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Correlation between different methods of working length measurement in root canal treatment

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Endodontic working length can be measured using apex locators, working length radiographs and also digital radiographic software. Apex locators are capable of identifying apical constriction using sinusoidal waves of different frequencies. Radiographic working length is usually calculated by inserting a file with a known length and reducing 0.5mm from the length of the tooth as appearing on the radiograph. It is usually taken as the final working length measurement. Digital radiographic software could be used to estimate the working length with a measuring tool by drawing a line from coronal reference point to the apical constriction. This could be measured with or without calibration. Software working length is measured without calibration in this study. The aim of the study is to assess the correlation between different methods used in estimation of the working length during root canal treatment.

Working length data were analyzed from SPSS 20.0 software by using paired sample t-test, Pearson Correlation and calculated ranks of Wilcoxon Signed Rank test. According to the paired sample t-test, both means of apex locator and software working lengths did not show a significant difference to the mean of the final working length (p-value: 0.205, 0.444 respectively). According to Pearson Correlation, apex locator and final working length are strongly correlated (r=0.868), while software working length and final working length are moderately correlated (r=0.623).

According to this study, the use of apex locator readings is the most dependable compared to software working length. Further research is needed to evaluate the use of calibrated software working length, which theoretically appears to be a predictable method.