

One-year Follow-up Evaluation of Use of Biphasic Calcium Phosphate Biomaterial in Regenerative Treatment of Chronic Apical Periodontitis

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Introduction. Non-surgical treatment of chronic apical periodontitis is a promising direction in endodontics. Literary sources prove the high efficiency of the use of synthetic biomaterials filling the osteolytic defects of the periapical area, placed orthograde and at the same time stimulating the healing processes in this area. Being directly in the lesion, the biomaterial becomes a matrix promoting adhesion, proliferation and differentiation of osteoblasts on nanoscale surface of biphasic calcium phosphate. Also biomaterials can be applied as an excellent apical barrier, which prevents an overfilling of a sealer and gutta-percha.

Aim, Materials and Methods. The aim of the study was to evaluate the use of biphasic calcium phosphate biomaterial in the regenerative treatment of chronic apical periodontitis. The study involved 35 patients aged 22–56 (35 teeth) with a diagnosis of chronic apical periodontitis. Among the included teeth, there were 12 incisors, seven canines, eight premolars and eight molars. The first visit included anesthesia, preparation of the carious cavity and endodontic access, determination of the length of root canals, chemomechanical preparation. Root canals were temporarily filled with antiseptic paste “Abscess Remedy” (PD, Switzerland) for 7–14 days.

In the second visit, the antiseptic paste was removed. The powder of hydroxyapatite (Hap) / β -tricalcium phosphate (TCP) ratio of 80/20 mixed with physiological solution until the pasty state was inserted by plugger over the apical foramina in to the periapical lesion on average amount 30–50 mcg. Then root canals were filled with AH Plus (Dentsply) and gutta-percha (Diadent Group International) by using cold lateral condensation technique. The final restoration was accomplished. Assessment of the condition of periapical tissues was based on radiovisiography (RVG) and the PAI index. The control examination was carried out immediately after the application of the biomaterial, then 3, 6 and 12 months later.

Results. Overfilling of AH Plus sealer and gutta-percha was not diagnosed. Observed patients were asymptomatic. Within 12 months, according to the RVG data, a decrease in the focus of bone destruction was detected, which was expressed in changes in the periapical index (PAI-index). For 12 months of observation, PAI 1 was in 31.4%, PAI 2 in 40.0%, PAI 3 in 22.9%, and PAI 4 in 5.7% of patients.

Conclusions. Studies have shown that biomaterials can be used as a filler for destruction of bone tissue, stimulating osteogenesis, and serve as an apical barrier, preventing release of the filling material beyond the root canal.