

Comparison of Hand Grip Strength Between Physiotherapy Students and Dental Students

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How to cite this article: Neha Lakshmanan, Senthilkumar S, Prathap Suganthirababu et. al. Comparison of Hand Grip Strength Between Physiotherapy Students and Dental Students. Indian Journal of Physiotherapy and Occupational Therapy / Volume 18, Year 2024.

Abstract

Background: In hand treatment assessments, hand grip strengths are utilized as a measure of strength. For all occupations, having a strong grip is a necessary requirement for success. Differences in the nature of the work, the workplace, and the things that professionals handle may be responsible for these behaviors. A good hand grip is highly helpful in a variety of hand-intensive occupations like physiotherapy and dentistry. Musculoskeletal disorders, especially in the hand and wrist region, are common and have a great impact on work life.

Purpose: The need for this study is to evaluate and compare the differences in hand grip strength between physiotherapy and dental students and to see if clinical training for physiotherapy students and dental students will have an impact on their hand grip strength.

Materials and methods: 100 subjects were selected from Saveetha Institute of Medical and Technical Sciences based on the selection criteria where 50 subjects were physiotherapy students(interns) and 50 subjects were dental students(interns). The hand grip strength of the subjects was assessed with the help of a hand dynamometer and the measurements were recorded. The entire study was conducted from November 2022 to March 2023.

Result: The results of this study shows that there was a difference between both the groups and that physiotherapy students have better hand grip when compared to the dental students.

Conclusion: The results and the data obtained from this research concluded that grip strength of physiotherapy students is more than that of dental students.

Keywords: Physiotherapy students,Dental students, Hand grip strength, Hand dynamometer.

Introduction

Measurement of handgrip strength is an important aspect of hand assessment¹. In hand treatment examinations hand grip strengths have been employed as a measure of strength². In order to assess general strength, work capability, the

severity of disease and injury processes, and the likelihood of success in rehabilitation, grip strength has been used³. It is extensively acknowledged that tests of grip strength is an objective indicator of the functioning of the upper extremity's functional system⁴ and is frequently used in clinical practice

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as an objective indicator of body function since it is connected with both upper extremity and overall body strength⁵. It is one of the best indicators of the limb's overall strength⁶. Grip strength, which is the amount of force utilized by the hand to pull on or suspend from things, is a specific example of hand strength. It is the strength and force that the hand is capable of producing. Different types of grips exist. Strong muscles are necessary for a stable carrying hold. Evidence-based medicine routinely uses grip strength testing for clinical decision-making and outcome assessment⁷.

Consistent posture, manual therapy methods, repetition, working while injured, and heavy workloads are the risk factors for the physiotherapy profession that should be of particular concern. Manual treatment techniques and repetition are most frequently used by hand injury physiotherapists, particularly for injuries to the wrist and base of the thumb.

The hand-wrist discomfort and thumb pain have been identified as an issue by physiotherapists who use manual treatments⁸, and they have an impact on the physiotherapist's capacity to use manual treatments since they affect the strength and function of the hand-wrist and thumb⁹.

Both hand dexterity and grip strength are essential skills for a dental professional. Hand grip strength refers to the force used by the hand to grasp or hang an object, while hand dexterity deals with the coordination of the tiny muscles in the hand⁶. Dental professionals who only stood to work reported the most hand/wrist pain, whereas those who alternated between sitting and standing reported the least¹⁰. Dentists experienced issues as a result of their poor posture, excessive wrist and finger use, and repeated motion⁴. When doing dental operations, dental assistants and dental hygienists may endure hand pain.

After lengthy treatments, grip strength may become decreased, changed, and uncomfortable with throbbing, altered sensations, and stiffness in the hands¹¹.

Aim

To compare the handgrip strength of physiotherapy students and dental students.

Materials and Method

This is a cross-sectional study conducted on 100 subjects. Prior to participation in this study, the subjects were explained about the study and informed consent was taken. 50 Physiotherapy Students (group A) and 50 Dental Students (group B), aged between 22-24 years, were taken from Saveetha Institute of Medical and Technical Sciences. Convenient sampling was used in this study.

