Comparison of Gait Characteristics, Trunk Stability and Energy Expenditure between Japanese- and European-Styled Nordic Walking in Older Adults

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Summary

Nordic Walking (NW) has positive effects on the physical function of the elderly. This study aimed to clarify the differences in gait, postural stability, and energy expenditure between Japanese- and European-styled NW. We recruited 30 community-dwelling older adults who were novices to NW. The 20-meter walking test was used to measure gait and postural stability, while energy expenditure was assessed using a 12-minute walking test. The results indicate that there was no significant difference in gait when walking 20 meters with the two styles of NW. However, the stability associated with the Japanese walking style was better than that of the European walking style. Additionally, there were no significant differences in the 12-minute walking distance or energy expenditure between the two styles of NW. These findings suggest that trunk stability should be considered when prescribing NW exercises for elderly novices.

Introduction

Nordic Walking (NW) has positive effects on the physical function of the elderly [1]. There are two styles of NW: the Japanese style (JNW) and the European style (ENW) [2]. In the JNW, the poles are positioned forward and used like a cane, while in the ENW, the poles are used to push against the ground towards the back of the body. However, little is known about the biomechanical and physiological differences between these two NW styles.

This study aimed to clarify the differences in gait, postural stability, and energy expenditure between the two NW styles among community-dwelling older adults.

Methods

We recruited 30 community-dwelling older adults who were novices to NW. The participants performed either the JNW or ENW in a random order on two different days, with a one-week interval between sessions. Thirty minutes of NW instruction and practice were provided prior to the JNW or ENW assessment.

The 20-meter walking test was used to measure gait and postural stability. The inertial measurement unit (IMU)-based shoe-worn GAIT Up system (Gait Up, Lausanne, Switzerland) was used to evaluate the spatiotemporal gait performances [3]. The area of postural sway and walking stability was measured using a wearable sensor (Gyko, Microgate, Bolzano, Italy) which was attached to participants at the level of the thoracic spine using a special harness [4]. Energy expenditure was assessed using the Polar Verity Sense (Polar Electro Inc., NY, USA) during a 12-minute walking test [5].

Results and Discussion

The subjects consisted of 2 male and 28 female older adults (mean age: 70.1 ± 4.2 years). There were no significant differences in gait speed (JNW: 1.45 ± 0.19 m/s vs. ENW: 1.45 ± 0.16 m/s, p = .954), cadence (JNW: 118.46 ± 14.98 step/min vs. ENW: 120.37 ± 8.65 step/min, p = .470), or stride length (JNW: 1.44 ± 0.12 m vs. ENW: 1.44 ± 0.12 m, p = .900). However, postural stability (sway area) was better with the JNW (352.30 ± 175.94 cm²) compared to the ENW (422.57 ± 204.12 cm²) (p = .03). Additionally, there were no significant differences in the 12-minute walking distance (JNW: 1048.27 ± 130.72 m vs. ENW: 1028.65 ± 96.56 m, p = .145) or energy expenditure (JNW:111.37 ± 31.19 kcal vs. ENW: 108.50 ± 30.38 kcal, p = .351).

The results indicate that there was no significant difference in gait when walking 20 meters with the two styles of NW. However, the stability associated with the Japanese walking style was better than that of the European walking style. Additionally, there were no significant differences in the 12-minute walking distance or energy expenditure between the two styles of NW.

Conclusions

Consideration should be given to trunk stability when prescribing Nordic Walking exercises for older adults who are novices, as the Japanese style appears to offer better postural stability.

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