

Abstract

“Bone mineral density of the ultra-distal radius in young women”

Musculoskeletal impairments, such as osteoporosis and fractures, reduce the quality of life and productivity of the individual and are financially burdensome for society. Wrist fractures are among the most frequently reported of fall-related injuries in women over the age of 65. It is essential to develop treatment and prevention programs for this devastating health issue. The purpose of the study was to measure the bone mineral density (BMD) of the ultra-distal radius and to determine if axially loading the radius influences BMD at this site in a sample of young healthy women. Fifty-two women aged (age $21.8 + 1.59$ years) participated in this cross-sectional study. The women were placed into two groups: one group served as controls and was made up of 35 women whose reported activities do not specifically include compressive axial loading of the wrist; the second group included 17 women whose reported activities specifically include compressive axial loading of the radius, competitive college gymnastics. It was hypothesized that the BMD would be statistically greater in gymnasts than in the control group. The BMD of both wrists was measured using, dual energy X-ray absorptiometry (DXA). The ultra-distal BMD was 30% higher in gymnasts than in controls (0.656 ± 0.055 vs. 0.562 ± 0.048 g/cm², $p < 0.001$). The results of this study supported the hypothesis that the gymnast group would have higher BMD and therefore demonstrated that the ultra-distal radius is responsive to loading. Ultimately, if some falls are unavoidable in the aged population, the incidences of fall related injuries, such as Colles' fracture, can hopefully be reduced through interventions such as physical activity which increase BMD a component of bone quality.