

Bone Health Special Interest Group Research Update

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Greetings!

Thank you for your membership in the Bone Health SIG! In keeping with our updated mission of promoting bone health across the lifespan, this issue highlights two recently published articles describing bone health in adolescents. Farr and colleagues explored the relationship between total body fat mass and bone mineral density, while Sharma and colleagues identified psychosocial factors, such as sports participation, that influence physical activity and impact bone health. We hope this information will give you new ideas for optimal management of our current or potential clients.



Relationship of total body fat mass to weight-bearing bone volumetric density, geometry, and strength in young girls.

Farr JN, Chen Z, Lisse JR, Lohman TG, Going SB. Relationship of total body fat mass to weight-bearing bone volumetric density, geometry, and strength in young girls. *Bone*. 2010;46(4): 977-84. Epub 6 Jan 2010.

[Relationship of total body fat mass to weight-bearing bone volumetric density, geometry, and strength in young girls.](#)

BACKGROUND: Understanding the influence of total body fat mass (TBFM) on bone during the peri-pubertal years is critical for the development of future interventions aimed at improving bone strength and reducing fracture risk. Thus, we evaluated the relationship of TBFM to volumetric bone mineral density (vBMD), geometry, and strength at metaphyseal and diaphyseal sites of the femur and tibia of young girls. **METHODS:** Data from 396 girls aged 8-13 years from the "Jump-In: Building Better Bones" study were analyzed. Bone parameters were assessed using peripheral quantitative computed tomography (pQCT) at the 4% and 20% distal femur and 4% and 66% distal tibia of the non-dominant leg. Bone parameters at the 4% sites included trabecular vBMD, periosteal circumference, and bone strength index (BSI), while at the 20% femur and 66% tibia, parameters included cortical vBMD, periosteal circumference, and strength-strain index (SSI). Multiple linear regression analyses were used to assess associations between bone parameters and TBFM, controlling for muscle cross-sectional area (MCSA). Regression analyses were then repeated with maturity, bone length, physical activity, and ethnicity as additional covariates. Analysis of covariance (ANCOVA) was used to compare bone parameters among tertiles of TBFM. **RESULTS:** In regression models with TBFM and MCSA, associations between TBFM and bone parameters at all sites were not significant. TBFM explained very little variance in all bone parameters (0.2-2.3%). In

contrast, MCSA was strongly related ($p < 0.001$) to all bone parameters, except cortical vBMD. The addition of maturity, bone length, physical activity, and ethnicity did not alter the relationship between TBFM and bone parameters. With bone parameters expressed relative to total body mass, ANCOVA showed that all outcomes were significantly ($p < 0.001$) greater in the lowest compared to the middle and highest tertiles of TBFM. CONCLUSION: Although TBFM is correlated with femur and tibia vBMD, periosteal circumference, and strength in young girls, this relationship is significantly attenuated after adjustment for MCSA. Nevertheless, girls with higher TBFM relative to body mass have markedly diminished vBMD, geometry, and bone strength at metaphyseal and diaphyseal sites of the femur and tibia. Copyright 2010 Elsevier Inc. All rights reserved.

PMID: 20060079 [PubMed - indexed for MEDLINE]PMCID: PMC2842480 [Available on 2011/4

A path analysis to identify the psychosocial factors influencing physical activity and bone health in middle-school girls.

Sharma SV, Hoelscher DM, Kelder SH, Diamond PM, Day RS, Hergenroeder AC. A path analysis to identify the psychosocial factors influencing physical activity and bone health in middle-school girls. *J Phys Act Health*. 2009 Sep;6(5):606-16.

[A path analysis to identify the psychosocial factors influencing physical activity and bone health in middle-school girls.](#)

BACKGROUND: The purpose of this study was to identify pathways used by psychosocial factors to influence physical activity and bone health in middle-school girls. METHODS: Baseline data from the Incorporating More Physical Activity and Calcium in Teens (IMPACT) study collected in 2001 to 2003 were used. IMPACT was a 1 1/2 years nutrition and physical activity intervention study designed to improve bone density in 717 middle-school girls in Texas. Structural Equations Modeling was used to examine the interrelationships and identify the direct and indirect pathways used by various psychosocial and environmental factors to influence physical activity and bone health. RESULTS: Results show that physical activity self-efficacy and social support (friend, family engagement, and encouragement in physical activity) had a significant direct and indirect influence on physical activity with participation in sports teams as the mediator. Participation in sports teams had a direct effect on both physical activity ($\beta = 0.20$, $P < .05$) and bone health and ($\beta = 0.13$, $P < .05$). CONCLUSION: The current study identified several direct and indirect pathways that psychosocial factors use to influence physical activity and bone health among adolescent girls. These findings are critical for the development of effective interventions for promoting bone health in this population.

PMID: 19953837 [PubMed - indexed for MEDLINE]

Bone Health Meetings and Symposia

We will keep you informed of current bone health research and collaborations through the year. If you are aware of any bone health related meetings and conferences, please let us know so we can share this in future communications.

Coming up are the following:

October 15 - 19, 2010
ASBMR 2010 Annual Meeting
Toronto, Ontario, Canada
<http://www.asbmr.org>

November 28 - December 1, 2010
Osteoporosis Conference 2010
Arena & Convention Centre Liverpool
Liverpool, Merseyside, United Kingdom
www.nos.org.uk/conference

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