

CLINICAL SUMMARY

Effect of β -hydroxy- β -methylbutyrate (HMB) on lean body mass during 10 days of bed rest in older adults

Loss of muscle mass due to prolonged immobility or bed rest decreases functional status and increases hospital morbidity and mortality in older adults. Dietary interventions are currently being explored for their efficacy in ameliorating the debilitating impact of muscle atrophy due to bed rest.

This study shows that HMB is an effective nutritional intervention for preservation of muscle mass in healthy older adults confined to bed rest.

Muscle inactivity due to prolonged immobility or bed rest causes rapid loss of muscle mass and strength. About 65% of older patients with hospitalization experience a decrease in ambulatory function, and between 30% and 55% report a decline in activities of daily living.

Healthy older adults have been reported to lose approximately one kilogram (2.2 pounds, about 6%) of lean tissue from the lower extremities after 10 days of bed rest, with an associated 16% decline in isokinetic knee extensor strength.

Strategies for nutritional intervention include increasing dietary protein intake, daily ingestion of essential amino acids, and supplementation with beta-hydroxy-beta-methylbutyrate (HMB).

The Deutz study reported on the effect of HMB supplementation on the changes in muscle mass, strength, and functionality in older adults between 60 and 79 years of age after 10 days of complete bed rest.

The study was a prospective, randomized, double-blinded, placebo-controlled trial conducted at a single site. It included 20 female and 4 male healthy older adults who were randomized to one of 2 groups—Control (Placebo) or HMB (3g HMB/day)(See table 1). Each subject received 2 sachets per day of either inactive powder placebo or HMB.

After 5 days of diet stabilization, subjects were confined to 10 days of bed rest followed by an 8-week period post-bed rest with resistance training. Over 5 days of pre-bed rest and 10 days of bed rest, subjects were fed a metabolically controlled diet providing the Recommended Daily Allowance (RDA) for protein intake (0.8g/kg body weight/day). DXA was used to measure body composition.

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Table 1: Participating groups

Group	# Subjects	Female/Male	Avg. BMI (kg/m ²)	Avg. Age (Years)
Control	n = 8	7/1	26.5 ± 1.2	67.1 ± 1.7
HMB	n = 11	8/3	24.9 ± 1.0	67.4 ± 1.4

RESULTS

Nineteen participants were evaluable after 10 days of bed rest.

The study results showed that the control group lost significantly more lean mass over bed rest than the HMB group (Figure 1) and that the HMB group gained leg mass by the end of bed rest/rehabilitation (Figure 2).

Figure 1.

HMB group had 92% less decline in total lean body mass vs control group

With the exclusion of one subject from the evaluable subjects, at the end of the 10-day bed-rest period, the control group showed decline in total lean mass of -2.05 ± 0.66 kg ($P=0.02$, paired t -test), compared to the HMB group, which showed 92% lower decline in total lean mass of -0.17 ± 0.19 kg ($P=0.23$, paired t -test).

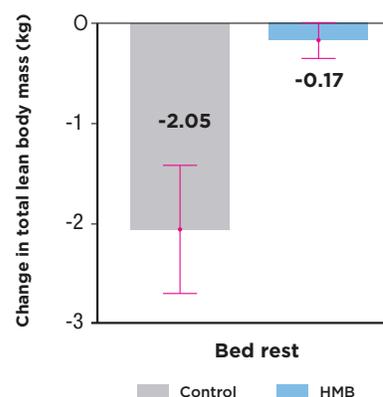
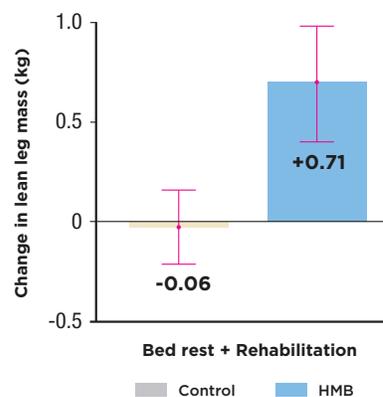


Figure 2.

HMB group gained lean leg mass vs control group

Change in lean leg mass from baseline to the end of rehabilitation. The HMB group showed an average gain of 0.71 ± 0.33 kg, ($P=0.06$, paired t -test), while the control group lost leg lean mass of -0.06 ± 0.22 kg ($P=0.78$, paired t -test).



NUTRITION CONCLUSION

HMB was able to prevent the acute decline in muscle mass in older adults over 10 days of bed rest, and this will most likely translate into maintenance of muscle strength/function during extended periods of immobilization, such as during hospitalization.

Deutz N, et al. *Clin Nutr.* 2013;32:704-712.