

## **PENGARUH PENAMBAHAN KITOSAN NANOPARTIKEL PADA SILER RESIN EPOKSI TERHADAP KERAPATAN KORONAL DAN APIKAL BAHAN OBTURASI SALURAN AKAR**

### **INTISARI**

Penutupan yang baik pada daerah koronal dan apikal sistem saluran akar sangat diperlukan untuk mencegah kebocoran sehingga menghasilkan keberhasilan perawatan yang bertahan lama. Kitosan nanopartikel ditambahkan pada siler resin epoksi sebagai *nanofiller* untuk meningkatkan ikatan ke dentin. Tujuan penelitian ini untuk melihat kerapatan koronal dan apikal bahan obturasi siler resin epoksi dengan dan tanpa penambahah kitosan nanopartikel.

Dua puluh gigi premolar mandibula dilakukan perawatan saluran akar dengan metode *crown down*. Saluran akar dipreparasi menggunakan file putar sampai file #30/0,09. Lubrikasi menggunakan EDTA gel 15%. Saluran akar diirigasi menggunakan NaOCl 2,5%, EDTA 17% dan dibilas dengan akuades steril setiap pergantian larutan pada saat pergantian file. Spesimen penelitian dibagi dalam 2 kelompok (masing-masing kelompok 10 gigi), yaitu kelompok I bahan obturasi guta perca dan siler resin epoksi, Kelompok II bahan obturasi guta perca dan siler resin epoksi dengan penambahan kitosan nanopartikel. Spesimen disimpan dalam inkubator pada suhu 37 °C selama 7 hari, kemudian dilakukan uji *centrifuging dye penetration* menggunakan larutan *methylene blue* 2%. Spesimen dipotong longitudinal dan diukur penetrasi cat di bawah stereomikroskop (perbesaran 8x) dalam satuan milimeter (mm). Data kemudian dianalisis dengan uji t tidak berpasangan.

Hasil uji t tidak berpasangan menunjukkan rerata kebocoran koronal dan apikal kelompok obturasi guta perca dan siler resin epoksi tanpa penambahan kitosan nanopartikel lebih besar secara bermakna ( $p < 0,05$ ) dibandingkan kelompok obturasi guta perca dan siler resin epoksi dengan penambahan kitosan nanopartikel. Kesimpulan dari penelitian ini adalah kerapatan koronal dan apikal bahan obturasi dengan penambahan kitosan nanopartikel lebih besar daripada kerapatan koronal dan apikal bahan obturasi tanpa penambahan kitosan nanopartikel.

**Kata kunci** : kitosan nanopartikel, kerapatan koronal, kerapatan apikal, siler resin epoksi

## **THE EFFECT OF CHITOSAN NANOPARTICLES IN EPOXY RESIN-BASED SEALER ON APIKAL AND KORONAL SEALING ABILITY OF ROOT CANAL FILLING MATERIALS**

### **ABSTRACT**

A good sealing ability of apical and coronal part of root canal system is needed to prevent microleakage thus resulting long-lasting successful treatment. Chitosan nanoparticles as nanofillers could be added to epoxy resin sealer to increase the bond strength to dentinal wall. The purpose of this study was to evaluate the addition of chitosan nanoparticles to epoxy resin-based sealer on coronal and apical sealing ability of root canal filling materials.

Twenty mandibular premolars were used in this study. The root canals were prepared using rotary files up to #30/0,09. The canal was irrigated with 2.5% NaOCl, and 17% EDTA, then was rinsed with sterile water. All teeth were randomly divided into 2 groups (n=10). Group I was obturated with gutta-percha and epoxy resin sealer, group II was obturated with gutta-percha and epoxy resin sealer that was added with chitosan nanoparticles. All specimens were stored in an incubator for 7 days at 37°C. After that, specimens were tested with centrifuging dye penetration method with *methylene blue 2%* solution. The specimens were longitudinally sectioned, observed under stereomicroscope (8x magnification) and measured in millimetres (mm). The data were analysed using independent t test.

The results of independent t test showed that dye penetration in coronal and apical part of the root canal in group I (gutta percha and epoxy resin sealer) was greater than group II (gutta percha and epoxy resin sealer with addition of chitosan nanoparticles). The conclusion of this research is coronal and apical sealing of root canal filling material with addition of chitosan nanoparticles are tighter than that of root canal filling material without the addition of chitosan nanoparticles.

Keywords: chitosan nanoparticles, sealing ability, epoxy resin-based sealer