

مقایسه تأثیر پنج تکنیک مختلف آماده‌سازی کانال بر آناتومی اولیه کانالهای شبیه‌سازی شده دارای انحنای شدید

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**اندودنتیست

Title: Comparison of the effect of five root canal preparation techniques on original canal anatomy in simulated severely curved canals

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Background and Aim: Many methods and techniques of canal preparation work well in large and relatively straight canals. However, in severely curved canals, the complexity increases markedly, and techniques rendering good results in usual cases may be unsuccessful. The aim of this study was to compare the effect of five root canal preparation techniques on original canal anatomy in simulated severely curved canals.

Materials and Methods: In this experimental in vitro study, 100 simulated canal blocks with similar hardness were made from polyester. The degree of curvature was 45° with a radius of 2.55 mm and a straight part of 8mm. The blocks were prepared with five different techniques (20 canals in each group) as follows: 1- Stepback 2- Passive step back 3- Balanced force using flex-R files 4- Balanced force using Ni-Ti hand instruments 5- Hybrid using a rotary Ni-Ti system (XtremRace). Digital photographs were taken from pre- and post instrumentation colored canals. Then images were superimposed and analyzed by an image editing software. The amount of removed material from the inner and outer canal walls was measured at five levels: 1-The canal orifice (O) 2-The halfway between the orifice and the beginning of the curve (HO) 3-The beginning of the curve (BC) 4-The apex of the curve (AC) and 5-The endpoint of preparation (EP). Additionally, the time of instrumentation, instrument failure and changes in working length were recorded. Data were analyzed by ANOVA and Kruskal-Wallis tests with $p < 0.05$ as the limit of significance.

Results: Mean transportation was towards the outer aspect of the curve at the EP in all canals but there were no significant differences between the studied groups. At the BC point, all of the canals were transported towards the inner aspect of the curve and there were significant differences for both transportation values & direction among different groups. The highest amount of transportation was in step back and the lowest, in hybrid group. The highest transportation value was in step back and the lowest in balanced force group. Fractured and deformed instruments were observed in Flex-R files. The shortest canal preparation time was seen in XtremRace and the slowest, in Passive step back groups ($P < 0.001$).

Conclusion: Based on the results of this study, changes in canal curvature were less with techniques using nickel titanium instruments and the fastest technique with least transportation was XtremRace.

Key Words: Shaping; Simulated canals; Step back; Passive step back; Balanced force; XtremRace

چکیده

زمینه و هدف: ایجاد یک شکل مخروطی ایده‌آل در کانالهای دارای انحنای شدید یا در دندانهایی که سیستم کانال ریشه پیچیده دارند، به

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