The adaptability of three different gutta-percha obturation techniques: Thermafil, Soft core(regular),Soft core (low heat) of two different sizes (Comparative in vitro study)

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Abstract

This comparative in vitro study was conducted to compare the adaptability of three different gutta-percha root filling techniques of two different sizes: Soft core (low heat) (35) and Soft core (low heat) (40), Soft core (regular) (35), Soft core (regular) (40), Thermafil (35), Thermafil (40), Ninety freshly extracted maxillary first molars with straight palatal root canals were selected. All the teeth had mature apices, selected carefully according to specific criteria. Using a diamond disc bur with straight hand piece and water coolant the palatal roots of teeth were sectioned perpendicular to the long axis of the root at the furcation area which was marked using marker pen. All roots were prepared with crown down technique using hand protaper system (Sx-F4).

The prepared roots were randomly divided into six groups of fifteen roots each; the groups were obturated by different obturation technique of two different sizes [Soft core(low heat) (35),Soft core(low heat) (40),Soft core(regular)(35),Soft core (regular) (40), ,Thermafil (35) and Thermafil(40)] then all samples were incubated in the incubator at 37 C for one week .

Each one of the obturated teeth was sectioned at five levels (1, 3, 5, 7, and 9mm) from the apex. Each section was stained using 2% methylene blue stain then the slides were examined at an original magnification of 20X by mean of stereomicroscope and photographed by digital camera. All slides were scaled by means of ocular micrometer, and the obtained digital images were edited with ACDSee 9.0 program by using Dell lap top computer (Irland), and the images were captured as Tagged Image File Format (TIFF) images. AutoCAD program (Autodesk Inc, San Rafael, Calf.) was used to calculate:

1. Sealer/Gutta percha ratio.
2. Sealer average film thickness.
3. The percentage of increase above sealer average film thickness.

Data were collected and analyzed using Sigma Scan Pro 10 (SPSS, Chicago, Illionois, and USA).

ANOVA(Analysis of variance of mean) and Least significant difference test (LSD) were used for statistical analysis.

The results revealed that at the apical three levels Soft Core (Low heat 40) obturation technique had the best adaptability to canal walls followed by Thermafil (40) and finally by Soft Core (Regular 40) with no statistically significant difference among them($P<0.05$), while at the coronal two levels Soft Core (Regular 40) obturation technique had the best adaptability to canal walls followed by Thermafil (40) finally by Soft Core (Low Heat 40) with no statistically significant difference among them($P<0.05$).

The groups obturated with size (35) obturators showed the worst adaptability to the canal walls with statistically significant difference between these groups and the groups obturated with size 40 obturators($P<0.05$).