

## **No Change in Perceptual or Chronotropic Outcome When Altering Preferred Step Frequency for a Short Duration**

GLORIA G HAYNES, MATTHEW J GARVER, JILL R BAKER, MEGAN M KRIGER, MARLEE M JONES, HEATHER L MARKGRAF, JANICE M NKRUMAH, AND BRIANA K PHILLIPS

Human Performance Laboratory; Department of Kinesiology and Nutrition; Abilene Christian University; Abilene, TX

---

*Category: Undergraduate*

*Advisor / Mentor: Garver, Matthew J. (mjg11a@acu.edu)*

### ABSTRACT

**INTRODUCTION:** Millions of individuals incorporate jogging into their physical activity routines as a leisurely pursuit and as a way to achieve positive health outcomes. People appear to choose jogging speed and the associated step frequency on pure, natural preference. Understandably, kinesthetics are important, but another important underlying factor is metabolic cost. The purpose of this work was to investigate if preferred step frequency (at a preferred jogging pace) also minimizes perceived effort (Borg Rating of Perceived Exertion, 6-20; RPE) and chronotropic stress (heart rate; HR) during a ten-minute activity bout when compared with step frequencies altered by 5%. **METHODS:** Recreationally-trained male subjects underwent two testing visits. The first visit was used to establish RPE and HR responses during a 10-minute jogging activity at preferred speed and step frequency. On a subsequent visit, between two and four days later, with preferred speed maintained, subjects were guided by metronome to strike at either 95% or 105% of their preferred step frequency. The 10-minute runs were randomized, crossed-over, and separated by 20 minutes. RPE and HR were analyzed by repeated measures ANOVA. **RESULTS:** Fourteen subjects (age:  $21.1 \pm 0.95$ ; body mass index:  $23.2 \pm 2.5$ ) enrolled. Preferred jogging speed (speed:  $6.4 \pm 1.0$  miles per hour;  $10.2 \pm 1.6$  kilometers per hour) and step frequency (steps:  $161.2 \pm 10.3$  steps/minute) were determined at the first visit, along with RPE ( $11.3 \pm 1.7$ ) and HR ( $166.4 \pm 12.7$ ). At the second visit, preferred speed was maintained while the frequency of foot-strike was altered. Neither differences in RPE ( $p = 0.252$ ;  $11.3 \pm 1.7$ ,  $11.6 \pm 1.9$ ,  $11.8 \pm 1.5$ ) nor HR ( $p = 0.547$ ;  $166.4 \pm 12.7$ ,  $164.7 \pm 14.9$ ,  $165.2 \pm 15.3$ ) were different when comparing the preferred, 95%, and 105% step frequency trials, respectively. Although anecdotal, some subjects verbalized displeasure with the change in pace and most all appeared to markedly alter the initial foot strike phase of the gait to meet the directed foot strike tempo. **DISCUSSION:** Our data must be interpreted cautiously. While altering step frequency by 5% for a short duration does not appear to alter an individual's RPE or HR appreciably, the result during longer duration activity may not be the same. In addition, the implications for biomechanical loading and metabolic cost were not presently investigated.