

Dietary Magnesium Intake on Heart Rate and Time-to-Fatigue During HIIT Exercise: A Pilot Study

BRIAN NEFF, JARED MOORE, & GEORGE SALEM, FACSM

Clinical Exercise Research Center; Division of Biokinesiology & Physical Therapy; University of Southern California; Los Angeles, CA

Category: Masters

Advisor / Mentor: Salem, George (gsalem@pt.usc.edu)

ABSTRACT

In high intensity interval training (HIIT), bouts of intense work are alternated with less intense periods. HIIT provides an effective stimulus to increase the volume of exercise at or above 90% heart rate maximum (HR_{max}). Magnesium (Mg) modulates energy metabolism and enzymatic processes. Studies suggest that Mg assists oxidative transport, improves glucose availability, delays lactate accumulation, and reduces inflammation. A gap exists in understanding how Mg affects HIIT. Moreover, the influence of a Vegan (VD) vs Omnivore (OD) diet on HIIT performance outcomes (e.g., heart rate [HR] and time-to-fatigue [TTF]), has yet to be investigated. **PURPOSE:** This study explored the relations between VD and OD Mg intake and HR_{max} and TTF during a HIIT treadmill (TM) protocol. It was hypothesized that a higher Mg intake would be associated with a lower HR_{max} and extended TTF. **METHODS:** Five healthy participants (1 female, 4 males; 27.2 ± 3.4 years) were enrolled and completed a TM HR_{max} test and HIIT protocol. The HIIT session comprised four repetitions of 4-minute higher intensity bouts at 85-95% HR_{max} followed by 3-minute recovery periods at 60-70% HR_{max} . Dietary Mg was assessed using the ASA24 recall. Values are reported as group mean difference \pm SD. Hedges g effect sizes (ES) were calculated, and Pearson correlation coefficients were determined. **RESULTS:** As expected, Mg intake was higher in VD than OD subjects with a large effect size (558.6 ± 29.0 mg, ES = 19.2). Differences in measured HR_{max} and TTF between groups was also observed, with VD having a lower HR_{max} (14.3 ± 1.5 bpm, ES = 9.3) and extended TTF (2.0 ± 0.5 min, ES = 3.9). A strong negative correlation ($r = -0.98$) was identified between Mg intake and measured HR_{max} , as well as Mg and RHR ($r = -0.73$). A moderate positive correlation ($r = 0.66$) was found for Mg intake and TTF. **CONCLUSION:** These preliminary data suggest that the higher Mg intake found in persons with a VD is associated with a lower HR_{max} and extended TTF during HIIT, compared to persons with an OD.