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### Comparison of Fat Oxidation During Walking on a Normal and Lower Body Positive Pressure Treadmill

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Lower body positive pressure treadmills (LBPPT) decrease ground reaction force by providing a lifting force as the treadmill chamber is inflated. These treadmills can be a beneficial exercise for larger patients with greater body fat. Substrate utilization is reflected in exercise intensity and fat oxidation (FatOx) is a function of intensity and total caloric expenditure. **PURPOSE.** To compare FatOx on a LBPPT and normal treadmill (NT). The first hypothesis tested was that LBPPT would have a significantly lower FatOx at each stage. A second hypothesis was that maximal FatOx would occur at a later exercise time point on the LBPPT compared to NT. **METHODS.** FatOx was measured using indirect calorimetry during a treadmill walking protocol. Seven apparently healthy college-aged female volunteers completed the following 6 stage graded protocol: standing, warm-up at  $58.96 \text{ m} \times \text{min}^{-1}$ , and exercise at  $88.44 \text{ m} \times \text{min}^{-1}$  with a 3% grade increase per stage on NT and LBPPT. Each stage was 3 minutes. The LBPPT was set at 80% of normal body weight. Metabolic data were collected every 15 seconds. Each volunteer fasted prior to participation. Steady state (SS) was considered the last minute of each stage. Volunteers completed all 6 stages or when the respiratory exchange ratio (RER) reached 0.95. **RESULTS.** FatOx rate was calculated based on SS oxygen consumption ( $\text{VO}_2$ ) and carbon dioxide production ( $\text{VCO}_2$ ) values. Average ( $\pm$ SD) FatOx rates ( $\text{g} \times \text{min}^{-1}$ ) on the NT were  $0.39 \pm 0.08$ ,  $0.47 \pm 0.08$ ,  $0.45 \pm 0.10$ ,  $0.45 \pm 0.09$ ,  $0.39 \pm 0.21$ ,  $0.44 \pm 0.11$ ,  $0.21 \pm 0.10$ . Average ( $\pm$ SD) FatOx rates on the LBPPT were  $0.36 \pm 0.11$ ,  $0.35 \pm 0.08$ ,  $0.32 \pm 0.06$ ,  $0.32 \pm 0.08$ ,  $0.35 \pm 0.06$ ,  $0.34 \pm 0.10$ ,  $0.33 \pm 0.11$  for warm up and stages 1-6, respectively. Repeated measures ANOVA was run on treadmill type and 4 stages of exercise (stage 1, 2, second to last stage, and last stage). There was a statistically two-way interaction between treadmill type and stage,  $F(3,18)=22.11$ ,  $p<0.001$ . Simple main effects were determined for treadmill type and stage. Pairwise comparison showed mean FatOx did not change over the four different stages on the LBPPT,  $F(3,18) = 0.23$ ,  $p = .646$ . Mean FatOx was significantly different over treadmill stage on NT,  $F(3,18) = 46.679$ ,  $P<0.001$ . Pairwise comparisons for NT showed that FatOx was significantly lower for the last stage compared to the three earlier stages ( $p<0.05$ ). There were no significant differences in FatOx for stages 1, 2 and second to last stage on NT. **CONCLUSION.** Current study demonstrates greater FatOx on NT at moderate exercise intensities compared to LBPPT. The first hypothesis is supported for stages 1, 2, and 3 yet not for other stages. The current protocol was not able to elicit an identifiable maximal FatOx on the LBPPT. **SIGNIFICANCE/NOVELTY** Maximal FatOx on NT may need to be individually determined as evidenced by the different stage that volunteers achieved an 0.95 RER value. Future studies are needed to better identify maximal FatOx on LBPPT.