Research article

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STRUCTURAL ORGANISATION OF FEMORAL BONES OF WHITE LABORATORY RATS ASSOCIATED WITH AMINOPHOSPHONATES AND AMINOBISPHOSPHONATES

ABSTRACT. Background. In recent years, the total amount of atypical forms of inflammatory processes of the jaw in a group of patients exposed to psychotropic substances significantly increased. **Objective.** To evaluate the degree of peculiarities of morphological changes in proximal epiphysis of femoral bone of white laboratory rats under influence of non-opioid branded equivalent of “tweak” and aminophosphonate drug “Pamired” (pamidronic acid). **Methods.** 30 white laboratory rats were used in the research and 3 groups of animals were formed with 10 animals in each group. Control group of animals received 1.0 ml of distilled water intragastrically and 1.0 ml of normal saline intraperitoneally once a day during 3 months. Experimental rats received aminobiphosphonate drug “Pamired” and 63 mg/kg of non-opioid branded equivalent of “tweak” (aminophosphonate substance) during three month. External and internal surface of proximal epiphysis of femoral bone were studied with scanning electron microscopy and light microscopy. **Results.** Animals that received aminobiphosphonate drug “Pamired” had high mineralization of collagen matrix. As a result growth plate became more narrow (dystrophy), size of foramina nutricia and branches of Volkmann canals became smaller during intense bone growth. Animals that received non-opioid branded equivalent of “tweak” had the highest degree of mineralization and visual breaking of growth plate. Size of foramina nutricia decreased and number of branches of Volkmann canals also decreased; it leads to degenerative processes in the bone. **Conclusion.** Administration of non-opioid branded equivalent of “tweak” in dose 63 mg/kg and aminobiphosphonate drug “Pamired” during 3 month cause bone hypermineralization and lead to structural disorders of femoral proximal epiphyses in white laboratory rats. Structural disorders due to administration of non-opioid branded equivalent of “tweak” are more intensive.

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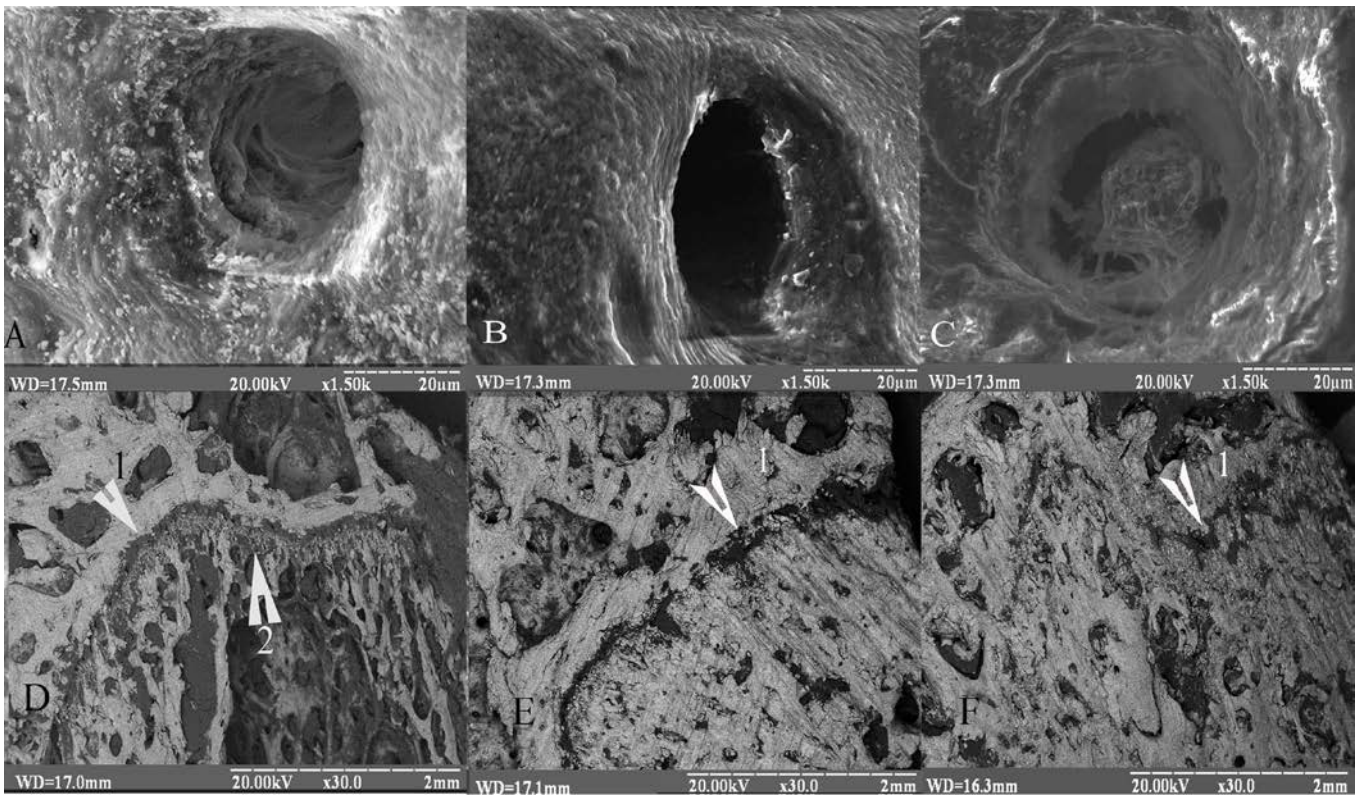

