MINERAL MATRIX REMODELLING IN INTACT BONES DURING FRACTURE HEALING.

---------------------------- Author ----------------------------
N. Kornilov, A. Avrunin, A. Sukhanov, V. Parshin. Russian Research Institute of Traumatology and Orthopaedics named after R. Vreden, St. Petersburg, State Medical University named after I. Pavlov, St. Petersburg, Russia.

---------------------------- Body ----------------------------
Having studied in experiments the dynamics of phosphate metabolism in the mineral matrix of intact bones in the process of isolated fracture healing, the authors determined the "traumatic area", and formulated the law of local reaction development (Avrunin et al., 1991, 1992). The purpose of this study was to estimate the dynamics of bone matrix turnover in different areas of intact bones. X-ray densitometry was used to follow the changes of thickness and mineral saturation of the right tibial cortical bone and caudal vertebrae in white male rats weighing 180-220 g with an isolated transverse fracture of the right femur fixed with an intramedullary nail. The animals were examined every day after the trauma during 2 months, and the mathematical models of the parameters were obtained. It was found out that the size and the mineral density of the studied zones varied around the changing trend with 7-day periodicity. While estimating the dynamics of parameters in two different areas we found the changes to be asymmetrical. The rate of asymmetry changed with circaseptane periodicity. During the first part of the period the rate of the mineral turnover was higher in one area of the bone and during the second part - in the other one. The oscillatory processes were significantly influeced by the distance from the fracture site. The results of the study revealed the presence of a certain area in the intact bone where the dynamics of mineral metabolism changes repeated the changes in the fracture site during different stages of fracture healing.