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Research Article

Study of Hand Grip Strength

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Abstract

Hand grip strength is a major component of hand function. A few studies from India have reported normative values for grip strength in an attempt to explore the association of grip strength with particular factors, namely age, relevant anthropometric factors, level of physical activity and profession. The main objective of the current study was to generate reference values for grip strength in a healthy Indian population in age groups ranging from 15-65 years using a Hand Dynamometer. Total of 120 people were considered for this study. Out of 60 were male and 60 were female participants. But final 56 readings of female were considered as the other 4 had some disorders (unhealthy population). Normative data for hand grip strength based on age, gender and dominance are available from deferent populations using variety of measurement methods for reference. However, these normative values can be used only for the particular populations from which the sample is derived.

Keywords: *Hand grip, strength, dynamometer, supported, unsupported*

1. Introduction

Grip is defined as 'force full act resulting in flexion at all the joints of the fingers along with thumb when used as a stabilizer to the object being held between the finger and the palm.'[1] Grip strength is a referred as a reliable and valid objective parameter to evaluate the strength of the hand as the part of the musculoskeletal system.[4] Grip strength is used in the clinical settings as an indicator of disease activity. [4] The evaluation of hand grip strength plays an important role in the assessment of upper limb impairment, to measure the baseline deficiency in hand muscle power, set treatment goals, to monitor progress during rehabilitation, and also to document the effectiveness of various treatment strategies and to assess patient's ability to return to employment. Grip strength is considered as an integrated performance of muscles that can be produced in one single muscular contract.[1]Hand grip is an important component of human function and is a unique feature that distinguishes humans from primates. [6] Handgrip strength is a physiological variable that is affected by a number of factors including age, gender and body size.[1] Hand grip strength is a major component of hand function. Although reference values are available from western populations it would not be appropriate to apply them for Indian population due to the variation in geographical, genetic, nutritional, social and cultural factors.

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A few studies from India have reported normative values for grip strength in an attempt to explore the association of grip strength with particular factors, namely age, relevant anthropometric factors, level of physical activity and profession.

2. Materials And Methods

The study was conducted for randomly selected 116 people of different age group sranging from 15 years to 65 years. In which 60 men and 56 women study was conducted to check the hand grip. The study conducted includes working age group (15-65). A total of 120 readings were taken with 50-50 ratio of male and female, but 4 readings were eliminated as they had some disorders. Participants were explained about the nature of the study in the language best understood by them. A verbal feedback was taken from the people about their health and disorders. Each participant will participate in single testing session. Hand grip strength was measured using Hand Dynamometer, a valid and reliable instrument. It is an isometric, hydraulic hand dynamometer. The Hand dynamometer was read in kilograms (kg) with varying gradation. The participant was made to sit on a chair without any arm rest, back straight, the shoulders adducted and neutrally rotated the elbows flexed to 90 degrees and the forearm in neutral position. The participant was instructed to squeeze the handle of the dynamometer as maximally as possible and release. No encouragement was given to the participant. Grip strength measurements for both the hands were taken by alternating the hands

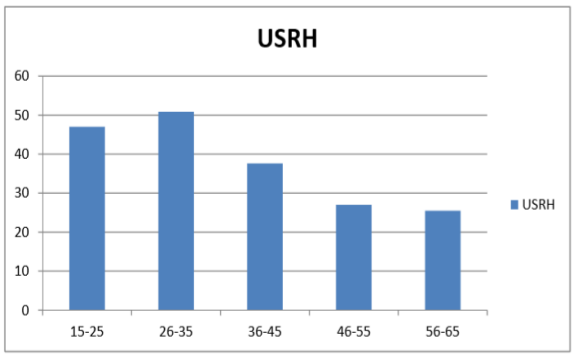
with 60 sec rest period in between each task to avoid muscle fatigue. Readings were noted for supported and unsupported position. In supported position the participant was asked to rest the elbow on the hard surface and was asked to squeeze the handle of the dynamometer.

Statistical Analysis: Descriptive statistics (mean±standard deviation) were determined for all measured variables. Data were analyzed using ANOVA test and T-test for comparing strength between male and female.

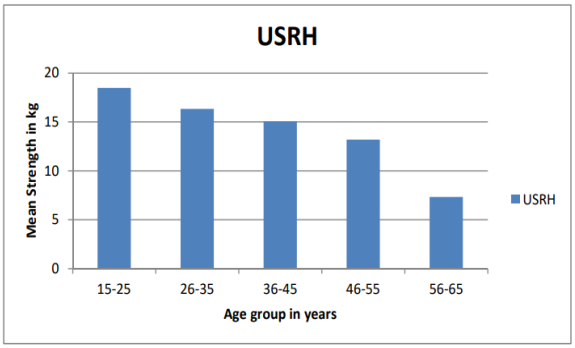
3. Results

1. The present study included 116 healthy subjects (60 male and 56 female).
2. Grip strength value measured in women was significantly lower than those of the men. It was found to be statistically significant using t-test (P <0.0001). 3. This study established the reference values for grip strength for healthy Indians based on data generated from 116 healthy participants in the agerange from 15 to 65 years including both men and women.
4. It was found that the grip strength increased gradually with age. The present study noted higher grip strength in males as compared to females.

