The Beneficial Effect of Physical Training in Diabetic Bone: A Short Time Study in STZ-induced Diabetic Rats

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Introduction: Type 1 Diabetes is associated with several complications including osteoporosis. Studies have shown a beneficial effect of physical training in bone turnover; however, there are only few studies attempting to this in diabetic bone. **Objectives:** We aimed to evaluated the effect of physical training in diabetic-induced bone loss rats during a short period of four weeks. Material and Methods: Male Wistar rats were distributed in four groups (seven rats each): Control, Diabetic (STZ, 40 mg/Kg i.v.), Control Trained (CT) and Diabetic Trained (DT). Training program consisted of running on a treadmill (13 m/min; 60 min/day; 5 days/week). Serum biochemistry and tibia biomechanics parameters were performed. Animals with serum glucose ≥ 250 mg/dL, polyphagia, polydipsia, polyuria and body weight loss were considered diabetics. **Results and Discussion:** Biochemistry analysis showed an increased ALP activity and lower Ionized Ca in diabetic trained group when compared to CT group, suggesting an increased bone formation mediated by physical training. Regarding biomechanical analyses, we observed a tendency of increase in ultimate load, stiffness, ultimate stress, ultimate strain and Young's modulus in Diabetic Trained group, that despite no significate, indicate an interesting improvement of bone mechanical by training in diabetes condition. On the other hand, our results are reinforced by reduction in ultimate load, ultimate stress and Young's Modulus values in Diabetic rats without training in comparison to Control group, indicating a poor bone strength and flexibility. **Conclusions:** The physical training in diabetes condition suggest a stimulation of bone formation by increased ALP activity, which lead to an improvement of bone mechanical condition, even though in a short time of study. In addition, these results indicate that training in diabetes condition during a long period may be helpful against diabetes-induced bone loss.

Key words: STZ-induced diabetes; Physical training; Biomechanical analyses and ALP activity.

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