Availability of Cephalometric Radiographs Constructed from Three-dimensional Computed Tomography: Transration research to three dimensional from two dimensional

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Abstract

Purpose

In recent years, diagnosis and evaluation using three-dimensional computed tomography (3D-CT) images provide highly detailed information in orthognathic surgery.

However, evaluations using plain cephalometric radiography also widely utilized. Evaluations would be very simple and straightforward if the aforementioned information could be obtained from a single testing approach. Therefore, we constructed two-dimensional (2-D) cephalometric images based on 3D-CT images, and compared them with conventional cephalometric radiographs.

Subjects and Methods

Standard lateral cephalometric radiographs and 3D-CT images were obtained from a simplified craniomaxillofacial model and a jaw deformity patient. LabView 7.1 (National Instruments, Austin, TX, USA) was used for the construction of 2-D cephalometric images from 3D-CT images. Cephalometric analyses were conducted using WinCeph 9.0 (Rise Corporation, Sendai, Japan), using 5 items for the angle analysis of the model and 22 items for the angle analysis on the patient. The analyses were performed by 7 evaluators, and correlation coefficients involving all measured values were calculated on the basis of the 2-D cephalometric images constructed from 3D-CT and conventional cephalometric radiography. Additionally, Wilcoxon-signed rank test was used for the comparison between each corresponding measured value.

Conclusion

In the simplified craniomaxillofacial model, significant differences were found in all 5 tems. In our patient with jaw deformity, significant differences were found in 4 items, including convexity, SNA, the mandibular Plane (Pl) to SN (Serra-Nasion), and the gonial angle. This study revealed that the 2-D cephalometric images constructed from 3D-CT images showed stronger correlations than those found in conventional cephalometric radiography.

Key words: **Cephalometric radiography, 2-D cephalometric images constructed from 3D-CT images, Craniomaxillofacial simplification model, 3-D bone shapes, Hypothetical (virtual) X-rays**