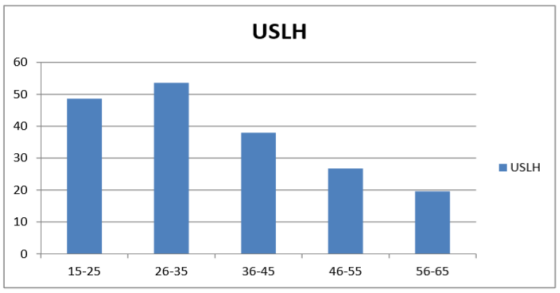
USRH: Unsupported Right Hand
USLH: Unsupported Left Hand
SRH: Supported Right Hand
SLH: Supported Left Hand
SD: Standard Deviation



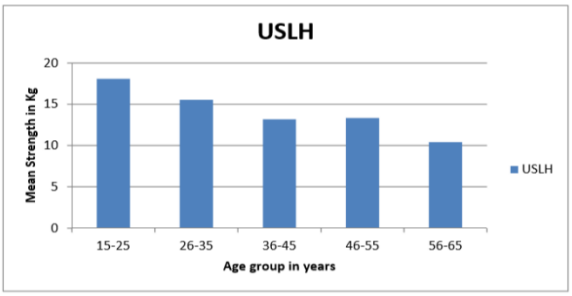
Graph 1- Unsupported Right hand for male



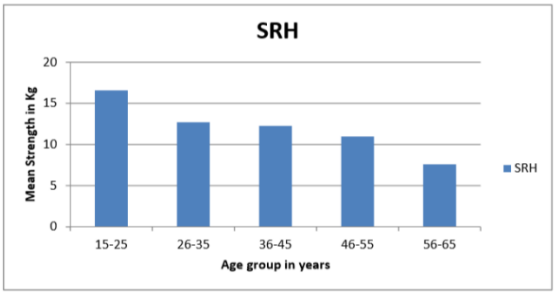
Graph -2 Unsupported Right hand for female



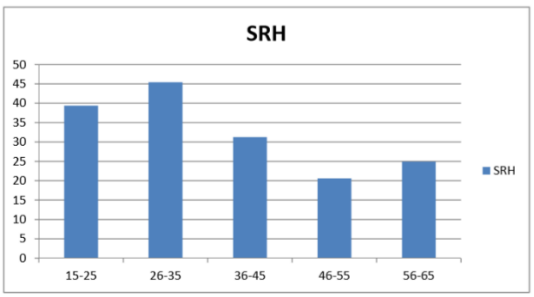
Graph-3 Unsupported left for male



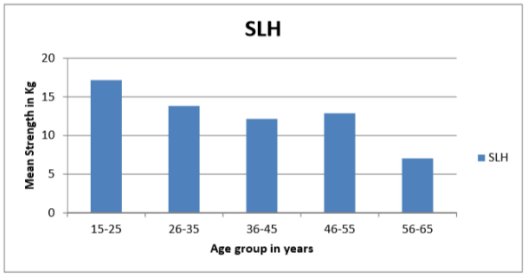
Graph -4 Unsupported left hand for female



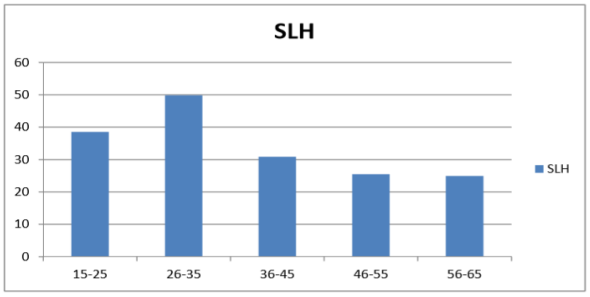
Graph-5 Supported Right Hand for female



Graph-6 Supported Right hand for male



Graph-7 Supported Left hand for female



Graph-8 Supported left hand for male

The findings of the present study would be of great value in estimating of handgrip strength and in physical therapy treatment strategies. In order to properly diagnose various musculoskeletal deformities, especially related to upper extremities, and for their rehabilitation, the assessment of handgrip strength in different positions is essential. This study was done because grip strength is an important indicator of how strong the muscles are in hand, wrist and forearm. It also affects activities like opening jars, carrying

Groceries, opening door knobs as well as its reliable

indicator of heart attack or stroke. If a certain person has grip strength less than the normal range then there is a need of suggesting them certain physical activities which could improve their strength, because even a 10 mint of physical activity can avoid disability and improve mobility. The results of this study concluded that the strength in females is less as compared to males.

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