

# Effect of Body Posture on Hand Grip Strength in Adult Bengalee Population

De<sup>1</sup>, S., Sengupta<sup>2</sup>, P., Maity<sup>3</sup>, P., Pal<sup>4</sup>, A., and Dhara<sup>5</sup>, P.C.

<sup>1</sup>Ergonomics and Sports Physiology Division, Dept. of Human Physiology with Community Health, Vidyasagar University, Midnapore-721102. West Bengal, India, <sup>1</sup>de.sujaya@gmail.com

<sup>5</sup>Professor, Ergonomics and Sports Physiology Division, Department of Human Physiology with Community Health, Vidyasagar University, Medinipur -721 102, West Bengal, India

## Abstract

**Objectives:** The present work was aimed to assess the variation of grip strength with the changes of posture and body joint angles and to establish an optimal body posture and joint angle for the maximum grip strength for adult Bengalee population. **Methods:** Adult male (n=156) and female (n=224) were involved in this study. The hand grip strength was measured by using Lafayette hand grip dynamometer. **Results:** The results revealed that male subjects had a significantly greater ( $p < 0.001$ ) grip strength compared to that of female subjects and the highest grip strength was found in standing posture with elbow angle of  $90^{\circ}$  in both adult male and female subjects. **Conclusions:** From the results it may be recommended that the grip strength of Bengalee population may be measured in standing posture with elbow angle of  $90^{\circ}$ , shoulder angle of  $180^{\circ}$ , and the trunk and wrist in neutral positions to provide maximum force.

**Key words:** Grip strength, Standing posture, Body joint angle, Bengalee (Indian) population

## Introduction

Reliable and valid evaluation of hand strength can provide an objective index of general upper body strength. The power grip is the result of forceful flexion of all finger joints with the maximum voluntary force that the subject is able to exert under normal biokinetic conditions. The synergistic action of flexor and extensor muscles and the interplay of muscle groups is an important factor in the strength of the resulting grip. Many factors influence the strength of the grip, including muscle strength, fatigue, time of the day, age, nutritional status, restricted motion, and pain. Grip strength is often used in medicine as a specific type of hand strength. The purpose of this testing is diverse, including to diagnose diseases, to evaluate and compare treatments, to document progression of muscle strength,

and to provide feedback during the rehabilitation process as a measure indicating the level of hand function. It can be used as a measure of fatigue. It is also able to predict a decline in function in old age (*Rantanen et al, 1999*).

*Wang et al (2005)* suggested for evaluating grip strength as a nutritional marker. Handgrip strength not only is a marker of body lean muscle mass but also may be used in conjunction with serum albumin as a nutrition-monitoring tool in patients. People are generally limited by their strength when exerting force. Strength is a muscle's capacity to exert maximal effort or resist maximal opposing force. Grip strength is correlated with the strength of the upper extremity, general strength of the body and some anthropometric measurements (*Rantanen et al, 1994*) and therefore is often adopted in clinical practice as an objective