Fig. 1. Scanning electron microscopy of the proximal division of femoral bone. A. Volkmann canal bearing ordered thread-like compactions on its surface, group 1 animal. ×1500. B. Volkmann canal of the group 2 animal. Uniform deposition of the mineral component, flattening of thread folds on the canal walls. ×1500. C. Volkmann canal of the group 3 animal. Predominance of the amorphous part in the mineral component lining the calan walls. ×1500. D. Longitudinal cut of the proximal fragment of femoral bone of group 1 animal (1 – metaepiphyseal plate, 2 – primary spongiosa). ×20. E. Longitudinal cut of the proximal fragment of femoral bone of group 2 animal (1 – metaepiphyseal plate). Scanning electron microscopy. ×20. F. Longitudinal cut of the proximal fragment of femoral bone of group 3 animal (1 – non-mineralized areas of metaepiphyseal plate). ×20.

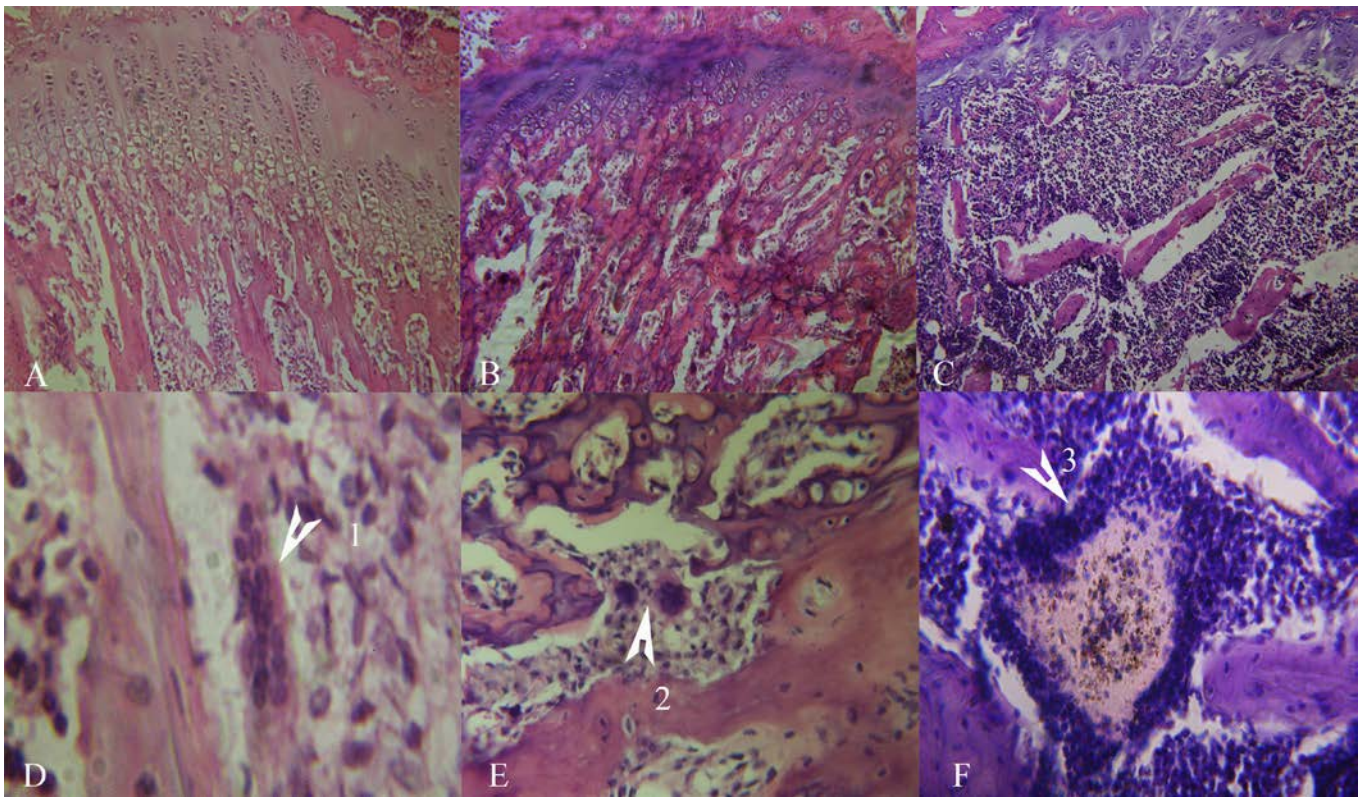

Fig. 2. The results of light microscopy of the proximal division of the femoral bones in the groups of examined animals. Hematoxylin&Eosin staining. A. Metaepiphyseal plate of the control group animal with regular histoarchitectonics (zonality is preserved). ×100. B. Decreased thickness and impaired zonality of metaepiphyseal plate in group 2 animal. ×100. C. Decreased thickness and no zonality of metaepiphyseal plate in group 3 animal. ×100. D. 1 –×800. E. 2 mature inactive chondroclast in the area of calcified cartilage with trabecular structure in the group 2 animal. ×200. F. 3 – calcification among the trabeculae of secondary spongiosa in the group 3 animal. ×600.

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