Spatiotemporal Parameters of Gait in Active Older Adults

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ABSTRACT

Spatiotemporal parameters of gait can be defined as the time and space characteristics of an individual's pattern of walking. Gait patterns often change as a result of aging, accompanied by changes in these parameters. **PURPOSE**: To analyze various spatiotemporal parameters of gait in active older adults and to compare them to known parameters in healthy older adults. **METHODS**: Spatiotemporal parameters were collected using a timing walkway (GAITRite®, Franklin, NJ). Twenty-three recreationally active participants (9 males and 14 females), age 67.7 ± 9.1 years, who participated in at least 150 min/week of physical activity, were recruited from local outreach programs and the fitness center at Texas Woman's University in Denton, TX. Each participant was required to walk barefooted across the walkway (7 meters) four times and instructed to walk as naturally as possible at a self-selected pace. Variables measured included cadence, velocity, stride length (SRL), step length (SPL), step width (SW), gait cycle time (GCT), and swing phase (SWP), stance phase (STP), single support phase (SSP), and double support phase (DSP) times in milliseconds and in percent time. A one sample T-test for each variable was performed with a significance level of 0.05. **RESULTS**: When comparing this active population with the referenced values from the general population, there were significant differences found in some of the analyzed spatiotemporal parameters. These included: increased cadence (115.7 ± 11.3 steps/min vs. 108.7 steps/min; $p = 0.007$), decreased GCT (1047.6 ± 104.1 ms vs. 1123.7 ± 122.4 ms; $p = 0.002$), decreased real time SWP (389.6 ± 30.3 ms vs. 414.1 ± 40.2 ms; $p = 0.001$), decreased real time STP (657.9 ± 83.2 ms vs. 706.6 ± 91.2 ms; $p = 0.010$), and decreased real time SSP (389.6 ± 30.3 ms vs. 414.3 ± 39.8 ms; $p = 0.001$). Other analyzed parameters that were found to be statistically insignificant included: increased walking velocity (123.1 ± 28.1 cm/s vs. 121.5 ± 23.4 cm/s; $p = 0.793$), decreased SRL (126.7 ± 20.5 cm vs. 134.1 ± 18.9 cm; $p = 0.095$), decreased SPL (63.3 ± 10.3 cm vs. 67.1 cm; $p = 0.087$), increased percentage of GCT in SWP (37.33 ± 2.29% vs. 36.85%; $p = 0.323$), decreased percentage of GCT in STP (62.66 ± 2.29% vs. 62.88%; $p = 0.653$), increased percentage of GCT in SSP (37.33 ± 2.29% vs. 36.87%; $P = 0.342$), decreased real time DSP (270.8 ± 69.7 ms vs. 292.6 ± 71.0 ms; $p = 0.148$), and decreased percentage of GCT in DSP (25.57 ± 4.54% vs. 26.04%; $p = 0.628$). Step width was also measured (63.8 ± 9.4 cm), but no reference values were available to make a comparison. **CONCLUSION**: The participants in this study were recruited from a population of active individuals who regularly reach the ACSM recommendation of ≥ 150 min/week of physical activity. Older adults, who engage in regular physical activity, may exhibit improved spatiotemporal parameters of gait when compared to the general population of age matched adults.