A Software for Space Analysis and Comparison of the Accuracy of Tooth Measurements by Digital and Manual Methods

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Abstract

Statement of Problems: Several methods have been presented for the prediction of mesiodistal width of the unerupted canines and premolars. Nowadays, application of digital methods is suggested in dental analysis in orthodontics.

Purpose: The aim of this study was to design a software for space analysis and comparison of the accuracy of tooth measurements by digital and manual methods in an Iranian population.

Material and Method: By using Delphi and C++ programming languages, a software was designed. After insertion of 2 dimensional scanned images of dental casts, the software can predict mesiodistal width of the unerupted canines and premolars by using 12-variable regression equations based on the incisors and first molars. After providing 2 dimensional images of 125 dental casts in permanent dentition (75 females and 50 males), the prediction accuracy of regression equations was investigated. By providing 2-dimensional images of dental casts in 50 patients with mixed dentition, the accuracy of dental measurements was evaluated through the designed software. Moreover, the time duration of manual and digital measurements was evaluated. Data was analyzed in SPSS, version 17, using paired sample t-test for comparing the manual and digital measurements and evaluation of interobserver and intraobserver errors.

Results: Prediction of the width of the canines and premolars by the designed software was not significantly different from manual measurement of those teeth on dental casts with digital Caliper (p >0.05). There were no significant differences between manual and digital measurement of mesiodistal width of the teeth (p >0.05). Also, there were no significant differences between intra-observer and inter-observer measurements and the speed of measurements in digital and manual methods. However, the time duration and speed of space analysis with these two methods were significantly different.

Conclusion: The designed software has a good accuracy in prediction of unerupted canines and premolars with equations and it is an efficient tool for predicting the mesiodistal width of the teeth as to the time duration or speed.

Key words: Digital, Space analysis software, 2D scanned images