AN INVITRO CONFOCAL LASER SCANNING MICROSCOPIC COMPARISON OF DEPTH AND PERCENTAGE OF PENETRATION OF THREE SEALERS INTO DENTINAL TUBULES AFTER ROOT CANAL OBTURATION

by

Dr. Rai Raunak Umesh

Dissertation Submitted to the
Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore

In partial fulfillment
of the requirements for the degree of

MASTER OF DENTAL SURGERY (M.D.S.)

in

CONSERVATIVE DENTISTRY & ENDODONTICS

Under the guidance of

Dr. Mahantesh Yeli
Professor

DEPARTMENT OF CONSERVATIVE DENTISTRY & ENDODONTICS
S.D.M. COLLEGE OF DENTAL SCIENCES & HOSPITAL, DHARWAD

April 2012

ABSTRACT

Background & objectives: Selection of an appropriate sealer will influence the final outcome of endodontic therapy. Sealers are used as a binding agent, as a lubricant, to fill accessory canals and to help in sealing the gutta percha cones. The penetration of sealer cements into dentinal tubules improves the sealing ability and retention of the material and entombs any residual bacteria within the tubules. The ability of the root canal filling materials to penetrate into dentinal tubules is an important aspect in the prevention of the reinfection of the dentinal tubules and of the root canal.

The purpose of this study was to evaluate the percentage and average depth of penetration of Endoflas F.S., AH Plus and Epiphany sealers into dentinal tubules among the coronal, middle and apical thirds of the root using Confocal Laser Scanning Microscope.

Materials and methods: Thirty maxillary central incisors were selected; cleaning and shaping was done and the teeth were obturated with Gutta percha and Endoflas F.S., Gutta Percha and AH Plus and the Resilon-Epiphany system. Each of the sealers was mixed with fluorescent acridine orange dye for visibility under Confocal microscope. Teeth were cross-sectioned into coronal, middle and apical sections of around 2 mm thickness. Sections were observed under confocal laser scanning microscope. The obtained images were analyzed for percentage and average depth of sealer penetration into dentinal tubules using lasso tool in Adobe Photoshop CS3 and LSM 5 image analyzer.

Differences among the groups were statistically analyzed using ANOVA test and Tukey post hoc procedure.

Results: The percentage of penetration of Endoflas F.S. in the coronal, middle and apical thirds of the root was 52.30%, 34.34% and 23.45% respectively. The percentage of penetration of AH Plus in the coronal, middle and apical thirds of the root was 65.36%, 52.36% and 30.69% respectively. The percentage of penetration of Epiphany in the coronal, middle and apical thirds of the root was 88.57%, 77.99% and 47.30% respectively. The average depth of penetration of Endoflas F.S. in the coronal, middle and apical thirds of the root was 110.30μm, 65.62μm and 44.90μm respectively. The average depth of penetration of AH Plus in the coronal, middle and apical thirds of the root was 407.26μm, 324.85μm and 158.01 μm respectively. The average depth of penetration of Epiphany in the coronal, middle and apical thirds of the root was 594.36μm, 467.00μm and 286.01μm respectively.

Interpretation & Conclusion: Under the condition of this study it can be concluded that the percentage and average depth of penetration of sealer into dentinal tubules was highest for Epiphany followed by AH Plus and was lowest for Endoflas F.S at the coronal, middle and apical thirds of the root.

Keywords: *Resilon/epiphany; Endoflas F.S.; AH Plus; Confocal laser scanning microscope; Sealer penetration*