Age-specific and sex-related changes of gait in the Japanese elderly

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論 文 内 容 の 要 旨

The objectives of this dissertation were to investigate the effect of aging on gait parameters in Japanese elderly, to clarify whether age-related changes in gait characteristics are consistent and continue with advanced age when subcategorizing according to early and late elderly, and to investigate the differences according to sex in gait characteristics between elderly Japanese men and women. Three studies were conducted in order to investigate: 1) age-related changes in the walking motion of elderly Japanese women; 2) age-related changes in the walking motion of elderly Japanese men; and 3) sex-specific differences in the walking motion of Japanese elderly. The first study indicated that the timing of peak joint angle and angular velocity parameters are the main characteristics that define gait changes in the elderly. Very elderly women showed a cadence-dependent walking pattern, and delayed peak timing of joint angle and angular velocity during the critical phases throughout the gait cycle (pre-swing, initial swing, and terminal swing phases). These delays in peak timing primarily reflect the unique joint behavior in very elderly women. The second study extended the same investigation for elderly Japanese men. The specific gait characteristics of very elderly men were slower walking speed, smaller cadence, delayed peak timing at the hip and knee joint, smaller first peak plantar flexion angular velocity, and greater second peak plantar flexion angular velocity at the ankle joint. The third study investigated sex differences between elderly Japanese men and women. Sex-specific differences in walk ratio, the hip maximal angle range, peak extension timing at the hip joint, and second peak flexion timing at the knee joint are peculiar in elderly individuals. In conclusion, the results of this dissertation would be useful for identifying and monitoring parameters that reflect the gait characteristics in the elderly population. In addition, the findings of this dissertation could be used to improve the health care system and would be necessary to assist well-being, nursing, rehabilitation of motor disorders, and to prevent walking ability deterioration in this population.