

THE EFFECT OF MEAL FREQUENCY ON BODY COMPOSITION DURING 12-WEEKS OF STRENGTH TRAINING

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Human trials on the effect of meal frequency on body composition are scarce. Short-term studies show increased rate of protein synthesis immediately after intake of amino acids [1], and frequent meals are shown to aid in the preservation of lean body mass when dieting [2]. Consequently it could be hypothesised that in response to strength training, more frequent meals will give larger muscle mass accumulation and lower fat mass (FM) than fewer meals. The purpose of this study was to compare the effects of 3 vs. 6 meals per day on changes in body composition in young men and women performing strength training over 12 weeks.

Men (n=33) and women (n=15) aged 21 to 35 with at least one year of previous strength training experience were randomly assigned to either a 6 meals a day group or a 3 meals a day group. The prescribed total dietary intake in both groups was equal and calculated to give a positive energy balance of approximately 1200 KJ/day, a protein intake of 1.5-1.7 g/kg/day and a carbohydrate intake of 5-7 g/kg/day. During the training period the dietary intake was controlled by repeated 24-hours recalls. All participants performed the same strength training program, training four times per week, giving each muscle group one heavy session and one light session per week. In the heavy sessions, training intensity varied between 10 and 3 RM sets, and 3-6 sets were performed in each exercise. Determination of body composition was performed with DEXA at the beginning of and immediately after the training period.

A total of 16 men and 11 women completed the project. After multiple regression analysis the 3 meal group had a significant greater gain in lean body mass (LBM) than the 6 meal group when adjusted for gender and energy intake ($p=0.04$), when adjusted for gender and protein intake ($p=0.03$), and when adjusted for gender, protein intake, carbohydrate intake and fat intake* ($p=0.01$). (*: Fat intake in g/kg body weight/day showed significance on LBM, $p=0.03$). No significant differences in regional changes in LBM were observed, although there was a tendency towards a greater gain in the three meal group. There were no significant differences in change in fat mass (FM) between the groups, but a tendency towards a greater gain in the three meal group, 7.33% (-5.23, 19.90), $p=0.24$. The three meal group had a 2.87%(0.62, 5.12) larger weight gain than the six meal group, $p=0.01$. The participants had a 2.31% (0.83, 3.79), gain in bone mineral density of the spine during the twelve weeks of strength training, $p<0.01$, but there were no differences between the groups.

In this study, three meals per day resulted in larger muscle gain from strength training than six meals per day over a period of twelve weeks. The reason why 3 meals a day

was superior to 6 meals a day in this study needs further investigation. More long-term studies are needed to determine the optimal meal frequency for gain in LBM from strength training.

References:

[1]. Rennie, MJ., Bohe, J., Wolfe, RR. Latency, duration and dose response relationships of amino acid effects on human muscle protein synthesis. *J Nutr* 132(10):3225S-7S, 2002.

[2]. Iwao, S., Mori, K., Sato, Y. Effects of meal frequency on body composition during weight control in boxers. *Scan J Med Sci Sports* 6:265-272, 1996

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