

Handcycle maximal perceptually-regulated exercise test using a Cyclus 2 ergometer

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Abstract

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Protocol

Set up the ergometer

Step 1.

Attach the handcycle to the Cyclus 2 ergometer. Remove the front wheel of the handcycle and loop the chain over the sprocket of the Cyclus 2. Attach the electronic shifter to one of the handles of the handcycle.

Enter the handcycle and participants settings

Step 2.

In the "system" tab of the main menu on the display screen, enter in the correct settings for the handcycle and participant.

Set the correct mode on the Cyclus 2

Step 3.

The ergometer needs to be in "power" based "manual control".

Participant gets into handcycle

Step 4.

The participant can get into the handcycle. If possible, change the configuration of the handcycle to the comfort of the participant. Allow a slight elbow flexion at the furthest point of the pedal cycle. If performing repeat testing, record the position of the handcycle so that it can be replicated on subsequent visits.

Warm-up

Step 5.

Participant can perform a self-selected warm-up in terms of duration and intensity. During this time monitor their cadence and establish what their preferred cadence is.

Prepare for the test

Step 6.

Cover the display unit so that the only the "time" and "cadence" can be seen by the participant. Make sure that a RPE 6-20 scale is visible to the participant throughout the test.

Participant instructions

Step 7.

Read the following instructions on how to conduct the PRETmax test:

During the following exercise, I want you to use this rating scale to help you adjust the exercise intensity to certain levels that I will prescribe to you. I will ask you to exercise at 5 intensities: 11, 13, 15, 17 and 20, in that order. You can see on the scale that number 6 is an intensity that means no exertion at all, whilst number 20 means maximal exertion. The numbers in between these extremes represent different levels of effort. For example a rating of 9 means a very light effort, which for a normal healthy person, is like walking slowly for a few minutes. A rating of 13 means the exercise is getting somewhat hard, but it still feels OK to continue at this level of exertion. Number 17 means exercise that is very strenuous. At this level, you can still go on, but you really have to push yourself as it feels very heavy and you are very tired. Number 20 is an extremely strenuous exercise level, which for many people is the most strenuous exercise they have ever experienced or could imagine experiencing. Please look at the scale and familiarise yourself with the numbers and words. When we begin, I will ask you to work at an RPE of 11. You will be asked to adjust the intensity to match a rating of 11 for 2 minutes. This will be followed by further bouts of 2 minutes at 13, 15, 17 and 20 on the scale. You will be free to change the resistance as often as required in order to maintain the desired rating and in the final stage in order to achieve a maximal effort that ends in volitional exhaustion after 2 minutes. Every 30 seconds we will make you aware of how much time you have left in order to achieve this effort. Please focus on your overall feelings, not just your arms or breathing. Please be aware that I do not have any expectations about your performance during the session and remember that my main interest is that you use your own feelings of effort to control the exercise intensity.

Begin the test: Stage 1, RPE 11

Step 8.

When the participant is ready, begin the test. In Stage 1, the participant changes the power output as often as is needed in order to maintain an RPE of 11 on the 6-20 scale. Each stage lasts for 2 minutes and it is a continuous test, there is no rest in between consecutive stages. Every 15s remind the participant of how long is left in the stage and what RPE they are required to go at. With 15s remaining in the stage ask the participant to verbally report differentiated measures of peripheral, central and overall RPE.

Stage 2, RPE 13

Step 9.

Once Stage 1 is complete (2 mins) instruct the participant that their target RPE is now 13 and to adjust the power output as often as needed to maintain the RPE. Remind the participant of the time remaining and target RPE as in Step 8. Collect the RPE at the end of the stage as in Stage 1.

Stage 3, RPE 15

Step 10.

Repeat Step 9, but with the correct RPE for the new stage.

Stage 4, RPE 17

Step 11.

Repeat Steps 9 and 10, but with the correct RPE for the new stage.

Stage 5, RPE 20

Step 12.

When beginning Stage 5 instruct the participant that they are required to produce an RPE of 20. They are to change the power output to ensure that they reach exhaustion at the end of the stage. They are not to perform an 'all out sprint' which is followed by a gradual decrease in power output.

End of the test

Step 13.

Once the final stage is finished (10 mins), hit "escape" on the display unit so that any resistance applied is removed. Save the test for later analysis. The participant can perform a cool down and get out of the handcycle when they are ready.