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The relationship between quality protein, lean mass, and bone health

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Background

The amount of quality protein (Essential Amino Acids (EAA): Protein) intake, and distribution of that protein to a meal, could play an important role with regard to lean mass (LM), bone mineral density (BMD), and bone mineral content (BMC). Research has demonstrated that muscle protein synthesis (MPS) is maximally stimulated at ~10g of EAA per meal (Cuthbertson, et al. 2005). A cross sectional study sought to determine the relationship between the amount of quality protein consumed in 24 hours and the amount of times the ~10g EAA threshold was reached at a meal, with respect to LM, BMD, and BMC.

Methods

Twenty-seven healthy males and females (22.0 ± 3.19 yrs; 169.68 ± 8.20 cm; 71.72 ± 13.95 kg) participated in this study. EAA intake was determined from a 3-day food record, and amino acid profiling for each food was determined using a computer program (Nutrition Data). LM, BMD, and BMC were measured using dual-energy X-ray absorptiometry (DEXA). Quality protein was defined as the ratio of EAA to total dietary protein. Data were analyzed using Pearson partial coefficient correlations, controlling for body mass, with an alpha level of 0.05.

Results

Quality protein consumed in a 24 hour period was positively associated with LM (r = .585, p = .002), BMD (r =.607, p = .001), BMC (r = .557, p = .003), and had an inverse relationship with body fat percentage (BF%) (r = -.574, p = .002). Reaching the EAA threshold for a meal, multiple times per day, was also positively associated with LM (r = .677, p = .001), BMD (r = .539, p = .004), BMC (r=.435, p=.02), and like the 24 hour quality protein intake, had an inverse relationship with BF% (r = -.664, p = .001).

Conclusion

It is concluded that quality protein intake, including the frequency by which the EAA threshold (~10g) is reached for a meal, is positively associated with favorable body composition and bone health.

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