ESMAC Extracting Biomechanical features of Posture walking using principal component analysis KIMIKO^{1,2}, Keizo Yamamoto³

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Introduction & Purpose

Posture walking (PW) is a style of walking proposed by KIMIKO, which was developed as a unique walking method based on walking to improve body shape such as hunchbacked and obesity caused by childbirth. However, biomechanical (kinematics and kinetics) data on PW are still insufficient. The purpose of this study was to clarify the differences between PW and general gait using principal component analysis

Methods

Participants

PW: 4 women who were qualified to teach PW

height: 164.9±6.2cm, weight: 53.4±4.3kg, age: 47.0±9.0 years Walk (control): 10 age-matched women

height: 160.4±5.0cm, weight: 54.1±6.0kg, age: 49.6±9.1 years

Gait analysis was conducted using an optical 3D motion capture system with force plates. In the analysis, the joint angles and joint moments of both walking styles were compared, focusing on the knee and hip joints. Principal component scores calculated by PCA were tested for group differences using the Welch's t-test (p<0.05).



The principal components, or features, from each of the gait measures are described. Mean (S.D.) represents the average value and standard deviation of PC scores derived from each trial. The p-Value corresponds to a Welch's t-test comparing the PC scores between the PW and the walk groups.

Discussions

In PW, shock absorption is NOT performed by the extensor muscles of the knee joint (ex. quadriceps). The activity of the knee joint flexor muscle group (ex. hamstrings) increases in late stance phase.