



### Reliability of Zephyr BioHarness and Fitbit Charge Measures of Heart Rate and Activity at Rest, During the Modified Canadian Aerobic Fitness Test and Recovery

We wanted to know if the Zephyr BioHarness would provide reliable results when worn by males and females of different ages while doing a fitness test.



#### What is the problem?

The Zephyr BioHarness is a device that can monitor and record physiological responses such as heart rate, breathing rate, posture and activity. Before these devices are used in research studies or in a real-world setting, we need to test whether the devices produce consistent results (reliability) when used over time. The results from previous Zephyr BioHarness studies cannot be generalized to everyone because they only tested small groups of people or young males. We wanted to know if the Zephyr BioHarness would provide reliable results when worn by males and females of different ages while doing a fitness test.

#### How did the team study the problem?

A group of 60 healthy participants (30 females, 30 males) across various age groups (range = 20 – 68 years) wore the Zephyr BioHarness so we could monitor their heart rate while they were sitting (rest and recovery) and performing the Modified Canadian Aerobic Fitness Test. We used statistical analyses to test whether the heart rate measures were stable over time.

#### What did the team find?

We found that the Zephyr BioHarness' measures of heart rate were consistent while the participants were resting, performing the fitness test, and recovering from the fitness test. Overall, the Zephyr BioHarness showed excellent reliability for heart rate measures.

#### How can this research be used?

The FIREWELL team will use the Zephyr BioHarness to monitor firefighters' heart rate while they perform firefighting tasks and explore differences in heart rate responses based on individual factors such as gender, sex, or age. Other researchers may use the Zephyr BioHarness in the same way. Fire services can use the Zephyr BioHarness to help keep firefighters safe by tracking their physical status during training and real fire situations.

#### Cautions

We tested the Zephyr BioHarness in healthy participants that were not firefighters. We are working on research to test on firefighters to see if we get similar results.

**Reference:** Nazari G, MacDermid JC, Sinden KE, Richardson J, Tang A. Reliability of Zephyr Bioharness and Fitbit Charge Measures of Heart Rate and Activity at Rest, During the Modified Canadian Aerobic Fitness Test and Recovery. *Journal of Strength & Conditioning Research*, Feb 13, 2017 [Epub ahead of print].

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