An anaerobic exercise test for breast cancer survivors

Jane Doe
PhD student, Human Kinetics, Allan McGavin Sports Medicine Centre

jdoe@interchange.ubc.ca

Project Concept: To invent a novel walking test that stresses the anaerobic energy system for post-menopausal breast cancer survivors to use in an upcoming exercise intervention trial. Researchers typically use bikes over treadmills to test clinical populations but we have previously shown that survivors do not enjoy using a cycle ergometer and typically have greater adherence to their exercise program when they use a treadmill. The only anaerobic exercise test currently available for clinical populations is the "steep ramp test" which is performed on a cycle ergometer.

Hypotheses: The survivor population will attain higher/more accurate values (maximal heart rates as well as a greater change in lactic acid) with the treadmill test compared to the standardized cycle ergometer test.

Methods: 15 survivors will be asked to undergo 3 tests: 1 standardized bike test and 1 novel treadmill test, which will be repeated.

Women will undergo the standardized anaerobic "steep ramp test", which has been previously validated in clinical populations to determine anaerobic capacity. Individuals will cycle at 25W for 30 seconds. After 30 seconds the wattage will increase by 25W every 10 seconds until volitional fatigue (less than 3 min). The treadmill test will consist of fast walking (3-4mph) on a steep incline (12%) until volitional fatigue (less than 5 minutes). We will ask the women to repeat the treadmill test on a separate day to see if similar results (time, heart rate, blood lactate) are attained compared to their first treadmill test.

Measures: Time to fatigue, maximal heart rate (at the end of test), change in blood lactate (from rest to end of test), rating of perceived exertion (RPE) (how hard the test felt on the standardized Borg scale).

Follow-up: If the treadmill test is reliable, we will then compare treadmill results in non-breast cancer survivors (healthy population) to see if lactate levels are lower in the survivor population.

Statistical Advice: I am looking for advice on what statistical tests I should use. I am unsure if using the Bland-Altman test is appropriate to validate the treadmill test against the bike test, and how many measures are required to validate it. None of my statistics books have this test in it and journal articles, which recommend it, are not clear enough on what are the requirements. I need to demonstrate that the treadmill test can reproduce, day-to-day, similar numbers in the same person (reliability). When comparing more than one variable, would I have to use a MANOVA or is it better to run paired t-tests with Bonferroni correction?