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Effects of ERM on PDLF With MTA and SuperEBA

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Objectives The purpose of this study was to evaluate the effects of epithelial rest of Malassez' (ERM) cells on periodontal ligament cementogenesis and osteogenesis with MTA and modified zinc oxide-eugenol cement (SuperEBA), with regard to apicoectomy.

Methods In in vitro studies, human periodontal ligament fibroblasts (HPLFs) and ERM were used. As retro-filling materials, MTA and SuperEBA were used. Experiment was divided into 6 groups: PLDFs as control group, PLDFs with MTA as MTA group, PDLFs with SuperEBA as SuperEBA group, PLDFs co-cultured with ERMs as ERM group, PDLFs with MTA co-cultured with ERMs as MTA+ERM group, and PDLFs with SuperEBA co-cultured with ERMs as SuperEBA+ERM group. HPLFs of each group at 7 days were analyzed using qRT-PCR with target genes of *SPON1*, *RUNX2*, *RANKL*, and *OPG* (n=5). Wound healing assay was carried out (n=5). In in vivo studies, after endodontic treatment and root-apex amputation of first molars of rabbit, MTA and SuperEBA were used as root-end filling materials. Two weeks after surgery, paraffin sections were stained and observed with Hematoxylin-Eosin and immunohistochemically, with primary antibody of anti-pan cytokeratin for detection of ERM cells. The data were analyzed by one-way ANOVA with post-hoc Tukey's multiple comparison test ($p<0.05$).

Results In in vitro studies, *SPON1* mRNA expressions of ERM group and MTA+ERM groups were significantly lower than those of control group and MTA groups. mRNA expressions of *RUNX2* and *OPG* in ERM group and MTA+ERM groups showed tendency lower than the control group and MTA group. In wound healing assay, HPLFs migration of MTA+ERM group showed a tendency to slow down compared with MTA group.

Conclusions These results indicated that ERMs may inhibit hard tissue formation. Therefore, it is suggested that inflammatory tissue which provoke proliferation of ERMs is necessary to be removed completely.