III

Biphasic Calcium Phosphate (BCP) Granules for Filling of Periapical Space in Endodontic Treatment of Apical Periodontitis

Madina Kurmanalina [1], ***Raisa Uraz*** [1], ***Janis Locs*** [2]

[1] *West Kazakhstan Marat Ospanov State Medical University, Department of Stomatology, Kazakhstan*
[2] *Riga Technical University, Rudolfs Cimdins Center for Development and Innovations of Biomaterials, Latvia*

Introduction. Regenerative endodontic procedures are widely being added to the current armamentarium of periapical therapy procedures (Gathani, 2016; Deng, 2016; Sharma, 2014). Biphasic Calcium Phosphate (BCP) biomaterials consist of synthetic bone minerals – hydroxyapatite (HAp) and calcium phosphateβ (TCPβ) in mineral content close to natural bone. HAP with slow biodegradation has stable long time of osseointegration. TCPβ has shorter time of biodegradation but has intensive release of Ca and P ions during this period.

Aim, Materials and Methods. The aim of the study is to present first experience of periapical implantation of TCP granules developed in Riga Technical University Rudolfs Cimdins Center for development and inovations of biomaterials.

Material: 10 (4 male and 6 female) patients aged from 22 to 45 with chronic apical periodontitis (10 teeth) were involved in the study.

Methods: Thermal and electric pulp tests indicated that the teeth were non-vital. Periapical radiograph showed the presence of a periradicular lesion varying in size from 1 to 5 mm. A total of 5 teeth were treated with primary root canal treatment and 5 teeth required retreatment. The teeth were opened with local anesthesia Sol. Ubistesini 1 : 200,000 (3M ESPE). The root canals were cleaned and shaped with K-files, H-files and Gates Glidden burs (Dentsply) using the step-back technique. Copious irrigation with 3 % sodium hypochlorite solution (*Белодез, ВладМиВа*) combined with EDTA and normal saline. Root canals were enlarged to No 40 size until clean white dentin shavings have been seen. Afterwards, the root canals were dried with sterile paper points (Euronda, Italy). As temporary dressing triple antibiotic paste composed of 400 mg metronidazole, 250 mg ciprofloxacin and 50 mg minocycline was applied. Composition was mixed with propylene glycol vehicle in order to obtain pasty consistency and was inserted in root canals for 1 week. The teeth were temporized.

The patients were recalled again after 1 week. During the second appointment 4 patients reported that they had experienced slight sensitivity on the day after the placement of triple antibiotic paste and that it had disappeared the next day; 6 patients were asymptomatic. During this second appointment, root canals were reirrigated with 3 % sodium hypochlorite, normal saline and dried with paper points. The granules of hydroxyapatite (HAp) / β- tricalcium phosphate (TCP) ratio of 80/20 in size range from 0.5 to 1 mm were inserted by plugger over the apical foramina in to the periapical lesion on average volume 30–50 mcg. Then the root canals were filled with AH Plus (Dentsply) and gutta-percha (Diadent Group International) by using the cold lateral condensation technique. The final restoration was accomplished.

Results. Patient remained asymptomatic during post-operative recalls. After a 3-month follow-up on examination, the teeth showed no pain on percussion, soft tissues were found healthy. 8 teeth control radiograph revealed the progressive reduction radiolucency of periapical lesion. 2 teeth had no signs of changes in periapical lesion radiolucency.

Conclusions. This study showed efficacy of HAp/β-TCP ratio of 80/20 in conservative endodontic treatment of chronic apical periodontitis. First results demonstrate successful outcomes. The follow-up for these patients will be maintained to control and collect late clinical data complete resolution of periapical radiolucency.

References.

Gathani, K. M. *Dent Res J*. 2016; 13: 379–386. Deng, Y. *J Oral Maxillofac Surg*. 2016; 74: 239–246. Sharma, S. *J Clin Diagn Res*. 2014; 8: 309–315.