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Comparison of hand grip strength between male sports Players v/s Female sports players

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Abstract
Background: Grip strength is the force applied by the hand to pull on or suspend from objects and is a specific part of hand strength. Optimum-sized objects permit the hand to wrap around a cylindrical shape with a diameter from one to three inches. Stair rails are an example of where shape and diameter are critical for proper grip in case of a fall. Other grip strengths that have been studied are the hammer and other hand tools. In applications of grip strength, the wrist must be in a neutral position to avoid developing cumulative trauma disorders (CTD's). A hand dynamometer is used to perform the hand-grip test. The curved handle of the dynamometer mimics the pattern of your hand when making a fist. The handle is pliable and receptive to pressure against it. Attached to the hand-grip is a monitor that shows the strength of the squeeze in kilograms. More advanced models may have a digital readout.
Need of the Study: Grip strength is one of the main components tested while evaluating hand function and also provides an objective index of the functional integrity of the upper extremity. This study is important to compare hand grip in male sports players vs. female sports players
AIM: Hand grip measurement in male sports players vs. female sports players.
Methodology: Study Design: Observational study, Study Setting: Madhav University and Ahmadabad, Sampling Technique: convient sampling Technique, Study Population: 15 Male Sports Players 15 Female Sports Players, Study Sample: 30 People, Study Duration: Total Study duration – 16 Weeks
Results: Male sport players have more strength then female sports players.
Conclusion: This study suggested that there is significant difference in hand grip strength between male sports players' vs. female sports players male sport players having more strength then female sports players.

Keywords: male sports players, female sports players, hand grip strength, hand dynamometer

Introduction
The human hand can be used to grip objects in several different positions. These different positions require different types of grip strength which are typically quantified based on the way the hand is being used.
The crush grip is what is most commonly thought of as "grip". It involves a handshake-type grip, where the object being gripped rests firmly against the palm and all fingers. A strong crush grip is useful in bone-crushing handshakes or for breaking objects with pressure.
In a pinch grip, the fingers are on one side of an object, and the thumb is on the other. Typically, an object lifted in a pinch grip does not touch the palm. This is generally considered a weaker grip position. The pinch grip is used when grabbing something like a weight plate or lifting a sheet of plywood by the top edge. Care must be taken to avoid cramping the muscles in the hand.
A support grip typically involves holding something, such as the handle of a bucket, for a long time. This type of strength is epitomized by the "Farmer's walk", where the bucket is filled with sand or water, and carried over a long distance. A great deal of muscular endurance is necessary to have a good carrying grip.

Need of the study
Grip strength is one of the main components tested while evaluating hand function and also provides an objective index of the functional integrity of the upper extremity. This study is important to compare hand grip in male sports players vs. female sports players

Aim & Objectives
Hand grip measurement in male sports players vs. female sports players.

Objectives
To compare the hand grip strength between male sports players vs. female sports players.

Hypothesis
This study hypothesize that there is a strong difference of handgrip between male sports players vs. female sports players.

Review of literature
1. D. Leyk Æ 2007 has done study on Hand-grip strength of young men, women and highly trained female athletes

concluded that with the exception of age all biometric values revealed significant differences between men and women ($P < 0.001$). Hand-dimensions had no significant influence on hand-grip strength per kg body mass (Fmax/body weight). This applies to both hand length (men: $r = –0.03$, $P = 0.196$; women: $r = 0.12$, $P = 0.027$) and hand width (men: $r = –0.01$, $P = 0.745$; women: $r = 0.03$, $P = 0.471$).

