**Supplement 1. Detailed description of the ART and CPET administration.**

1. **Astrand-Rhyming Test (ART)**

Before the administration of the ART, weight was measured via a scale (Tanita MC-580; Tanita, Tokyo, Japan), with an adjustment of 0.5 kg for the adolescent’s clothes. Seat height of the stationary bicycle (Ergofit Cycle 4000 MED; Gymna NV België, Diepenbeek, Belgium) was individually adjusted and recorded to ensure consistency between the two test moments. 85% of the maximal heart rate was estimated, using the formula 208-(0.7 x age) [1]. The researcher took time to explain the objective and procedures of the ART. The participant was also informed that he or she could stop the test at any time and for any reason, but especially if threatening symptoms appeared (e.g., chest pain, shortness of breath, dizziness, or nausea). Last, the participant’s resting heart rate and blood pressure were measured and recorded in seated position on the bicycle after a two minute rest period. Heart rate was measured using the Polar H10 heart rate sensor (Polar Electro Oy, Kempele, Finland), which is shown to have a good agreement and small bias compared to ECG recordings for heart rate measurements in resting conditions, as well as during an incremental exercise test on a bicycle [2]. Blood pressure was measured with an Omron M6 Comfort Model 2020 (Omron, Kyoto, Japan).

The participant started with a two minute warm-up period at a low intensity to familiarize him-or herself with the 50 revolutions per minute pedalling speed. After the warm-up, the initial workload was set during the first two minutes in order to achieve a heart rate between 125 and 170. Initial workload was based on sex and individual fitness status as presented in Table 1. Fitness status (i.e., conditioned or unconditioned) was based on whether the participant declared to engage in sport activities on a regular basis. In the event that heart rate failed to achieve a value within the target zone (i.e., between 125 and 170 beats per minute), the load was adjusted accordingly. The pedalling speed of 50 revolutions per minute and work load were then maintained throughout the test. Ratings of perceived exertion were assessed using the Borg Scale [3] and blood pressure was measured at the four-minute mark. Heart rate and work load were recorded at the end of each minute with a target goal of obtaining two consecutive heart rate values over 125 beats but below 170 beats per minute (bpm), within five bpm of each other, during the fifth and sixth minute of work. If not, participants continued cycling for another two minutes. The test was interrupted if threatening symptoms appeared or when the heart rate reached 85% of age-predicted maximum heart rate.

Once the test was completed, the participant was instructed to perform a cool down at a reduced workload for three minutes. Immediately after the cool down period, blood pressure and heart rate were measured and recorded again. If abnormal responses occurred, physiological observations were continued and an additional assessment of blood pressure and heart rate was conducted.

Maximal oxygen uptake (VO₂ max) - expressed as ml/kg/min - was estimated using the Astrand-Rhyming gender-sensitive nomogram and an adjustment for age (with a factor of 1.1) for participants aged ≤ 15 years [4,5].

**Table 1. Work load based on sex and an individual’s fitness status [6,7].**

|  |  |  |  |
| --- | --- | --- | --- |
| Sex | Physical fitness status | Work Load (Kg.m.minˉ¹) | Work Load (Watt) |
| Males | Unconditioned | 300 or 600 | 50 or 100 |
| Males | Conditioned | 600 or 900 | 100 or 150 |
| Females | Unconditioned | 300 or 450 | 50 or 75 |
| Females | Conditioned | 450 or 600 | 75 or 100 |

1. **Cardiopulmonary exercise test (CPET)**

The CPET was performed on a cycle ergometer and using the VyntusTM CPX Metabolic Cart (Vyaire Medical, Chicago, USA) in an air-conditioned laboratory of the University Hospital Leuven where the room temperature was regulated at 18-22°C. A single physiotherapist and researcher (J.C.) or PhD researcher (M.M.) both specialised in conducting maximal exercise tests administered the CPET. Before the administration of the test, clear instructions were given to the participant. Seat height and steering position were individually adjusted. Resting blood pressure (VyntusTM CPX Metabolic Cart; Vyaire Medical, Chicago, USA or SunTech Tango M2; SunTech Medical, Morrisville NC, USA), heart rate and rhythm via a 12 lead ECG (VyntusTM ECG; Vyaire Medical, Chicago, USA) were measured and recorded in seated position on the bicycle. A 10+10W/min, 20+20W/min or 50+25W/min stepwise protocol was chosen to achieve maximal voluntary exhaustion within 8-12 minutes [8], based on the estimated fitness level of the participant. The pedalling speed was set at 60-70 revolutions per minute and was maintained throughout the test. During the test, heart rate and heart rhythm were registered continuously and blood pressure was measured every two minutes. In- and expired gasses were analysed breath-by-breath (VyntusTM CPX Metabolic Cart; Vyaire Medical, Chicago, USA). The sample line and twin tube were calibrated before each test according to the manufacturer’s instructions. VO₂ max values - expressed as ml/kg/min - were defined as the highest 30 seconds average. All participants were asked and encouraged to perform a symptom-limited graded exercise test until exhaustion. In order to define a maximal effect, the criteria described by the European Association for Cardiovascular Prevention and Rehabilitation were used [9]. Ratings of perceived exertion were assessed using the Borg Scale [3].

**References used in Supplement 1**

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