

مقایسه خواص بیومکانیکی ریشه دندان، بدنبال دو روش مختلف آماده سازی و پرکردن

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Title: Comparing the Dental Root Biomechanical Properties Following Two Different Methods of Instrumentation and Obturation

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Introduction: Clinically, vertical root fracture occurs commonly in endodontically treated teeth. Previous studies have shown little changes in root fracture strength following endodontic treatment. The purpose of this study was evaluation of changes in dental root biomechanical properties following two different methods of instrumentation by Rotary (R) or Hand (H) files and two different methods of obturation by lateral (L) or vertical (V) technique.

Materials & Methods: In this invitro study, one hundred extracted human mandibular premolars with straight root, closed apices and free of caries were selected. For the teeth to be identical and simple to study, all teeth were decoronated 3mm above the CEJ. With making artificial PDL, all teeth were mounted in acrylic molds. Teeth were randomly distributed into four experimental groups according to the instrumentation and obturation techniques used each with a sample size of 25. Hand instrumentation was done using stainless steel (S.S) files and Step-Back technique. Rotary instrumentation was done using Ni-Ti files (Race) and crown-down technique. Loading was applied using a crosshead conical tip mounted in an Zwick testing machine. The crosshead tip was initially placed into the canal orifice of each tooth, advanced vertically until it contacted the gutta-percha automatically and at a constant rate (2mm/min). Root fracture was noted with observation of a sudden deflection in the running graph. Load to fracture was recorded in Newton (N). The energy to fracture, slope of elastic area and displacement was calculated using origin V.5.0 software through running graphs. The data were analyzed using ANOVA and Duncan test.

Results: Maximum mean load to fracture was observed in RL group (524 N). Minimum mean load to fracture was observed in RV (Rotary & Vertical) group (319 N). A significant difference in mean load to fracture was found between the (Rotary & Vertical) RV & (Hand & Lateral) HL, (Hand & Vertical) HV & (Rotary & Lateral) RL and (Rotary & Lateral) RL & (Rotary & Vertical) RV groups ($P < 0.05$). Both the energy and displacement were significantly correlated with load to fracture.

Conclusion: The fracture strength of roots obturated through vertical compaction of gutta-percha was lower than that of lateral compaction regardless of method of instrumentation. Fracture strength of root was not affected by the method of instrumentation (hand or rotary).

Key words: Fracture strength, Hand instrumentation, Rotary instrumentation, Root biomechanical properties, Root fracture.

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چکیده

مقدمه: با توجه به اینکه شکستگی ریشه یکی از مشکلات عمده دندانهایی است که درمان ریشه شده اند و با قبول این حقیقت که مطالعات گذشته کاهش کمی را در میزان استحکام شکست ریشه دندان بدنبال درمان ریشه در مقایسه با روشهای قدیمی نشان داده اند، هدف از مطالعه حاضر مقایسه میزان نیروی لازم برای شکست ریشه دندان به دنبال دو روش مختلف آماده سازی توسط فایل های چرخشی (R) و دستی (H) و دو روش مختلف پرکردن جانبی (L) و عمودی (V) گوتاپرکا بود.

مواد و روش ها: در این مطالعه تجربی آزمایشگاهی تعداد یکصد عدد دندان پره مولر کشیده شده فک پایین انسان انتخاب شد. دندانها عمود بر محور طولی ریشه در ۳ میلیمتر بالای سمتوانامل جانکشن قطع شد. با ساخت لیگامنت پرئودنتال مصنوعی، دندانها بصورت عمودی درون آکريل مانت شدند.