

Significance of Grip Strength in Geriatric Rehabilitation: A Pilot Study

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Abstract

Background: Grip strength has been proposed to be an indicator as well as a predictor of old age disability. Indian studies confirming this are lacking. Moreover, multi-center data for comparison is also deficient in our setting.

Objectives: To determine the significance if any, of grip strength measurement in Geriatric Rehabilitation practice in assessing and predicting physical disability.

Subjects and Methods: In this cross-sectional, single blinded, single center study, patients 60 years or older of both sexes were included. Functional impairment and cognitive impairment were measured using the FIM Score and MMSE respectively. Grip strength was measured with Tracker™ computerized hand function evaluation system, at the second and third handle settings by a second examiner who was blinded to the patient's diagnosis or the functional status.

Results & Conclusion: Data obtained from 20 persons revealed that all of them were independent in ADL and 75% physically active. Self-perceived health correlated positively with peak grip strength. The study is ongoing and the role of grip strength assessment, a safe, simple, fast, cost-effective and portable test may prove useful in the rehabilitation of our elderly.

Key Words: grip strength, geriatric rehabilitation

Introduction

Geriatric rehabilitation research can be divided into three categories – (1) disablement process, (2) organizational structure, and (3) rehabilitation intervention¹. It is important to have adequate data on the disablement process to plan and execute effective interventions.

Grip strength, a simple measure, has been used by many researchers as an indicator as well as a predictor of old age disability². It is also an indicator of nutritional status³ and physical function and muscular strength⁴. Frederiksen et al⁵ identified hand grip strength as a suitable phenotype for genetic variants of mid- and late- life physical functioning.

Though there are many western studies stressing the importance of grip strength as a predictor of disability, Indian studies are lacking. Moreover, a normative database comprising of data from multiple centers is unavailable in the Indian context.

Objectives

The study was aimed at determining the significance, if any, of grip strength measurement in Geriatric

Rehabilitation practice in assessing and predicting physical disability.

Materials and Methods

Type of study: Cross-sectional, single blinded, single centre study

Subjects: Patients of either sex, attending PMR OPD were included in the study if they were 60 years or older irrespective of the diagnosis. They were excluded from the study if they had a diastolic BP recording above 120 mm Hg. Inability to understand the test procedure, difficulty in test performance or unwillingness to take part in the study were considered as exclusion criteria. Consent was obtained from all participants before commencing the procedure.

Methodology: Demographic data and self-reported disability were obtained using a structured questionnaire. The Edinburgh Handedness Inventory was used to determine the hand dominance. Functional impairment was assessed using the Functional Independence Measure (FIM) and cognitive impairment using the Mini Mental State Examination (MMSE) Scale. Grip strength was tested using Tracker™ computerized hand function evaluation system. A comparison was also made to the

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grip strength value obtained using a locally available spring loaded hand held dynamometer.

Procedure: Interviews to determine demographic data and functional status were done by one investigator. Second investigator, blinded to the diagnosis and functional status of the patients tested grip strength.

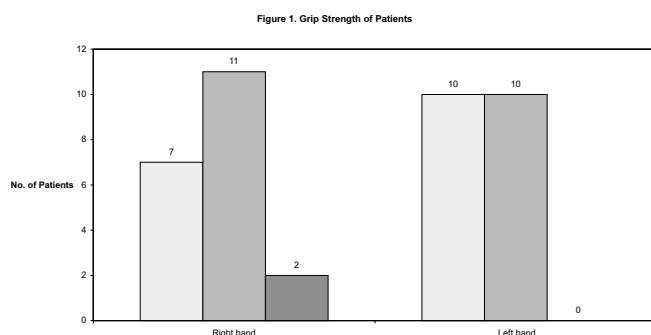
Standard patient positioning (recommended by American Society of Hand Therapists – ASHT) was followed. The procedure was demonstrated to the patients prior to testing and verbal encouragement was given during the procedure. The side to be tested first was chosen by the patients. Each test was performed three times.

Dynamometer handles of Tracker™ were placed both at the second and third handle settings and peak grip strength (PGS) and average grip strength (AGS) were noted for either side.

Results

Preliminary results of 20 patients (11 males and 9 females) are published in this article. The age of the participants varied from 60 to 81 years. There was only one patient who was left-hand dominant (male).

The average grip strength (AGS) measurements obtained for both hands of all patients are shown in figure 1. Grip strength power of right hand was shown to be in the normal range for 7 patients, 11 had mild deficit and 2 had



moderate power deficit. Ten patients had normal power and 10 had mild power deficit in the left hand. The power deficit shown in the Tracker™ system was in comparison to the western data (Mathiowetz et al⁶).

Right sided hand grip strength measured with locally available hand held dynamometer correlated significantly with peak grip strength (PGS) and AGS measured with Tracker™ system.

Self-perceived health reported by patients (obtained from questionnaire) correlated significantly with both peak grip strength (PGS) and average grip strength (AGS) measured by Tracker™ system (Table 1). This finding may suggest that grip strength could be an indicator of health status of elderly patients. Out of twenty, 15 patients were physically active and 18 were often engaging in

manual activities (Table 2).

TABLE : 1

	Self-perceived health	Self-reported physical activity	Frequency of manual activities in daily life
Significant correlation of PGS	YES (P = 0.038)	NO	NO
Significant correlation of AGS	YES (p = 0.016)	NO	NO

TABLE : 2

Category	No. of patients	Category	No. Patients	Category	No. of Patients
Excellent	1	Very active	4	Very often	12
Good	14	Active	11	Often	6
Fair	4	Slightly active	5	Sometimes	2
Poor	1	Sedentary	0	Never	0

No statistically significant correlation of peak or average grip strengths were found with self-reported physical activity level, frequency of manual activities in daily life, FIM, difficulty in self-care, MMSE, demispan or weight.

Discussion

Tracker™ system uses the norms published by Mathiowetz et al⁶. Vaz et al⁷ developed predictive equations for normal grip strength of Indians (Bangalore, 2002).

Giampaoli et al⁸ said that only reduced handgrip strength predicted incident disability in men 77 years or older. According to a study conducted by Rantanen et al⁴, the number of chronic conditions correlated positively with motor disability and negatively with physical activity and muscle strength in older women. In our study, the initial data suggests that handgrip strength can indicate self-perceived health in elderly.

Although more than half participants in this study were 'physically active' (15 no.) and 'very often' engaging in manual activities (12 no.), statistical significance to grip strength was not attained. This could probably be due to small sample size. A comparison to normative data of similar age group was not done (other than the readings given by instrument), as only western norms were available for this age group.

The right sided hand grip strength obtained with hand dynamometer was comparable to that of Tracker™ system. Hence hand dynamometer can be used in OPD to determine the strength of patients in this age group.

Conclusions

- Self-perceived health correlated positively with peak grip strength.
- All participants were independent in ADL and 75% of study population were physically active.
- Present norms of grip strength are not satisfactory for our population, attempts should be made to collect data for Indians.
- Grip strength testing is a simple, relatively safe, easy and fast method of assessing health and disability in elderly.

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