

FIG. 2. Complex knee joint geometric model.

Conclusions

This work is only an initial part of a project of our laboratory which should lead to a final goal - a dynamic FE model useful for verification of a total knee replacement and well simulating the force relations inside a human knee. For this reason we chose a way of a gradual increasing of complexity of FE models and permanent validation of such models with laboratory tests. First we want to make a static model as detailed as possible and after that pass over a dynamic model.

Acknowledgements

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MORFOLOGICAL RESULTS OF ACUPUNCTURE STIMULATION FOR SKIN WOUNDS REPARATION IN EXPERIMENT

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Reparative and compensatory processes stimulation for quickest skin recovery is important for aesthetic surgery [1,2,3,4].

Aim

This research is to examine acupuncture stimulation effects for reparative regeneration of skin wounds in experiment.

Methods

Experiment was performed on 36 guinea pigs. The skin and subcutaneous fibrous tissue incision 3,5 cm long was made on 20 cm² of cut hair back. The periosteum was sepa-

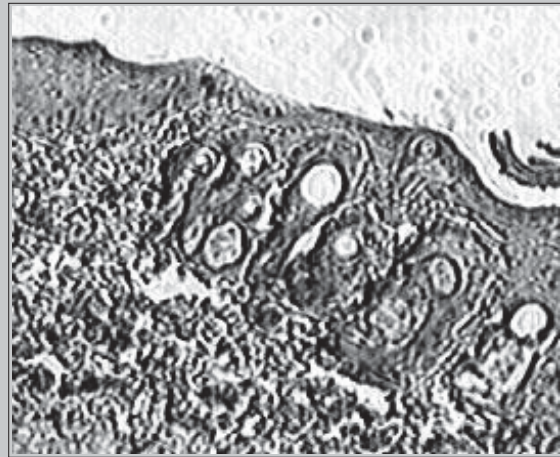


FIG. 1. Reparative regeneration of the skin wound 3 days postoperatively for the animals of the 1-st group.

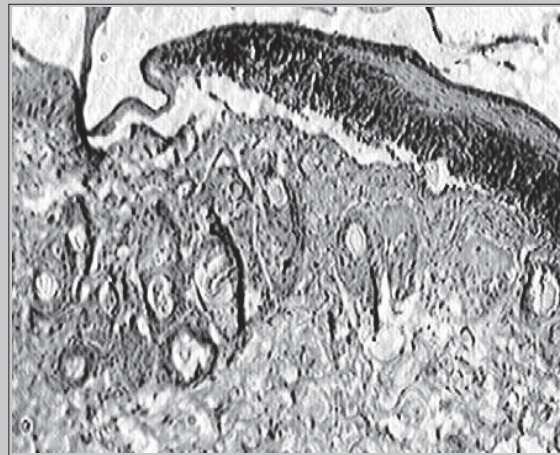


FIG. 2. Reparative regeneration of the skin wound 3 days postoperatively for the animals of the 2-nd group.

rated from the bone. Operations were carried out with Sol. Novocoini 0,25%. Once they put stitches in a wound, Viridis nitentis 1% was used to work up the wound. Animals were divided into 2 groups, 18 animals per a group. Acupuncture stimulation of the acupoint G14 [5] was applied for the animals of the 1-st group postoperatively while 10 days. 2-nd group animals did not passed postoperative treatment. It



was a control group. Animals were removed from the experiment 3,7,14, days, 2 months after the operation. During investigation we determined indexes of marked nucleuses, indices of epithelium proliferation and fibroblasts. Quantitative volume of different types of cells was established by osteometry methods.

Results showed authentic difference of proliferation indexes in the 1-st group as regards control group. Epithelium proliferation and fibroblasts indices were different from coefficient of significance $p < 0,001$ for the 3-rd day. For the 7,14-th days they were different from $p < 0,01$ and $p < 0,001$ correspondingly. Reparative regeneration of the skin wound 3 days postoperatively (FIG.1 and FIG.2)

Conclusion

Acupuncture treatment has positive influence to the processes of connective tissue and epidermis regeneration, scar formation and reorganization as well.

