

**Republic of Iraq  
Ministry of Higher Education  
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College of Dentistry**



**Evaluation of the efficiency of three different obturation techniques to fill the isthmus area of root canals prepared by two different instrumentation techniques (An in vitro study)**

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### *Abstract*

The presence of root canal complexities such as isthmus may lead to failure of root canal therapy because of such inaccessible area may harbor tissue, microbes and debris after instrumentation

The purpose of this study was to evaluate the efficiency of three different obturation techniques (lateral condensation, E&Q and Soft Core) to obturate the isthmus area of roots prepared by two different instrumentation techniques (Rotary ProTaper Universal and ProTaper Next systems).

Sixty freshly extracted lower first mandibular teeth were randomly divided into two main groups (A and B) of 30 teeth each. Group A was prepared by rotary ProTaper Universal whereas group B was prepared by ProTaper Next system. Each main group was then randomly subdivided into three subgroups of 10 teeth each and obturated with the three obturation techniques. All specimens were then placed in cold cure acrylic mold just from the side of the crown leaving the root unmolded to facilitate the sectioning process, then three sections were obtained from each specimen by using microtome at 2, 6 and 10 mm from the apex. Each section was then viewed under stereomicroscope (40X) and imaged with digital camera (4X). Each image was managed with image J program to calculate the surface area of the whole isthmus and that of the gutta percha and/or sealer extended into the isthmus, so the collected data represented the percentage of extension degree of gutta percha and /or sealer into the isthmus (EDGS).

The highest mean value of **(EDGS)** was evident with Soft Core technique in the apical area and was significantly higher than that of the E&Q and lateral condensation techniques, and what related to instrumentation, ProTaper Next system better than ProTaper Universal system in subgroups of lateral condensation and E&Q techniques whereas ProTaper Universal was better in subgroups of Soft Core techniques.

Under the conditions of this study, Soft Core system showed a higher efficiency in obturating the isthmus area than the other obturation techniques.