0256 Assessing Mandibular Changes Following Orthognathic Surgery Using 3D Cone-Beam CT

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Objectives: To evaluate alterations in the 3D position of the mandibular rami and condyles in groups of patients receiving either maxillary advancement and mandibular setback, or maxillary surgery only. Methods: High-resolution cone-beam CT scans were taken of 21 patients before and after orthognathic surgery. Ten patients underwent maxillary surgery only and eleven patients received maxillary advancement and mandibular setback. Three-dimensional surface reconstructions of the mandibular rami and condyles were created from pre- and immediately post-surgery scans. By superimposing the surfaces of the cranial base in 3D, positional changes in the posterior border of the mandibular rami and condyles were assessed. Three-dimensional color maps visually displayed and quantified these changes. Independent samples t-test assessed the statistical significance of group comparisons. Results: The average displacement in condylar position was 0.77mm (SD=0.12mm) and 0.70mm (SD=0.07mm) for two- and one-jaw surgeries, respectively (p>0.05). All two-jaw surgery patients showed backward rotation of the mandibular rami (mean 1.98mm, SD=1.03mm), with maximum surface distance change ≥2mm in 8 of 11 subjects. For the one-jaw surgery, all subjects showed small backward rotation of the mandibular rami (mean 0.78mm, SD=0.25mm), with only 1 subject having a maximum surface distance change ≥2mm. The difference in mean backward rotation was statistically significant (p<0.01). Conclusion: This method clearly identifies the location, magnitude and direction of mandibular rotations during surgery. The 3-D imaging allows quantification of vertical, transverse and antero-posterior ramus rotations that accompanied mandibular but not maxillary only surgery. (Supported by NIDCR DE-05215).

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