

Differences between Nordic Walking, Walking, Power Walking and Jogging regarding oxygen consumption and heart rate

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Aim of the study

The purpose of the study was to compare oxygen consumption and heart rate of Nordic Walking, Walking, Power Walking and Jogging. The three walking techniques and Jogging were performed and tested under field conditions while using moderate and technique specific velocities.

Methods

32 healthy subjects (46.9±6.1 years; 69.6±10.7 kg; 171.4±7.4 cm, VO_{2max} : 43.32±8.25 ml · kg⁻¹ · min⁻¹) with extensive jogging experience participated in this study. The sample includes 21 women (46.4±6 years; 65±8.3 kg; 167.9±5.5 cm, VO_{2max} : 40.78±6.11 ml · kg⁻¹ · min⁻¹) and 11 men (47.8±6.6 years; 78.2±9.5 kg; 178.1±5.6 cm, VO_{2max} : 48.18±9.84 ml · kg⁻¹ · min⁻¹).

Breath analysis was executed with a portable indirect calorimetric device (MetaMax 3B®, Cortex, Germany), heart rate was recorded continuously during main investigation.

Preliminary treatment: A submaximal treadmill exercise test (Bruce Protocol) with measuring heart rate and oxygen uptake was performed to determine VO_{2max} . To reach a comparable initial level for testing all participants completed a sport type specifically technique training for all sports, but with particularly focus on Nordic Walking. This training was executed at 2 days per week for 90 minutes about a period of 4 weeks.

Main investigation: Every subject performed each endurance exercise type on 4 separate days in a randomised order. In consideration of between-day variability the testing time of all investigations for every participant was almost identical (±2 hours). A testing session contained 4 exercise periods in different velocities (6.1; 6.8; 7.5 km · h⁻¹ for Nordic Walking, Walking, Power Walking and 6.8; 7.5 km · h⁻¹ for Jogging). Each exercise period lasted 5 minutes to achieve steady state conditions.

Results

Results between different types of sport were calculated using repeated measurement analysis of variance and estimated means.

For all subjects, Nordic Walking resulted in a significant increase in oxygen consumption and heart rate compared to Walking and Power Walking. The differences between Nordic Walking and Walking showed a range of 8.74% (1.27 ml · kg⁻¹ · min⁻¹ at 6.1 km · h⁻¹) and 10.89% (2.58 ml · kg⁻¹ · min⁻¹ at 7.5 km · h⁻¹) higher oxygen consumption and 6.31% (5.52 bpm at 6.1 km · h⁻¹) and 6.18% (7.39 bpm at 7.5 km · h⁻¹) higher heart rate responses during Nordic Walking. The measured differences between Nordic Walking and Power Walking were less than the comparison of Nordic Walking and Walking showed.

Power Walking resulted in marginal increased oxygen consumption (0.11 ml · kg⁻¹ · min⁻¹ at 6.1 km · h⁻¹ and 0.55 ml · kg⁻¹ · min⁻¹ at 7.5 km · h⁻¹) and heart rate (1.49 bpm at 6.1 km · h⁻¹ and 1.25 bpm at 7.5 km · h⁻¹) compared to Walking.

Jogging at 6.8 und 7.5 km · h⁻¹ led to a significant increase in oxygen uptake and heart rate responses compared to Walking and Power Walking. Only Nordic Walking exceeded at 7.5 km · h⁻¹ the values of Jogging.

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