A study to comparison of characterizations of Zinc Oxide Eugenol based and Mineral Trioxide Aggregate based root canal sealers

Seok-Eun Lee¹, Ja-Won Cho¹, Hyun-Jun Yoo¹, Myung-Gu Lee², Yeol-Mae Jeon¹, Da-Hui Kim³, Hye-Won Park¹

¹Department of Preventive Dentistry, College of Dentistry, Dankook University, Cheonan, Republic of Korea

²College of Biomedical & Health Science, Department of Biomedical Chemistry, Konkuk University, Chungju, Republic of Korea

³Department of Dental Hygiene, College of Health Science, Dankook University, Cheonan, Republic of Korea

Objective: The aims of this study were to investigate antimicrobial activity and cytotoxicity of zinc oxide eugenol (ZOE) based and mineral trioxide aggregate (MTA) based root canal seal.

Methods: The root canal sealers in this study are Tubli-Seal as a ZOE based sealer and ProRoot as a MTA based sealer. The antimicrobial activity of ProRoot and Tubli-seal was carried out by susceptibility assay using *Enterococcus faecalis*, *Porphyromonas endodontalis*, and *Porphyromonas gingivalis*. The cytotoxicity of the root canal sealers was investigated by MTT assay, real-time RT-PCR, and ELISA after treatment of the sealers onto pulp cells. Also, the components of the root canal sealers were analyzed by X-ray fluorescence analysis.

Results: MTA based sealer showed stronger antimicrobial activity against *E. faecalis* than ZOE based sealer, and the antimicrobial activity of the both sealers against *P. endodontalis* and *P. gingivalis* showed no significant difference. ZOE based sealer showed strong cytotoxicity for pulp cells and induced expression and production of inflammatory cytokines. However, MTA based sealer did not affect cell viability of pulp cell and did not significantly induce expression of inflammatory cytokines such as TNF- α , IL-6 and IL-8. In analysis of the components, MTA based sealer has more kinds of metal oxides than ZOE based sealer.

Conclusion: MTA based sealer had stronger antimicrobial activity against *E. faecalis* compared to ZOE based sealer and did not significantly show cytotoxicity to pulp cells. In the basis of these results, MTA based sealer may be a suitable material to root canal therapy.

Key Words: zinc oxide eugenol, mineral trioxide aggregate, root canal sealer