

***Evaluation of the effect of root  
canal preparation size and flaring  
on the depth of irrigant penetration  
(in vitro study)***

A Thesis

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## *Abstract*

This study was conducted in vitro to evaluate and to compare the efficiency of Maxi-I-probe (side-vented needle), in the amount of root canal irrigant penetration for five different master apical file sizes (MAF) and four different degrees of coronal and middle thirds flaring.

Two hundred resin blocks with simulated root canals were used in this study and divided into 5 major groups (40 for each) based on the size of master apical files (#20, #25, #30, #35, and #40). Each major group was subdivided into 4 subgroups depending on different sizes and depth of flaring (10 for each). The instrumentation and flaring techniques were used as following: A. without flaring group, root canal shape resembles shape of the master apical K-file, B. flaring I group, flaring done with Gates Glidden I for 2 mm coronally, C. flaring II group, flaring was done with Gates Glidden I for 4 mm coronally, Gates Glidden II for 2 mm, D. flaring III group, flaring was done with Gates Glidden I for 6mm, Gates Glidden II 4mm and Gates Glidden III for 2 mm coronally. The syringe used for irrigation with Max-i-probe gauge 28 which was inserted 9 mm from the working length at flow rate 0.25mL/sec.

A Pilot study was done to detect ideal flow rate by using different loading on the syringe. 1 Kg gave 0.1mL/sec., 2 Kg gave 0.166 mL/sec., and 4 Kg gave 0.25 mL/sec. The statistical analysis for the data was done by using SPSS (statistical package for the social science) version 18; ANOVA and LSD were used to assess the P-Value at 1% and 5% significant difference.

It was shown that, Max-i-probe had a limited amount of irrigant entrance. Flaring was more effective in small canals than the larger canals, but increasing MAF size had more effect in irrigant entrance than increasing the Flaring.