3479 Photopolymerization of fiber reinforced root canal post

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Objectives: During the last few years fiber reinforced composite (FRC) root canal post has been introduced to market. However, there still remains question of possible problem with the adhesion between highly crosslinked polymer matrix of FRC-posts and filler-composite. An alternative to resolve this problem FRC post simultaneously with the surrounding filler composite. The aim of this study was to determine the degree of conversion (DC) of resin matrix of FRC post polymerzed by light initiation in a simulated root canal.

Methods: Four different lengths (7,12,18,24 mm) of cylinders were used as a model of root canal. Two groups of cylinders where used: cylinders in Groups 1 were filled only with dimethacrylate resin (StickResin, StickTech, Finland) only. Cylinders in Groups 2 were filled with continuous unidirectional E-glass fibers (StickClassics) that have been further impregnated with resin. Specimens were light-cured (Elipar, ESPE, Germany) for 40 sec from the top of the cylinders. The bottom of the cylinder was fixed on FTIR/ATR (Fourier Transform Infrared spectroscopy/Attenuated Total Reflectance) (Spectrum One, Perkin Elmer) sample accessory and polymerisation process was analysed. Degree of conversion (DC%) was calculated from the aliphatic C=C peak at 1638 cm^{-1}, normalised against the aromatic C=C peak at 1582 cm^{-1}: DC% = (1-C/U)x100%, where C=absorption peak of the cured specimen, where U=absorption peak of the uncured specimen. Spectra of the sample was recorded every 2.5 min up to 5 min. Each IR-spectra was recorded with 8 scans using a resolution of 4 cm^{-1}.

Results:

	DC%/Length of cylinder(mm)			
Group	7	12	18	24
1. Resin	69.2	67.3	63.9	57.0
2. Resin+glass fibers	66.8	66.0	59.0	56.1

Regression line was fitted into both models with regression coefficients of 0.946 (resin, p=0.027) and 0.938 (fibers+resin, p=0.031).

Conclusions: This in vitro study showed that sufficient degree of conversion could be achieved by exposing light from other end of glass fiber post.

Seq #317 - Properties of Post and Core Materials, Properties of Endodontic Instruments, Effects of Bleaching Agents
11:00 AM-12:15 PM, Saturday, 9 March 2002 San Diego Convention Center Exhibit Hall C

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