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STUDY OF THE REPARETIVE OSTEOINTEGRATION PROPERTIES OF CALCIUM PHOSPHATE CERAMICS "KAFAM"

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Over the past decades the bone-plastic surgery has a tendency to replace bone implants by synthetic implantation materials, whose structure and composition are close to the mineral component of human bone. This tendency opens a new stage in bone-replacing surgery. Abroad and in the CIS countries comprehensive and widespread studies are being made in the fields of synthesis and medical-biological tests of material able to stimulate the processes of reparative osteogenesis [1,2].

The co-workers of the Academy of Sciences of Belarus together with the Belarusian State Medical University have

developed and studied a porous bone-replacing material based on calcium phosphate - Kafam [3]. The present paper deals with the "Kafam" osteointegration properties investigated on laboratory animals by the angio-osteoscintigraphy.

Calcium phosphate ceramics was prepared from cheap natural biological materials. During this process organic and inorganic reagents of high purity were used to clean raw material. During in vivo experiments, the calcium phosphate ceramics samples with different heat treatment temperatures: 900 (type B) and 14000 C (type D) were used and had different physical-chemical properties. The type B material had larger porosity and smaller strength, as compared to the type D one. The crystalline structure of ceramics "Kafam" of the both-type materials corresponded to hydroxyapatite with a small amount of calcium phosphate admixture.

For the biological activity of calcium phosphate material to be specified, the angio-osteoscintigraphy procedure is adopted. Usually this method finds use for evaluation of the intensity of the metabolic processes that occur during healing of animal bone defects. With the angio-osteoscintigraphy applied, experiments were made on 54 rats, on whose anterior surface of the proximal end of the tibia of the back paw a number of the defects 7-8 mm long and 2-2.5 mm wide were performed. In this case, the medullar canal was not destructed.

All operated animals were divided into three groups: 18 individuals in each group (2 tentative and 1 control). In the first group of animals the performed bone defects were filled with ceramics "Kafam" (type B). In the second group the defects were filled with ceramics "Kafam" (type D). In the third group the bone defects were repaired under a blood clot. During operation the wounds of all animals being under general anaesthesia were treated with antibiotic and were sutured. The angio-osteoscintigraphical assessments were done after 7, 14, 21, 28, 42, 56 days since surgery. For this purpose, a computerized gamma camera LEM (Firm "Siemens") and an osteotropic radio pharmacological preparation "Medronat" labeled with technetium-99 were used. In 120-150 min after preparation injection, the content of the latter in the zone of the bone defect and also in the symmetric zone of the intact bone was investigated.

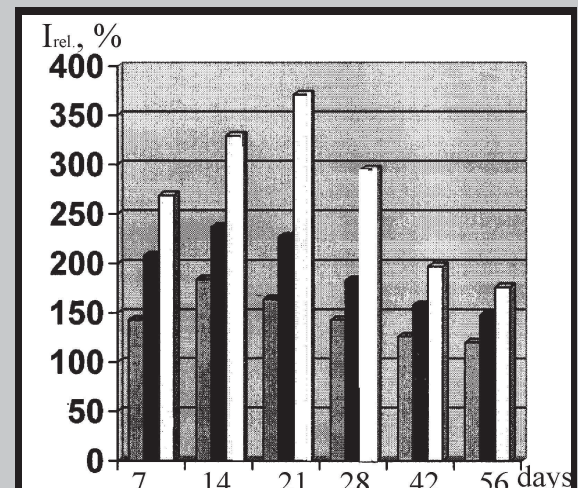


FIG. 1. Variations of the accumulated osteotropic radio pharmacological preparation content in the bony regenerative tissue during healing of the bone defect using material "Kafam".