Centering ability and dentin removal of rotary systems in curved root canals

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Abstract

Introduction: The aim of this study was to compare centering ability and dentin removal of three rotary systems in curved root canals of extracted teeth.

Materials and Methods: Sixty root canals of mandibular first molars with curvatures ranging between 25-35° were divided into three groups of 20 teeth each. Based on pre-instrumentation radiographs that assessed the angle and the radius of canal curvatures, teeth with curvatures were equally spread between the three groups. The root canals were sectioned horizontally at two levels before preparation and then remounted onto the muffle. All root canals were prepared using a low-torque control motor with Mtwo or Medin or Race instruments. Cross-sectional images were obtained before and after instrumentation. Cross-sectional area and centering ability were evaluated. The data were analyzed using the one-way ANOVA and Tukey tests.

Results: Neither instrument fracture nor permanent deformation occurred during preparations. The best centering ability was obtained by Mtwo instruments compared to Race and Medin instruments. In the coronal and middle sections, Mtwo removed less dentin than Race and Medin; while the difference in the apical section was not significant.

Conclusion: Under the conditions of this study, the debridement of root canals was more conservative with Mtwo. The canals prepared with these instruments were better centered in all three regions of the root. [Iranian Endodontic Journal 2009;4(3):91-5]

Keywords: Centering ability, Medin, Mtwo, Race, Root canal, Rotary instruments.

Introduction

Success of root canal treatment greatly depends on the complete removal of microorganisms and necrotic tissue through chemo-mechanical preparation of root canal system which includes debridement of infected dentin and organic tissue (1). The aim of instrumentation is preparing a continuously tapered root canal area with increasing apico-coronal diameter which facilitate the irrigation and handling of the instruments (2,3). Effective root canal preparation should also provide a three dimensional area for proper condensation of root filling materials to establish an acceptable apical seal. Anatomic limitations of root canals such as curvatures make debridement difficult. Many instruments have been presented to overcome these problems, but only a few seem to be capable of obtaining the primary objectives of root canal preparation (4,5). It has been shown that root canal preparation using rotary nickel-titanium instruments facilitates root canal shaping and also maintains the canal curvature, even within severely curved canals (5-8). Many manufacturers have introduced new instruments with various novel designs and claims of superb preparation and quality. There are many variations in the design of NiTi rotary instruments and accordingly, many investigations have assessed their quality (1,4,8).