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TOP > Available Issues > Table of Contents > Abstract	

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Tooth Axis and Skeletal Structures in Mandibular Molar Vertical Sections in Jaw Deformity with Facial Asymmetry using MPR Images

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Abstract: The objective of the present study was to investigate frontal morphological asymmetry in the mandibular molar region in terms of tooth axis and skeletal structures using vertical MPR sections in jaw deformity accompanied by facial asymmetry. Subjects consisted of 15 patients with jaw deformity accompanied by facial asymmetry aged 17.4 years to 37.8 years. There were four men and eleven women. Based on X-ray computed tomography (CT) scans, DICOM viewer software was used to prepare multiplanar reconstruction (MPR) sections. The mandible was then positioned on a reference plane based on the menton and left and right gonions, and a vertical MPR section passing through the mesial root of the first mandibular molar was prepared. The following measurements were made on both the shifted and non-shifted sides: maximum buccolingual width of the mandibular body; height of the mandibular body; inclination angle of the mandibular body; degree of buccal protrusion of the mandibular body; and inclination angle of the buccolingual tooth axis of the first molar. Furthermore, degree of median deviation in the menton was measured using frontal cephalograms. Differences in morphological parameters between the shifted and non-shifted sides were assessed. Furthermore, the relationship between median deviation and asymmetry were statistically analyzed. There was no significant asymmetry in the maximum buccolingual width of the mandibular body, the height of the mandibular body or the degree of buccal protrusion of the mandibular body. However, when compared to the shifted side, the inclination angle of the buccolingual tooth axis of the first molar for the non-shifted side was significantly greater. There was a relatively strong correlation between median deviation and inclination angle of the mandibular body. The above findings clarified that, in orthognathic surgery for jaw deformity accompanied by facial asymmetry, actively

improving asymmetry in the buccolingual inclination of the tooth axis of the molar region during presurgical orthodontic treatment is important in achieving favorable post-treatment occlusal stability and facial symmetry.

Key words: Jaw deformity, Facial asymmetry, X-ray CT, Mandibular vertical section, Bucco-lingual inclination

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