Relationship between hand grip strength and postural static balance among undergraduates of a Nigerian university

Adesola O Ojoawo1, Aduralere P Afolabi, Babatunde E Arayombo2, Odunayo T Akinola3
1Department of Medical Rehabilitation, Faculty of Basic Medical Sciences, College of Health Sciences, Obafemi Awolowo University, Ile Ife, Nigeria
2Department of Anatomy and Cell Biology, Faculty of Basic Medical Sciences, College of Health Sciences, Obafemi Awolowo University, Ile Ife, Nigeria
3Department of Physiotherapy, Faculty of Basic Medical and Health Sciences, College of Health Sciences, Bowen University, Iwo, Nigeria

Abstract. Hand grip strength (HGS) is a useful functional measure of the integrity of upper extremity. The study is designed to evaluate the relationship between HGS and static balance among undergraduates of a Nigerian university.

Material and Method. Four hundred undergraduates (229 males and 171 females) selected consecutively of the Obafemi Awolowo University, Ile-Ife, participated in the study. The hand grip dynamometer was used to measure the grip strength while the participants were on standing and the static balance performance was measured using one-leg stance and stop clock. Data were analysed using descriptive and inferential statistical. Alpha level was set at 0.05.

Result. The result showed that there was a significant correlation (r=0.136; p<0.05) between balance performance and wrist circumference, there was significant relationship (r = 0.280; p < 0.001) between left grip strength and balance performance. Also a significant relationship (r= 0.289; p<0.001) between right grip strength and balance performance was found. It was also shown that the there was a significant difference between handgrip strength of the right upper limb of males and females (t=15.894; p=0.000) and between static balance performance for males and females (t=5.364; p=0.000). Prediction equation for the right hand grip strength was 31.855 (Ht/m) + 0.284 (Wt/kg) + 1.918 (WrstC/cm) – 65.378, and that of the left hand grip strength was (28.622 (Ht/m) + 0.288 (Wt/kg) + 1.816 (WrstC/cm) – 61.193).

Conclusion. It can be concluded from the study that increase in hand grip strength can increase static balance performance of individual.

Key words: hand grip strength, static balance, one legged stance test, dynamometer.

Introduction
Hand functionality is considered to be vital in most of the daily activities involving upper limb be it carrying loads, lifting objects, opening or closing doors to name a few. Besides, grip, strength can be an important index of general health, nutritional status, overall strength and the amount of protein reserves in the body (1-4). Furthermore, the measurement of grip strength has great importance for occupational health purposes (5). The measurement of grip strength is an important component of the hand rehabilitation because it helps to establish a baseline for treatment and it is a measure of the effectiveness of therapy (6).

Various devices are being used for measuring muscular strength. These include balance, cable-tensiometer, grip dynamometer and strength meter (7, 8). Manual and mechanical methods are normally employed to assess and evaluate hand grip strength in which hand held dynamometer is considered to be a reliable instrument in evaluating grip strength being used widely in rehabilitation (9). It is used to measure the force of flexor muscles of hand generated during gripping the dynamometer.

Balance is the ability to sustain body center of pressure within the base of support necessary to maintain a position in space or a movement in a harmonized and controlled situation and against internal and external perturbation (10). Also, postural balance is often defined as ‘the act of maintaining, achieving or restoring a state of balance during any posture or activity (11). This complicated motor skill justifies the body situation...