

Effects of Hand Position with Relation to Elbow and Shoulder Position on Maximum Grip Strength

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Abstract

This study aimed at determining the grip strength at various angles of shoulder and elbow positions and associate them with discomfort at each point. Method: 60 right handed male subjects aged 20-35 years were taken to measure grip strength at shoulder forward flexion at 0°, 45°, 90°, 135°, 180° with elbow at 0° and 90° flexion; discomfort was measured with a VAS scale. Result: scores of grip strength: minimum at 90° elbow and 180° shoulder and maximum at 0° elbow and 180° shoulder. VAS score: the maximum at 0° elbow and 135° shoulder and minimum at 0° elbow and 0° shoulder. Conclusion: there exists a relation between grip strength and discomfort.

Introduction

The hand is an integral part of normal human functioning. Quality of performance in daily living skills, recreational, and vocational pursuits is influenced by adequate hand function. Power grip is the result of a sequence of (a) opening the hand, (b) positioning the fingers, (c) bringing the fingers to the object and (d) maintaining a static phase that actually constitutes the grip (*Landsmeer et al, 1960*). Fingers in power grip usually function in concert to clamp on and hold an object into the palm. The fingers assume a position of sustained flexion that varies in degree with the size, shape, and weight of the object. *De et al (2011)* reported variations in grip strength

with the changes of posture and body joint angles and established an optimal body posture and joint angle for the maximum grip strength for adult Bengalee population. *Parvatikar & Mukkanavar (2009)* demonstrated that various joint positions can affect grip strength, especially elbow and shoulder joints with respect to wrist positions. Handgrip strength is a physiological variable that is affected by a number of factors including age, gender and body size. Since the force exerted on the hand or wrist while performing a task may be a contributing factor in the development of MSD disorders in the upper-arm, it has become imperative to design hand tools