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Use of Collagen, PTFE and PRF Membranes in Bone Reconstruction an Experimental and Histomorphometric Study

Ioana Irina Neculae[1], Vlad Marian Anghelescu[1], Sabina Andrada Zurac[2], Octavian Marius Dinca[1], Cristian George Vladan[1], Alexandru Bucur[1]

[1]Medical Department of Oro-Maxillo-Facial Surgery, Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

[2]Medical Department of Pathology, Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

Abstract

Bone regeneration techniques cannot be done without barrier membranes, even if horizontal or vertical ridge augmentation and socket ridge preservation is taken into consideration. This study presents a comparison between outcomes of bone regeneration, after producing standardized bone defects followed by covering them with membranes, on an animal experimental model. The study was conducted on 18 New Zeeland rabbits, by creating 2 defects in the left tibial bone of each rabbit: one standardized defect with a diameter of 4 mm, and the second by creating 5 monocortical holes with a small round bur. The defects were augmented with bovine bone, beta-tricalcium phosphate and perioglass and they were covered with 3 types of membrane: collagen (12 defects - group A), PTFE membrane (12 defects - group B) and PRF membrane, made from the blood of the same rabbit (12 defects – group C). The animals were sacrificed after 6 months and analysed histomorphometrically. The new bone around graft particles has a thickness of 98.26 µm for collagen membrane, 49.19 µm for PTFE membrane and 63.98 µm for PRF membrane. The density of osteoblasts and osteocytes has an average of 0.0012 for collagen membrane, 0.0009 for PTFE membrane and 0.0010 for PRF membrane. Regarding the collagen membrane, it is observed that when used the bone regeneration appears to have a higher density of osteoforming cells and a higher quantity of new bone

Key words: barrier membrane, bone regeneration, prf membrane, ptfe membrane, collagen membrane