

# P69 MORPHOGENESIS OF THE SKELETAL BONES AFTER IMPLANTATION OF HYDROXYAPATITE INTO THE TIBIA

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### MORPHOGENESIS OF THE SKELETAL BONES AFTER IMPLANTATION OF HYDROXYAPATITE INTO THE TIBIA

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**Key words:** rats, bone defect, hydroxyapatite, regeneration

**Introduction.** In the study, we attempted to assess features of bone growth after implantation of hydroxyapatite material OK-015 into the tibia.

**Materials and methods.** 126 rats with initial mass of 130-135 grams were divided into 3 groups: 1<sup>st</sup> group – intact animals, 2<sup>nd</sup> group – rats with 2.2 mm defect formed on the border between proximal metaphysis and diaphysis of the tibia. In the 3<sup>rd</sup> group, the bone defect was filled with 2.2 mm hydroxyapatite implants that contained vitreous phase up to 6,6%.

The observations terms were 7, 15, 30, 60, 90 and 180 days. The humeri, hipbones and the 3<sup>rd</sup> lumbar vertebrae were excised

for osteometry, and Simon index calculation.

**Results and discussion.** The intact animals exhibited intensive longitudinal and appositional bone growth. The 2<sup>nd</sup> group exhibited retarded bone growth evident in decrease of humerus length by 2.44%-5.43% in the period from the 30<sup>th</sup> till the 90<sup>th</sup> days compared to the controls. Length of the vertebral body by the 30<sup>th</sup> day of observation was less than that of the controls by 3.05%. Here we may assume that the experimental conditions influenced primarily epiphyseal cartilages because only the humerus features two epiphyseal cartilages unlike the rest of the studied bones. In the period from the 7<sup>th</sup> day to the 90<sup>th</sup> day antero-posterior diameter of the humerus was less than in the control group by 5.42%-8.83%. Vertebral body width in the same period decreased by 2.76%-5.49% and transverse diameter of the diaphysis of humerus decreased by 4.11%-7.10%. By the 180<sup>th</sup> day of observation, all values returned to baseline. Bone loss was confirmed by dynamics changes of obturator foramen size: its longitudinal size increased by 2.03%-5.61% compared to the controls. In the 3<sup>rd</sup> group growth rate also decreased yet to smaller extent than in the 2<sup>nd</sup> group and was observed mostly in humerus. The length of the humerus was less than in 1<sup>st</sup> group, by the 7, 30, 60 and 90 days by 2.69%-4.20%. Hipbone length and vertebral body length were not different to those of controls. Antero-posterior diameter of the humerus, was less than in group 1<sup>st</sup> on the 3,31%-7,22% respectively, in time from 15 day to 60 days. The transverse size of the vertebral body was not different to that of the control group. Simon index under such conditions increased similarly to the 2<sup>nd</sup> group.

**Conclusions.** The defect in tibia results in decrease of bone growth rate. Bone growth rate depended on regeneration activity degree in bone defect zone. Implantation of hydroxyapatite also resulted in retarded bones growth though less expressed than in the 2<sup>nd</sup> group. Probably, we can influence regeneration processes in the defect zone by implanting hydroxyapatite and systemic skeletal reactions by changing composition of implants.