Bone Mass and Bone Quality Are Altered by Hypoactivity in the Chicken

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Résumé en anglais	Disuse induces a rapid bone loss in adults; sedentarity is now recognized as a risk factor for osteoporosis. Hypoactivity or confinement also decrease bone mass in adults but their effects are largely unknown and only few animal models have been described. We have used 10 chickens of the rapidly growing strain 857K bred in a large enclosure (FREE group); 10 others were confined in small cages with little space to move around (HYPO group). They were sacrificed at 53 days and femurs and tibias were evaluated by texture analysis, dual energy X-ray densitometry, microcomputed tomography (microCT) and histomorphometry. Hypoactivity had no effect on the length and diameter of the bones. Bone mineral density (BMD), microCT (trabecular bone volume and trabecular microarchitecture) and texture analysis were always found significantly reduced in the animals of the HYPO group. BMD was reduced at both femur and tibia diaphysises; BMD of the metaphysis was significantly reduced in the femur but not in the tibia. An increase in osteoid volume and surfaces was noted in the HYPO group. However, there was no alteration of the mineral phase as the osteoid thickness did not differ from control animals. Bone loss was much more pronounced at the lower femur metaphysis than at the upper metaphysis of the tibia. At the tibia, only microarchitectural changes of trabecular bone could be evidenced. The confined chicken represents a new method for the study of hypodynamia since these animals do not have surgical lesions.
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