



Abstract



Muscle mass maintenance: protein and physical activity

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A period of muscle disuse due to sickness or injury can lead to substantial loss of skeletal muscle mass and strength in otherwise healthy individuals. The resulting health consequences, such as impaired functional capacity, decreased muscle strength, peripheral insulin resistance, and a decline in basal metabolic rate, are of particular concern to older individuals, who are already functionally and/or metabolically compromised. Even a few days of disuse can already result in substantial loss of muscle mass and strength. These findings are of particular clinical relevance because hospitalization of (older) individuals with acute illness generally results in a mean hospital stay of 5–7 days. Such short successive periods of muscle disuse occurring throughout the lifespan may be instrumental in the progressive loss of muscle mass with aging. Loss of skeletal muscle mass due to disuse must be attributed to an imbalance between muscle protein synthesis and breakdown rates. A decline in basal (post-absorptive) muscle protein synthesis rates has been reported following both bed rest as well as limb immobilization. Furthermore, more recent work has shown that the muscle protein synthetic response to protein or amino acid administration becomes blunted following a period of disuse. Though declines in both post-absorptive and postprandial muscle protein synthesis rates seem to play the biggest causal role in the loss of muscle mass during a period of disuse, there is also some indirect evidence that increases in muscle protein breakdown rates occur during the first few days of muscle disuse.