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Combined effects of errors in frontal-view asymmetry diagnosis

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ABSTRACT

The aim of the present investigation was to determine the relative extent of geometric error and errors in point identification in postero-anterior roentgenography. In one series of tests a group of dry human skulls was used, and the same cephalometric landmarks were identified twice by two orthodontists, using postero-anterior roentgenographs, first using the dry skulls as such, and then the same skulls with metal markers inserted to show the exact locations of the cephalometric points. Consistency and normal variation in the reproducibility of head position in the cephalostat between repeated roentgenographs were studied by a photographic technique in a group of young healthy adults, measuring the extent of minor head movements. Geometric error was calculated using a computer-aided design program (CAD) by rotating the three-dimensional co-ordinates of the cephalometric landmarks and thus obtaining projection error in the frontal view. Accuracy of cephalometric point identification was best in dental landmarks and vertical orientation of superior orbital margins. Geometric error was least when landmarks near the anterior midsagittal plane, such as upper and lower dental midlines or point gonion were compared with each other. Width measurements from frontal-view cephalograms are most sensitive to minor movements in head posture. Due to combined errors, the use of width measurements in facial asymmetry diagnosis should not be used since variance in errors in landmark identification can be larger than that in actual landmark location.

Pages 629-636

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