2. Nicola M Massy-Westropp has done study on Hand Grip Strength: age and gender stratified normative data in a population-based study that concluded with The age and gender grip strength values are lower in younger adults than those reported in international literature The study population was relatively young, with 41.5% under 40 years; and their mean BMI was 28.1 kg/m^2 (SD 5.5). Higher hand grip strength was weakly related to higher BMI in adults under the age of 30 and over the age of 70, but inversely related to higher BMI between these ages.
3. Taina Rantanen, February 10, 1999 Midlife Hand Grip Strength as a Predictor of Old Age Disability The purpose of this research was to study midlife muscle strength as a predictor of late life functional limitations and disability among initially healthy men with an average age of 54.0 years (Range, 45-68 years) at baseline. The average follow-up time was 25.3 years.
4. Leyk D, Gorges W, Ridder D, Wunderlich M, Rüther T, Sievert A, Essfeld D 2007 Hand-grip strength of young men, women and highly trained female athletes that Mean maximal hand-grip strength showed the expected clear difference between men (541 N) and women (329 N). Less expected was the gender related distribution of hand-grip strength: 90% of females produced less force than 95% of males. Though female athletes were significantly stronger (444 N) than their untrained female counterparts, this value corresponded to only the 25th percentile of the male subjects.
5. Manjunath Hemberal, Venkatesh Doreswamy, Swetha Raj Kumar (2014) study of correlation between hand circumference and maximum grip strength. Hand circumference is a good predictor of muscle grip strength (MGS) than BMI and forearm circumference.
6. Demirel P, Kiran S, Barut C. Morphological and functional aspects of hand in relation to age, gender and sports playing condition. Acta Medica International 2014; 1(2):67-73. Results of the present study about morphological and functional aspects of hand in relation to age, gender and sports playing condition in a Turkish population sample. However prospective studies investigating the factors affecting hand morphology in terms of anthropometry during growth and development period are necessary for more detailed evaluation.
7. Saravanan Murugan, Dhrumika Patel, Kinjal Prajapati, Madhuri Ghoghari, Pranjali Patel. Grip strength changes in relation to different body postures, elbow and forearm positions. Int J Physiotherapy Res 2013; 04:116-21. Gender differences in hand grip strength existed when comparisons were made between male and female. Standing with elbow flexion and forearm supination can be used to elicit maximal response of handgrip strength as per the results of this study.
8. Shyamal Koley, Navdeep Kaur and J.S. Sandhu (2009) [5] A Study on Hand Grip Strength in Female Laborers of Jalandhar. Females working in different constructional sites have poor nutritional status due to their lower socioeconomic conditions but they require more physical strength i.e. handgrip strength to perform their daily work efficiently. Quite naturally poor nutritional status fails to provide adequate handgrip strength to them affecting their skills. More researches are required.
9. Nicola M Massy-Westropp , Tiffany K Gill and 2 others (2006 – 2009) This study provides a large sample of normative data for clinical use in hand and upper limb rehabilitation, and possible screening for other health issues. It explores the relationship of grip strength with elevated BMI and found no significant relationships. The study compares the Australian sample with international grip strength norms, finding these population-based norms to be lower than international convenience samples.
10. Andersen-Ranberg K1, Petersen and 2 others (2002) [6] Cross-national differences in grip strength among 50+ year-old Europeans Grip strength is easily measured in a large cross-national survey. Gender-specific grip strength declines with age in all countries. The pattern of decline is similar in all countries, but people aged 50 and over in the southern European countries have lower grip strength than their northern and continental European peers. to understand more of the underlying mechanisms that are analogous to the gender difference in grip strength, which indicates that men have substantially better grip strength than women, but still higher mortality rate, even if grip strength predicts mortality within each gender.

Methodology

- **Study Design:** Observational study
- **Study Setting:** Madhav University and Ahmadabad.
- **Sampling Technique:** convient sampling Technique
- **Study Population:** 15 Male Sports Players 15 Female Sports Players
- **Study Sample:** 30 People
- **Study Duration:** Total Study duration – 16 weeks

Criteria for selection

1. Inclusion Criteria

- Both male and female are included.
- Age between 17 to 35 years
- Sports players
- Player should be playing sports since 1 year.

2. Exclusion Criteria

- Person with musculoskeletal disorder of upper limb.
- Person with any neurological condition of upper limb.

Materials used in the study

1. Hand held dynamometer
2. Page

3. Pen
4. Chair
5. Watch

Method

For measuring the hand grip strength person was asked to hold the hand held dynamometer in dominant hand for 3 seconds in sitting position. Elbow was 90 degree flexed and wrist without support.

Results

Mean and standard deviation of Age in female sports players and male sports players.

Table 1

	Female players	Male players
Mean of Age	26.87	25.60
SD	4.422	4.222

Mean and standard deviation of Hand grip strength in female sports players and male sports players.

