 125 patients with bimaxillary dentoalveolar protrusion treated with premolar extractions and maximum incisor retraction using skeletal anchorage were selected. Pre-treatment (T1) and post-treatment (T2) Cone Beam Computed Tomography (CBCT) volumes were registered using voxel-based mandible regional superimpositions. 3D models of the registered mandibles were built and T1 and T2 alveolar width were measured at the 1) inter-radicular space between the lower central incisors and the 2) mid-root of the mandibular right central incisor. ANOVA analysis was used to determine difference between T1 and T2 alveolar width.

Results: The mean lower incisor retraction was 6.12mm +/- 1.25. At the crestal level, the inter-radicular alveolus showed an average decrease of 1.02mm +/- 0.44 (20% reduction) while the mid-root alveolus showed an average decrease of 0.48mm +/- 0.39 (8% reduction) after incisor retraction. There was a statistically significant difference (P<0.05) between the bone change at the inter-radicular regions versus the mid-root regions.

Conclusion: There was a decrease in buccal/lingual width of the alveolus following maximum incisor retraction. At the crestal level, the reduction of alveolar width was more significant in the inter-radicular region.