

Boron supplementation improves bone health of non-obese diabetic mice.

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Abstract

Diabetes Mellitus is a condition that predisposes a higher risk for the development of osteoporosis. The objective of this study was to investigate the influence of boron supplementation on bone microstructure and strength in control and non-obese diabetic mice for 30 days. The animals were supplemented with 40 µg/0,5ml of boron solution and controls received 0,5ml of distilled water daily. We evaluated the biochemical parameters: total calcium, phosphorus, magnesium and boron; bone analysis: bone computed microtomography, and biomechanical assay with a three point test on the femur. This study consisted of 28 animals divided into four groups: Group water control - Ctrl (n=10), Group boron control - Ctrl±B (n=8), Group diabetic water - Diab (n=5) and Group diabetic boron - Diab±B (n=5). The results showed that cortical bone volume and the trabecular bone volume fraction were higher for Diab±B and Ctrl±B compared to the Diab and Ctrl groups (p≤0,05). The trabecular specific bone surface was greater for the Diab±B group, and the trabecular thickness and structure model index had the worst values for the Diab group. The boron serum concentrations were higher for the Diab±B group compared to non-supplemented groups. The magnesium concentration was lower for Diab and Diab±B compared with controls. The biomechanical test on the femur revealed maintenance of parameters of the bone strength in animals Diab±B compared to the Diab group and controls. The results suggest that boron supplementation improves parameters related to bone strength and microstructure of cortical and trabecular bone in diabetic animals and the controls that were supplemented.

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