THE INFLUENCE OF CHANGES IN TACTILE SENSIBILITY AND MUSCULAR STRENGTH ON HAND FUNCTION IN OLDER ADULTS

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PURPOSE: The effects of aging on motor function include a marked decline in strength and muscle mass, leading to impairments of mobility and activities of daily living. Aging also affects human hand function. For example, a decline in manual dexterity often accompanies old age. This decline corresponds to age-related changes in muscle and/or tactile functions. This study investigated whether age-related changes in muscular strength and tactile sensibility are related to hand function in older adults.

SUBJECTS: The subjects were 47 older adult females (average age 73.7 ± 6.5 years). Prior to the study, we administered the Mini-Mental State Examination, and all subjects passed (borderline passing score of 25).

METHODS: Hand function was assessed using the Perdue pegboard test. The number of pegs placed in the holes within 30 sec was recorded. Handgrip strength was measured using a handgrip dynamometer. These tests were repeated twice with the dominant hand, and the maximum value was determined. Tactile-pressure threshold on the distal palmar pad of the index finger was evaluated using Semmes-Weinstein monofilaments. A threshold was recorded for the smallest filament diameter that could be perceived. This test was also performed on the dominant hand.

ANALYSIS: Differences due to age groups (60-69 years; n=13, 70-74 years; n=12, 75-79 years; n=10, 80-85 years; n=12) were examined using a one-way analysis of variance (ANOVA). Pearson's correlation was performed to determine the relationships between functional test (placing pegs) and handgrip strength or tactile-pressure threshold.

RESULTS: Scores on the Perdue pegboard test showed significant differences among the four age groups (p < 0.01) and decreased with age. Tactile-pressure threshold was augmented with increasing age (p < 0.05), whereas handgrip strength did not differ among the four age groups. There was a significant relation between the Perdue pegboard test score and tactile-pressure threshold (r = -0.57), but not handgrip strength (r = 0.26).

CONCLUSIONS: These results suggested that manual dexterity in hand function was attenuated with increasing age. We considered that this attenuating effect was strongly associated with a decline in tactile sensibility rather than a change in the muscular strength of the hand.

Keywords: Ageing, Sensitivity, Muscle Force