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SIRIPAN SIWASAKUNRAT: CORRELATION OF COMPUTERIZED POSTUROGRAPHIC MEASURE WITH TANDEM WALK AND STEPPING TESTS IN THAI HEALTHY ELDERLY. THESIS ADVISORS: CHANUT AKAMANON, M.A. (Comm. Dis. and Sp.Sc.), CHUSAK VEJBAESYA, M.D., Ph.D., SOPA PICHAIYONGWONGDEE, M.Sc. (PHYSIOLOGY). 191 p. ISBN 974-662-520-9

The purpose of this study was to determine the relationship between balance performances measured by the Stepping test, Tandem Walk test and Smart Balance Master in Thai healthy elderly. Seventy elderly (35 males and 35 females), ranging in age from 60-88 years, received three tests of balance. The measured variables used in this study were distance progression of Stepping test (cm), rank of error of Tandem Walk test, percentage of maximum stability obtained from Sensory Organization Test (SOT), and Dynamic test: sway velocity of Center Target test (deg/sec), on axis velocity (deg/sec) and directional control (%) on three pacing speeds (slow, medium and fast) of Rhythmic Weight Shift Left/Right and Front/Back tests, reaction time (second), movement velocity (deg/sec), end point excursion (%), maximum excursion (%), and directional control (%) for Center of Gravity (COG) movement to eight targets of Limits of Stability test (LOS).

The results of correlation analysis in the male elderly group revealed statistically significant correlations between Stepping test and reaction time for the right target ( $r=0.3754$ ) and movement velocity for the left ( $r=-.4308$ ) and left-front ( $r=-.4094$ ) targets of COG movement. For Tandem Walk test, there were statistically significant correlations between this test and percentage of maximum stability on eyes closed ( $r=-.3967$ ) and sway reference support and vision ( $r=-.5124$ ) of SOT, sway velocity of Center Target test ( $r=0.4891$ ), directional control for medium pacing speed on Rhythmic Weight Shift Front/Back test ( $r=-.3784$ ), reaction time and movement velocity for the right-front target ( $r=0.4074$  and  $r=-.4307$  respectively), movement velocity for the left ( $r=-.3654$ ) and left-front ( $r=-.3880$ ) targets of the LOS test.

For the female elderly group, the results of correlation analysis revealed statistically significant correlation between Stepping test and on-axis velocity for slow pacing speed of Rhythmic Weight Shift Left/Right ( $r=0.5801$ ) and Front/Back ( $r=0.3118$ ) tests, and reaction time for the right target ( $r=0.5593$ ) of the LOS test. In the Tandem Walk test, there were statistically significant correlations between this test and percentage of maximum stability on eyes open ( $r=-.4046$ ) and sway reference support with eyes open ( $r=-.4424$ ) obtained from SOT, directional control for slow pacing speed of Rhythmic Weight Shift Left/Right test ( $r=-.3394$ ), on-axis velocity for slow pacing speed of Rhythmic Weight Shift Front/Back test ( $r=-.3752$ ), end point excursion for the left target ( $r=0.4779$ ), maximum excursion for the right ( $r=-.4055$ ) and right-front ( $r=-.5160$ ) targets, directional control for the front ( $r=-.5862$ ) and right-front ( $r=-.4134$ ) targets of COG movement obtained from LOS test.

Based on the level of correlations found in this study, when interpreting the results of Tandem Walk test, the examiner should take into consideration the efficiency of both sensory and muscular systems. For the Stepping test, only the efficiency of the muscles may be considered. In addition, it is speculated that if the Tandem Walk test is supplemented by other clinical balance tests, the relationship with the posturographic variables measured from the Smart Balance Master may be enhanced. Further study is needed to confirm this speculation.