Subjects: The subjects were selected based on the inclusion and exclusion criteria from Saveetha College of Physiotherapy and Saveetha Dental College. The sample size was 100 subjects where 25 males and 25 females were assessed in each group.

Selection criteria:

Inclusion Criteria:

- Physiotherapy Interns
- Dental Interns
- Age:22-24
- Gender: both male and female
- BMI:normal BMI (18.5-24.9)
- Asymptomatic subjects without any clinical complications related to the upper limb

Exclusion criteria:

- Recent fractures of the wrist.
- Any pain due to pathology in wrist.
- Soft tissue injury of the wrist.
- Subjects pursuing fitness training.

Outcome measures

Jamar Hand Dynamometer

The most common evaluation equipment for assessing grip and squeeze strength is a Jamar hydraulic dynamometer. A hand dynamometer can be used by physical therapists and other medical practitioners to assess patients' development before and after therapy.

Using a hand held dynamometer to measure grip strength is the most commonly used technique. It is used for measuring the muscular force produced by the forearm and hand's flexor mechanisms. The three basic types of handgrip dynamometers are as

follows. These include hydraulic, air, and spring-loaded compression tools that are weighed in pounds or kilograms. For accuracy, a hydraulic dynamometer is best¹²

Study Period: November 2022 to March 2023.

Procedure

100 subjects were selected from Saveetha Institute of Medical and Technical Sciences based on the inclusion and exclusion criteria out of which 50 subjects are physiotherapy students(interns) and 50 subjects are dental students(interns). The hand grip strength of the subjects was assessed with the help of a hand dynamometer. The subject was asked to sit with their shoulder adducted and elbow at 90° on the arm rest and wrist in neutral position.

The student was made to sit with hip and knee flexed to 90° with the foot flat on the ground and then the measurements were taken.

Preparation of apparatus:

The desired spacing should be set on the adjustable handle. Before shifting the handle from one position to another, make sure the handle clip is situated at the lower post from the gauge. Inaccurate readings will occur if the handle is not positioned correctly. The red peak-hold needle should be anticlockwise rotated to zero.

Position of subject:

Sitting

Test position:

Shoulder adducted and neutrally rotated, elbow flexed 90°, forearm and wrist in neutral position.

Instructions to the subjects:

Ask the individual to squeeze as hard as they can without holding the breath with their dominant hand for 5 seconds while the instrument is comfortable in their hand. With a 30-second break in between, perform each test three times.

Record the reading (average) after the individual has used the equipment.

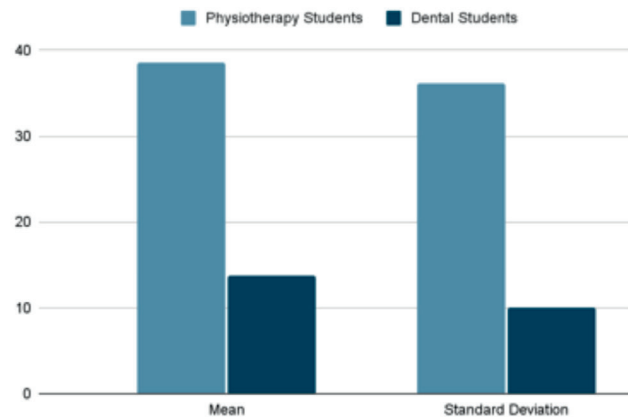
Before taking a new reading, reset the peak hold needle to 0⁶

Data Analysis

Graph - 1

Comparison of hand grip strength between physiotherapy students and dental students.

INTERPRETATION: The mean hand grip strength of physiotherapy students is higher than that of dental students.



Result

- Statistically significant difference between Physiotherapy Students and Dental Students was found by statistical analysis of quantitative data.
- Using Jamar Hand Dynamometer, the hand grip strength was measured among students which showed that the hand grip strength of male students in both the groups is higher than the female students .
- The mean hand grip strength of physiotherapy students is 38.6 and that of dental students is 36.1.
- The mean and standard deviation is plotted in graph 1
- Statistical analysis of the samples reveals that there is a difference between both the groups and that physiotherapy students have better hand grip when compared to the dental students.

