Osteogenic impact of football training in women and men with prediabetes

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Aim

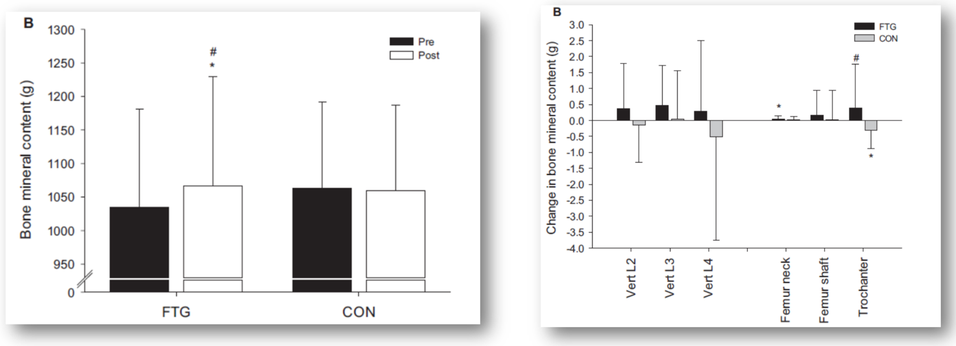
The aim of the study was to evaluate the effects of football training on bone health in 55- to 70-yerar-old sedentary women and men with prediabetes.

Method and design

Patients (n = 50) with prediabetes (age; 61 ± 9 years, BMI 29.7 ± 0.6 kg/m^2 , body fat content; 37 ± 1%, VO_{2max} ; 22.7 ± 0.8 mL/min/kg and mean arterial pressure; 104 ± 3 mm Hg) were randomized into a football training group (FTG; n = 27, 14 women) and a control group (CON; n = 23, 11 women). At baseline, 73% and 24% were diagnosed with femur osteopenia and osteoporosis, respectively. FTG performed football training twice weekly 30-60-minute sessions in 16 weeks, and both FTG and CON received professional dietary advice. Pre- and post-intervention whole-body and regional bone mineral content (BMC) and density (BMD) were determined with DXA-scans, and venous blood samples were drawn and analyzed for plasma bone turnover markers

Results

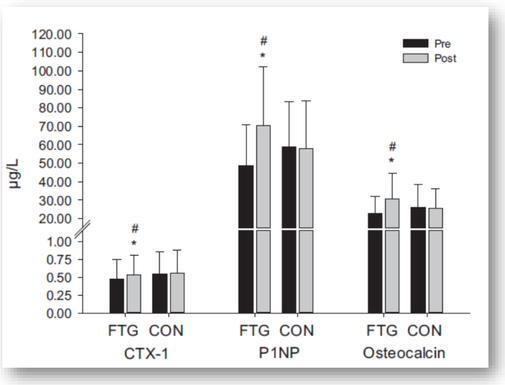
Change scores were greater (P < 0.05) in FTG compared to CON in leg BMD (0.023 ± 0.005 vs -0.004 ± 0.001 g/cm^2) and in leg BMC (32 ± 8 vs -4 ± 6 g). Between-group changes in favor of FTG (P < 0.05) also occurred in the femur neck BMD (3.2%) and femur shaft BMD (2.5%). Whole-body BMC and BMD were unchanged in both groups during the intervention. In FTG, resting plasma osteocalcin, P1NP, and CTX-1 rose (P < 0.05) by 23 ± 8, 52 ± 9 and 38 ± 7%, with greater change scores (P < 0.05) than in CON. Finally, P1NP (formation)/CTX-1 (resorption) ratio increased (P < 0.05) in FTG (127 ± 15 vs 150 ± 11) from pre- to post-intervention, with no change in CON (124 ± 12 and 123 ± 12).



Figur B

To the left: Leg bone mineral content in FTG and CON pre- and post-intervention.

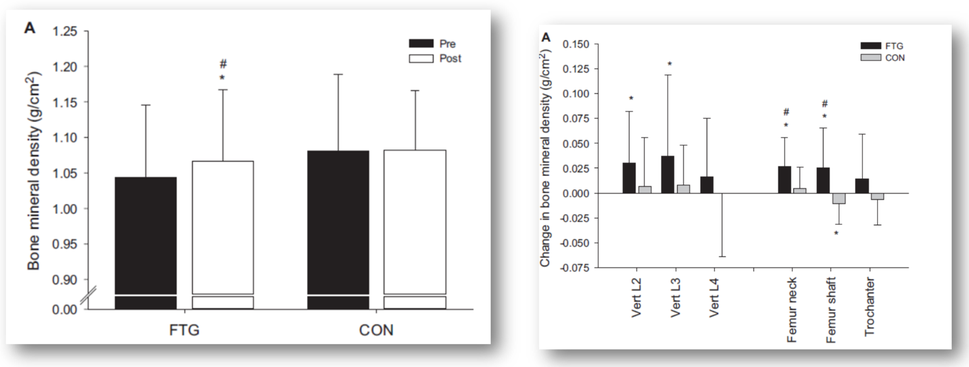
To the right: Change in bone mineral content in FTG and CON pre- and post-interventionin selected sites in the lower spine and the femur.



Figur C

Plasma bone turnover markers in FTG and CON pre-and post-intervention.

*Denotes a significant difference from pre. #Denotes a significant difference in change score from CON. Significant level P < 0.05. Data are means ± SD (standard deviation)



Figur A

To the left: Leg bone mineral density in FTG and CON pre- and Post intervention

To the right: Change in bone mineral density in FTGT and CON pre- and post-intervention selected sites in lower spine and the femur

Conclusion

In conclusion, football training provides a powerful osteogenic stimulus and improves bone health in 55- to 70-year-old women and men diagnosed with prediabetes.