Measurement Accuracy and Efficiency of Virtual Models in Orthodontics

J.T. HERRING, D.B. RAVASSIPOUR, J.C. TULLOCH, and C. PHILLIPS, University of North Carolina, Chapel Hill, USA

The introduction of virtual study models has potential to simplify and improve orthodontic record keeping. Objective: The study was to compare 1) the accuracy of linear measurements made using virtual models with those obtained from conventional plaster models and 2) the time required to record the measurements with the different systems. Methods: Forty patients, ages 9.6y to 35.6y, each had three sets of alginate impressions taken. Two sets were randomly selected and sent for commercial virtual model fabrication. One set was poured in plaster. Neither commercial company was aware that the virtual models were being used for research purposes. Thirty-four measurements of tooth width and arch dimensions were made by one examiner on the plaster models using digital calipers and on the virtual models using the software analysis tools provided by each company. Measurements were repeated after at least seven days for all three model types for 10 patients. Results: Reliability for each type of model was excellent (interclass correlations statistics >0.75) for all measurements. The average difference for the 40 subjects ranged from – 0.80mm (lower intermolar width) to 0.20mm (right curve of Spee) when plaster model values were compared to one virtual model type and – 0.50mm (upper intermolar width) to 0.20mm (upper intercanine width) for the other. Thirteen of the 34 differences were statistically significantly different among the model types (Repeated Mx. ANOVA) at the p=0.015 level. After proficiency was achieved, the mean time taken to record all measures was 25 and 19 minutes, respectively for the two virtual model systems and 15 minutes for plaster models. Conclusions: The reliability and accuracy of the measures made from the virtual model systems are well within the clinically acceptable range, though greater time is required to obtain these measures. Supported by the Southern Association of Orthodontists Research Grant.

Seq #45 - Digital Models / Caries Detection / Periodontal Disease Assessment
11:00 AM-12:15 PM, Thursday, 13 March 2003 Henry B. Gonzalez Convention Center Exhibit Hall C

Back to the Diagnostic Systems Program
Back to the 32nd Annual Meeting and Exhibition of the AADR (March 12-15, 2003)