INTRODUCTION

• Stride frequency is a key parameter in the study of walking and running gait because of its associations with performance and energy expenditure (Hay, 1994, Candau et al. 1994).

• Accelerometers have become extremely popular in the measurement of stride frequency as well as other related stride variables with current sensors capable of recording both accelerations and electromyography.

• The purpose of this preliminary investigation was to assess the estimation of stride frequency during running using a single tri-axial accelerometer compared to a commonly used infrared device the Optojump system.

METHODS

• Five healthy participants wore a Delsys Trigno tri-axial accelerometer attached to the right anterior shin.

• Participants repeatedly ran at a submaximal pace through a four metre section of Optojump with a total of forty three trials collected.

• Stride frequency was calculated as stride time divided by one.

• For the Optojump, stride time was the sum of contact and flight times from two consecutive steps.

• For the accelerometer, stride time was calculated as the time between two consecutive foot contacts on the right side. Foot contact was identified by local maxima in the Y (medial-lateral) acceleration trace.

• Estimates of stride frequency were compared using paired samples t-tests, intraclass correlation coefficients (ICCs) and Bland and Altman 95% limits of agreement (LOA) with significance set at p < 0.05.

RESULTS

• No significant differences were found between mean stride frequencies \( p = 0.069 \).

• The ICCs for stride frequency were 0.93 and 0.96 for single and average measures respectively.

• The mean difference between estimates was 0.01 Hz (95% LOA: -0.05-0.07 Hz).

DISCUSSION & CONCLUSION

• The high ICCs and low mean bias between methods suggest that an accelerometer attached to the shin can accurately estimate stride frequency in running.

• Discrepancies in stride frequencies can be partially explained by differences in device sampling rates i.e. 137.15 Hz versus 1,000 Hz.

• Further analysis should be performed to evaluate whether temporal measures such as stance time and flight time can also be accurately quantified for individual steps over longer distances and at faster velocities.

• This would provide a portable and convenient way to provide simple gait data in field situations.

REFERENCES


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