



Age-Related Changes in Balance Control from the Age of 20 to 60: A Preliminary Study

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INTRODUCTION

- The Centers for Disease Control and Prevention reports that about 18 million of older people are treated ever year in the emergency room for nonfatal injuries that occur during falls.
- Studies also suggested that about 15% of adults aged 40-49 years experience balance problem due to vestibular or vision problems.
- We hypothesized that balance instability may begin to emerge as early as the age of 40.
- Thus, the purpose of this study was to examine the aged-related changes in balance control from the age of 20 to 60.

METHODS

In this study, twelve adults aged from 21 to 65 years completed two types of balance testing:

- 1) Standing balance test: Participants were tested with the SMART Balance Master System (Fig. 1) by performing the sensory organization test (SOT). Condition 1 of the SOT was standing on a tilting platform, and the second condition was standing on the same platform when the surrounding environment moved along with body sway (Fig. 2).
- 2) Walking balance test: Participants walked for six minutes on a treadmill while presenting a moving virtual corridor (Fig. 3) in two conditions. Condition 1 was walking with moving corridor, and the second condition was walking while the width of the moving corridor was varied sinusoidally (Fig. 4).

Stability Measures:

- 1) Standing stability - the average score from the SOT.
- 2) Walking stability - the spatiotemporal gait parameters, such as the average step width.



Figure 1: SMART Balance Master System

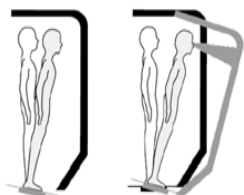


Figure 2: Sensory Organization Test: Condition 1(Left) and Condition 2 (Right)

METHODS



Figure 3: Experimental setting for walking conditions

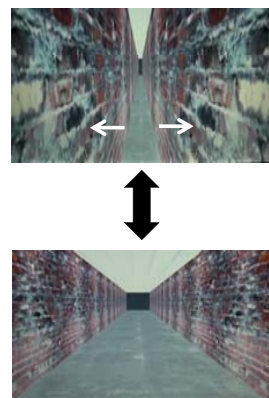
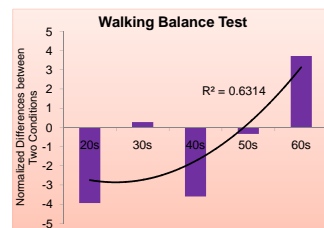
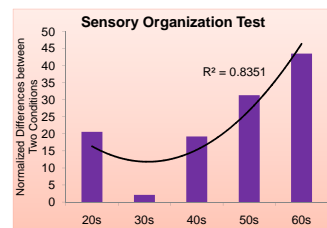
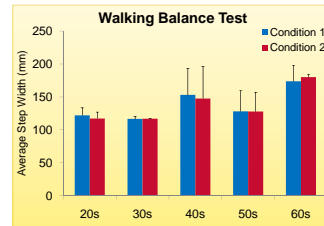
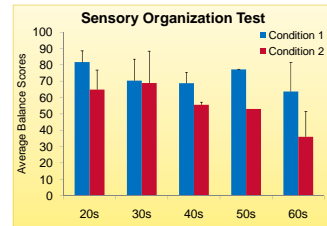


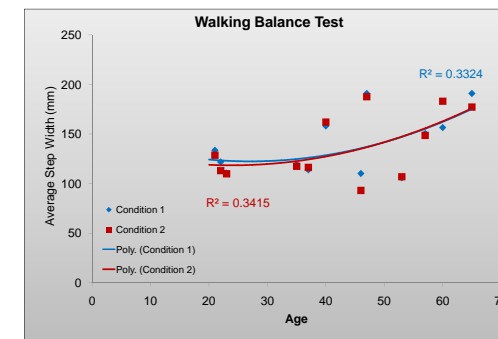
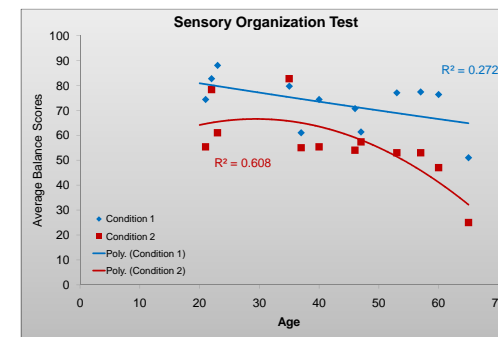
Figure 4: Moving Virtual Corridor

Measurements and Data Analysis: All data were categorized into 5 age groups (from 20s to 60s). A Pearson correlation was utilized to examine the relationship between the stability measures and age.

RESULTS



RESULTS



DISCUSSION

- Both standing and walking balance tests consistently showed that the ability to maintain balance was reduced from the age of 40.
- To reduce the public health burden associated with fall injuries among older adults, it is possible that healthy aging should require appropriate screening even from the age of 40.
- Our study utilizing a much larger sample size could further confirm these initial intriguing results.

ACKNOWLEDGEMENTS

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