

Evaluation of radiographic magnification in lateral cephalograms obtained with different X-ray devices: Experimental study in human dry skull

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Editor's summary

Lateral telerradiographs present extreme relevance in Orthodontics as they demonstrate the relationship of the bone bases and dental relations, besides providing indispensable measures to the orthodontist in growth analysis, diagnosis, treatment planning, therapy monitoring and evaluation of results. Some factors that have great influence on image formation in telerradiographs are: Radiographic distortion, radiographic magnification and errors in the delimitation of the measurement points and cephalometric variables. The objective of this study was to evaluate the influence of radiographic image magnification factor in angular, linear and proportional measurements in cephalometric tracing.

Fourteen lateral cephalograms were obtained from a dry human skull with metallic spheres of predefined dimensions, in different devices from three manufacturers: Panoura, Instrumentarium and Tomeceph. After obtaining the telerradiographs, they were scanned. The cephalometric points were marked on the radiopaque images regarding metallic spheres, using the program Radiocef. The program obtained the angular

and linear cephalometric measurements. Pearson's correlation test was used to verify the relationship between the rate of radiographic magnification and cephalometric measurements analyzed.

The results confirmed the small change that the angular and proportional measures are subjected to when varying the magnification factor. Linear measurements derived from cephalometric points located in the median sagittal plane presented dimensional changes similar to linear measurements which have as reference the points located in the lateral region of the face. It was observed a high positive correlation between the magnification of the images, regardless of the location of the cephalometric points that generated these measures. The telerradiographs performed on different devices of the same brand did not represent uniformity of measurements. The authors emphasized that it should be avoided the comparison of linear cephalometric measurements from different x-ray machines, even from the same brand and model. Or, alternatively, it should be used a ruler allowing to standardize the magnification rate between radiographs taken on different devices.

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