

Efficacy of four nickel–titanium root canal instruments to prepare root canal at danger zone

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I. Objectives

The aim of this study were to evaluate efficacy of four nickel-titanium root canal instruments to prepare root canal at danger zone

II. Material and Methods

Forty mesial roots of extracted human lower molars were used. Masiobuccal and mesiolingual canals were instrumented using the crown-down technique with ProFile, GT™ Rotary file, Quantec file and ProTaper™. The muffle system introduced by Bramante and modified by McCann et al. was used to evaluate the root canal preparation. In each root, one canal was prepared with a straight up-and-down motion and the other canal was with anticurvature motion. Canals were instrumented until apical foramens were up to size of 30 by one operator. Each instrument was used only in one canal.

Pre- and post-instrumentation canal images were observed under a stereomicroscope, stored in a computer using a CCD camera and micro VIDEO Studio 200 program, and were traced and analyzed using Auto® CAD 2000 (Autodesk Corp., San Lafaél. CA, U. S. A.). The post-instrumentation canal images were superimposed over the pre-instrumentation images, and the change in root thickness was measured at the inner and outer sides of the canal at 1, 3, and 5 mm levels from the furcation area. Data were analyzed using two-way ANOVA.

III. Results

At 1 and 5 mm levels from the furcation, there was no significant difference in removing canal dentin among instruments. However, ProTaper group removed significantly more canal dentin than other three groups at 3 mm level, followed by Quantec, GT, and ProFile groups ($p < 0.05$).

There was no significant difference between straight up-and-down motion and anticurvature motion in removing canal dentin.

IV. Conclusions

It is concluded that there is no difference between straight up-and-down motion and anticurvature motion in saving canal dentin at danger zone. Special caution may be needed in preparing root canal at danger zone when using high tapered instrument to protect root dentin.