Discussion

A particular aspect of hand strength is grip strength, which is the force used by the hand to pull or hang from things. It is highly helpful in a variety of hand-intensive occupations, such as physiotherapy and dentistry. Musculoskeletal conditions are

frequent and have a significant influence on work life, particularly in the hand and wrist region. This study is required in order to assess and compare the variations in hand grip strength between physiotherapy and dental students and to determine which group is more adversely affected sooner in their careers.

This study was conducted with 100 subjects out of which 50 were physiotherapy students and 50 were dental students. Ethical concerns and permissions were taken prior to the beginning of the study. The outcome measure used was hand grip strength in kilograms with a hand dynamometer. The grip strengths were taken in sitting position where the Shoulder and elbow was flexed to 90° and wrist in neutral position.

The results showed that grip strength was greater in physiotherapy students than in dental students. Both male and female subjects participated in the study where both were of equal proportions in the age group of 22-24. The working hours were taken into consideration by a self-administered questionnaire which showed that both the groups work for equal hours. The mean value of the male physiotherapy students is 26.9 and the standard deviation is 6.4. The mean value of male dental students is 44.3 and the standard deviation is 6.8 and the mean of the female dental students is 28 and standard deviation is 4.8.

The mean value of the measurements for Physiotherapy Students was 38.6 and that of Dental students was 36.1. The standard deviation of Physiotherapy Students was 13.8 and that of Dental Students was 10.4.

The main idea of the study was to contrast the hand grip strengths of both of the groups. Measurements of grip strength are routinely used to offer an objective assessment of the results of hand injuries⁹. They can also be used to determine whether more physiotherapy is necessary while treating hand injuries¹³. Evaluation of hand grip strength has drawn interest among all muscle function tests as a straightforward, safe indicator of upper extremity muscle strength. For all vocations, having strong grips is a necessary requirement for success². Such phenomena may be accounted for by variations in the nature of employment, the workplace, and the objects that employees must handle¹.

Similar findings have been recorded in the following studies,

A study by Zakariya MP et al. found that the average power grip strength of dentists was 79.45, whereas that of physiotherapists was 80.96, with a mean difference of 1.51⁶. Rucha Kulkarni et.al found that grip strength was measured in three positions: neutral, flexion, and extension, with readings of below 100 mm hg, between 100 and 200 mm hg, and above 200 mm hg. Dental professionals have weak grip strength, as evidenced by the fact that the p value for all three studies was 0.0001¹¹

Dentistry is a specialized area of medicine that calls for strong pinching and repetitive finger motions. Dentists also suffer from the highest rates of musculoskeletal issues because of bad posture, unsuitable working habits, and poor mechanics. Their wrist joint performs the majority of the labour.

Their hand and fist are needed for all major surgeries, minute treatments, scaling, etc. The diameter of their instruments varies slightly.

Moreover, extended treatments may impair their grip strength¹¹ Impairment in grip strength is a sign of higher postoperative problems, a longer hospital stay, and a decline in physical condition, so it is important to consider the patient's occupation when measuring grip strength in patients. Determining the effectiveness of various treatment strategies and procedures requires a valid and reliable assessment of handgrip strength.¹⁴

Consistent posture, manual therapy methods, repetition, working while injured, and heavy workloads are the risk factors for the physiotherapy profession that should be of particular concern. Manual treatment techniques and repetition are most frequently used by hand injury physiotherapists, particularly for injuries to the wrist and base of the thumb. The hand-wrist discomfort and thumb pain have been identified as an issue by physiotherapists who use manual treatments⁸, and they have an impact on the physiotherapist's capacity to use manual treatments since they affect the strength and function of the hand-wrist and thumb⁹. Understanding how little adjustments to the body and its components might impact hand grip performance in work life and in daily activities is crucial for rehabilitation.

The technique of grip strength assessment offers usefulness as a safe screening tool to examine a person's health.

Conclusion

The results and the data obtained from this research concluded that grip strength of physiotherapy students is more than that of dental students.

ISRB Approval: This research has been approved by the ISRB committee. ISRB no: 03/050/2022/ISRB/SR/SCPT

Funding: Self

Conflict of Interest: no conflict of interest during this research.

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