

## **Evaluation and Comparison of Wearable Technology Device Data Between Devices During Trail Running**

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### **ABSTRACT**

An estimated 20 million people participate in trail running with this number expected grow at a rate of 15% annually. Wearable technology devices have become more relied upon to track running data such as distance, cadence, elevation gain, etc. The consistency between these devices is not well-established.

**PURPOSE:** To determine the consistency of data across wearable technology devices. **METHODS:** Seventeen participants (F = 7) ran on the Thunderbird Gardens Lighting Switch trail in Cedar City, UT. The participants were each fitted with two Garmin Instincts, two Polar Vantage M2s, and two Stryd sensors. One device from each manufacturer was placed on the left side (wrist for watches and foot for Stryd), and the other devices were placed on the right. Each pair of devices was started simultaneously, and the participant then completed a self-paced out-and-back trail run of approximately 20 minutes. All devices were stopped simultaneously at the completion of the run. Data collected across all devices includes average pace, best pace, average cadence, distance, ascent, and descent. The average percent difference and coefficient of variation (CV) between similar and different devices was calculated. **RESULTS:** The pairs of devices from the same manufacturer were found to be most consistent with each other (Garmin to Garmin: 3.27%; Polar to Polar: 1.4%; Stryd to Stryd: 1.15%) while devices from different manufacturers were found to be very different (Garmin to Polar: 12.75%; Garmin to Stryd: 10.11%; Polar to Stryd: 17.75%). Between devices from the same manufacturer, ascent was found to be least reliable (Garmin: CoV=0.20; Polar: CoV=0.12; Stryd: CoV=0.26). **CONCLUSION:** Data collected by wearable technologies of the same manufacturer will be mostly consistent with each other. However, data collected by a technology from a different manufacturer may be inconsistent with data from another device. In addition, elevation data may vary more than other data between watches. This finding is important because trail runners tend to compare their trail runs with other runners and often find ascent data important to measure progress. The location of the trail in a canyon may have impeded accuracy. Based on our findings, it may not be accurate to compare trail runs completed by runners with a different wearable technology device manufacturer.