TACSM Abstract

Title: Differences in Bone Mineral Density at the Femoral Neck and Lumbar Regions across Female Soccer Players, Olympic Lifters and Power Lifters

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ABSTRACT

Power lifting can improve total body bone mineral density (BMD), but improvements in the regions most susceptible to injury (femoral neck and lumbar vertebrae) have not been demonstrated. Soccer players, who engage in odd-impact loading, have greater BMD at the femoral neck than sedentary controls. Olympic lifting involves both high- and odd-impact loading at the femoral neck and lumbar regions, but comparisons in BMD across sport-specific athletes have not yet been made. **PURPOSE:** To examine differences in total BMD and BMD at the femoral neck and lumbar vertebrae between female power lifters (PL), Olympic lifters (OL), soccer players (SP) and recreationally active individuals (RA). **METHODS:** Thirty-seven females participated in this study: 10 PL, 8 OL, 8 SP, and 11 RA (mean age = 24.5 ± 7.9 years). Total BMD, BMD at lumbar vertebrae L1-L4, and BMD at the femoral neck of the dominant leg were measured along with body composition (total fat mass, lean mass, and percent body fat) with dual-energy x-ray absorptiometry. Body composition components were compared across groups with a one-way ANOVA. BMD measures were compared across groups with an ANCOVA with weight, height, and body mass index as covariates. Tukey's tests were used for post-hoc analysis. Significance was accepted at $P < 0.05$. **RESULTS:** All three athletic groups had greater total BMD than RA (1.071 ± 0.066 g·cm-2). OL (1.306 ± 0.08 g·cm-2) had greater total BMD than PL (1.071 ± 0.07 g·cm-2), but it was not different than SP. At the femoral neck, OL (1.127 ± 0.09 g·cm-2) and SP (1.212 ± 0.10 g·cm-2) [but not PL (1.075 ± 0.16 g·cm-2)] had greater BMD than RA (0.971 ± 0.99 g·cm-2). BMD at the femoral neck was greater in SP than in PL, with no difference between OL and PL. At lumbar spine sites L2 – L4, there was no difference across the three athletic groups. OL and PL had a greater BMD than RA at L2-4, whereas SP had greater BMD than RA at only at L4. There was no difference across all groups at L1. **CONCLUSION:** Olympic lifting includes both high- and odd- impact movements in addition to high-force loading. Olympic lifters showed similar BMD at the femoral neck as soccer players and similar BMD in the lumbar spine as power lifters. Thus, Olympic lifting may have greater BMD effects in the two key regions that are susceptible to injury compared to sports that do not combine power and odd-impact training.