

The effects of physical activity (treadmill and vibration stimulation training) on RANKL and OPG expression in bone cells, in rats with glucocorticoid-induced osteoporosis

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The aim of this study was to investigate bone tissue and plasma levels of RANKL and OPG in rats with prednisolone-induced osteoporosis and to evaluate the outcomes of physical activity on the skeletal system by treadmill and vibration platform training. Osteoporosis is a disease characterised by low bone mass and structural deterioration of bone tissue leading to bone fragility. Vibration exercise is a new and effective measure to prevent muscular atrophy and osteoporosis. The animals were divided into 5 groups. 1: control rats; 2: rats with osteoporosis receiving prednisolone; 3: rats receiving prednisolone and treadmill training; 4: rats receiving prednisolone and vibration stimulation training; 5: rats receiving prednisolone, treadmill training and vibration stimulation training. Bone evaluations used whole-body scans, histology and histomorphometric analysis. RANKL and OPG expression was evaluated by immunohistochemistry and biochemical analysis. After treatment, our data demonstrated that RANKL expression was significantly increased in groups 2 and 3 and decreased in groups 4 and 5. Conversely, OPG expression was significantly decreased in groups 2 and 3 and increased in groups 4 and 5. In conclusion, our findings suggest that mechanical stimulation inhibits the activity of RANKL. This finding provides new insights into the occurrence and progression of osteoporosis.

References

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Key words

Bone, osteoporosis, glucocorticoids, RANKL, OPG, physical activity.