Table 2

	Female players	Male players
Mean of AGE	26.66	34.20
SD	10.65	11.33

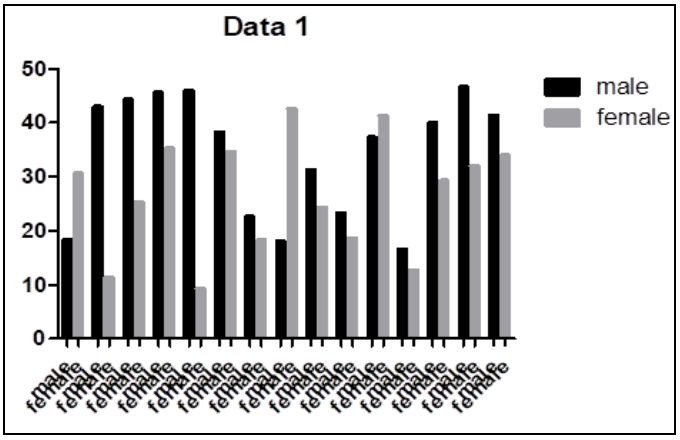

Fig 1

Discussion

Grip strength is the force applied by the hand to pull on or suspend from objects and is a specific part of hand strength. Optimum-sized objects permit the hand to wrap around a cylindrical shape with a diameter from one to three inches.

Grip strength is a general term also used by physical strength of an animal, and athletes, referring to the muscular power and force that they can generate with their hands. In athletics, it is critical for rock climbers and in competitions such as the World's Strongest Man. Grip strength training is also a major feature in martial arts, and can be useful in various professions where people must work with their hands.

The human hand can be used to grip objects in several different positions. These different positions require different types of grip strength which are typically quantified based on the way the hand is being used.

The crush grip is what is most commonly thought of as "grip". It involves a handshake-type grip, where the object being gripped rests firmly against the palm and all fingers. A strong crush grip is useful in bone-crushing handshakes or for breaking objects with pressure.

In a pinch grip, the fingers are on one side of an object, and the thumb is on the other. Typically, an object lifted in a pinch grip does not touch the palm. This is generally considered a weaker grip position. The pinch grip is used when grabbing something like a weight plate or lifting a sheet of plywood by the top edge. Care must be taken to avoid cramping the muscles in the hand.

A support grip typically involves holding something, such as the handle of a bucket, for a long time. This type of strength is epitomized by the "Farmer's walk", where the bucket is filled with sand or water, and carried over a long distance. A great deal of muscular endurance is necessary to have a good carrying grip.

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. For example, it is used to indicate changes in hand strength after hand surgery or after a rehabilitation program. By asking subjects to maintain a maximum contraction for longer periods, it can be used as a measure of fatigue. It is also able to predict a decline in function in old age. Since the above-mentioned grips involve the action of a large number of different joints and muscle groups, grip strength is not always very sensitive to measure individual muscle groups in medicine. For this purpose, dynamometers have been developed that provide more specific information on individual muscles in the hand such as the Rotterdam Intrinsic Hand Myometer (RIHM).

Hand grip is an important, though often overlooked, component of strength in sports. However, the grip strength is most often a secondary or auxiliary function of the sport. Sports in which grip strength are included within the secondary focus include the following: movement-based climbing, gymnastics, pole dancing, horse racing, power lifting or professional arm-wrestling; ball-based baseball, gridiron football, rugby, canoe polo, badminton or tennis; and combat sports such as brazilian jiu-jitsu, boxing, fencing, judo or wrestling.

Grip strength training requires a different type of training regimen than other muscular training. The reasons are primarily based on the interplay of the tendons and muscles and the lack of "down time" or rest that most people's hands get.

Conclusion

This study suggested that there is significant difference in hand grip strength between male sports players' vs. female sports players male sport players having more strength then female sports players.

Summary

Grip strength is necessary for performing activities of daily living which are required for functional activities. This study

is important to know about the strength of hand grip in female sports players and male sports players.

To compare strength between female sports players & male sports players. For measuring the hand grip strength person was asked to hold the hand held dynamometer in dominant hand for 3seconds in sitting position.

Elbow was 90 degree flexed without support. Unpaired t test was applied for comparison. P value is 0.0636 so there is no significant result. The aim of the study is to compare the hand grip strength between male sports players & female sports players. In this study for measurement of hand grip strength Jamar hand held dynamometer is used.

In this study mean and standard deviation of 15 female sports players 26.66 and 10.65 and mean and standard deviation of 15 male sports players 34.20 and 11.33 it shows that male sports players have more grip strength.

There is no significant difference in hand grip strength female sports players & male sports players.

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