



Instrumented Treadmill with an Accelerometry System: a Valid and Reliable Tool for Running Analysis.

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INTRODUCTION

Concurrent **biofeedback** has been demonstrated to be an effective strategy to **reduce running-related injuries** (RRI) [1,2,3], many of which are related to impact accelerations [4,5].

This study investigated the **validity** and **reliability** of a new device integrated directly into the treadmill (AccTrea), compared to a traditional acceleration impact system (AccAthl).

MATERIAL AND METHODS

30 recreational athletes performed **2 running tests** (5 min at 10km/h, 0% slope) on different days.

1st session: to assess the validity of an **AccTrea vs an AccAthl**.

2nd session: to test the reliability.



RESULTS

The results showed that AccTrea is a valid and reliable tool for measuring spatio-temporal parameters like:

- **step length** (validity ICC = 0.94; reliability ICC = 0.92)
- **step time** (validity ICC = 0.95; reliability ICC = 0.96) (Figure 1)
- **step frequency** (validity ICC = 0.95; reliability ICC = 0.96)

Peak acceleration impact for both left (reliability ICC = 0.88) and right legs (reliability ICC = 0.85): high reliability

Peak impact asymmetry (ICC = 0.55): modest validity

The Bland–Altman plots demonstrated low mean differences and wide limits of agreement (LoAs) of 95%.

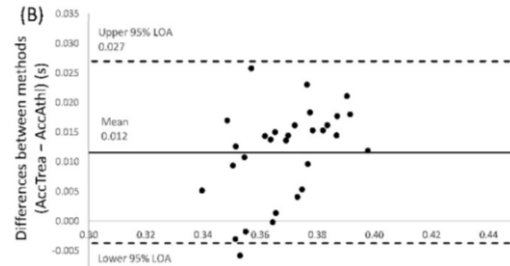


Figure 1. Bland–Altman plots representing comparisons between the AccTrea system and the AccAthl system for step time.

LITERATURE CITED

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DISCUSSION

The implementation of a biofeedback system, such as the one analyzed in this study, represents a step forward to make **impact reductions** and **running economy improvements** accessible to the entire population [6] thanks to its **low cost** and the unneeded instrumentation of athletes.

CONCLUSIONS

AccTrea is a reliable and valid tool for athletes to be informed of their **biomechanical responses** in relation to spatio-temporal variables during running on an instrumented treadmill.

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