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ORIGINAL ARTICLE

Handgrip Strength in Fibromyalgia

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ABSTRACT

Objectives: This study aims to compare the handgrip strength values of fibromyalgia (FM) patients and healthy individuals and to demonstrate the relationship between clinical factors and FM disease severity.

Patients and methods: Twenty-five female patients (mean age 34±9.2 years; range 20 to 50 years) with FM and 23 age- and body mass index-similar healthy females (mean age 35.3±9.2 years; range 26 to 46) were included. Demographic characteristics of the subjects were recorded. Tender point count was noted in the patient group. Also; total myalgia score and fibromyalgia impact questionnaire scores were calculated. Handgrip strength was measured with Jamar® dynamometer. Patients who had fibromyalgia impact questionnaire scores ≥70 out of 100 were considered to have severe FM, while those who had scores <70 were considered to have moderate FM.

Results: There were no significant differences between the patient and control groups in terms of age, height, weight, and body mass index. However, patients' handgrip strength values were lower than those of the control group (p=0.011). In the patient group, positive correlation was only present between handgrip strength and body mass index values (r= -0.510, p=0.037). There was no significant difference between moderate and severe FM patients in terms of handgrip strength values.

Conclusion: Fibromyalgia patients had decreased handgrip strength when compared to healthy subjects. Handgrip strength values of moderate and severe FM patients were similar. FM severity was correlated with body mass index and severity of myalgia.

Keywords: Dynamometer; fibromyalgia; handgrip strength; myalgia score; tender point.

Fibromyalgia (FM) is a chronic disease accompanied by widespread body pain, heightened tenderness in specific anatomical regions, fatigue, sleep disorders, and irritable bowel syndrome.[1] There are some studies that investigated handgrip strength in FM patients.[2-7] Patients with FM generally have demonstrated low levels of handgrip strength.[2-6] On the other hand, FM patients were also shown to have similar handgrip strengths with healthy controls.[7] In addition, it has been demonstrated that handgrip strength can also be used to detect patients with FM and distinguish patients with moderate and severe FM.[2]

Accordingly, in this study, we aimed to compare the handgrip strength values of FM patients and healthy individuals and to demonstrate the relationship between clinical factors and FM disease severity.

PATIENTS AND METHODS

Twenty-five female patients (mean age 34±9.2 years; range 20 to 50 years) with FM diagnosed between January 2012 and March 2015 at the Department of Physical Medicine and Rehabilitation, Ankara Physical Medicine and Rehabilitation Training and Research Hospital, Ankara, Turkey, according to 1990 criteria of American College of Rheumatology[8] and age- and

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body mass index (BMI)-similar 23 female healthy volunteers from the hospital staff (mean age 35.3±9.2 years; range 26 to 46) were included. Patients with severe somatic and psychiatric disorders (cancer, severe coronary artery disease, schizophrenia, etc.) or other rheumatologic diseases were excluded. All participants provided their informed consents. The study protocol was approved by the local ethics committee.

The handgrip strengths of the dominant hands were determined as kilograms using a hand held dynamometer (Jamar® dynamometer, Saehan Corporation, Masan, Korea), which has high validity and reliability coefficients.[9] For measurement, the participant sat on a chair, shoulder adducted and neutrally rotated, elbow flexed to 90 degrees, and forearm and wrist in neutral position. Three measurements were performed using the dynamometer and the highest value was noted. All subjects were evaluated by the same physiatrist.

Total myalgia score (TMS), which represented the severity of the clinical symptoms, was calculated by summing up total tender point count (TPC) and the tenderness score for each point, as determined on a 4-point scale (0= no tenderness, 1= mild tenderness, 2= moderate tenderness with grimace, 3= severe tenderness with flinch). A total of 18 points were evaluated and the maximum possible TMS was 54.[7] Digital palpation method was used to determine tender points.

Quality of life in FM patients was determined by Turkish version of Fibromyalgia Impact Questionnaire (FIQ).[10] This scale measures 10 items, namely physical functioning, well-being, work missed, work difficulty, pain, fatigue, morning tiredness, stiffness, anxiety, and depression. Each item has a minimum score of 0 (no disability) and a maximum score of 10 (maximum disability). The maximum score is 100. Patients who had scores ≥70 were considered to have severe FM, while those with scores <70 were considered to have moderate FM.[2]

Statistical analysis

The data were analyzed by SPSS for Windows version 15.0 package program (SPSS Inc., Chicago, IL, USA). Mann-Whitney test was used to compare patient and control groups, and also subgroups of FM (moderate vs. severe). Spearman correlation analysis was performed to determine the relations of clinical variables. A p value ≤0.05 was considered as statistically significant.

RESULTS

Demographic and clinical characteristics of the subjects are presented in Table 1. There were no differences between the groups regarding age, gender, weight, and BMI (all p>0.05). On the other hand, handgrip strength values of the patient group were significantly lower than those of the control group (p=0.011). TPC and TMS values were higher in the patient group than the control group (both p<0.001).

Mean FIQ score of FM patients was 69.7±5.9. A positive correlation was present only between handgrip strength and BMI values (r=0.510, r=0.037).

There were 14 patients in the moderate subgroup and 11 patients in the severe subgroup. BMI and TMS values of the patients in the severe

Table 1. Demographic and clinical characteristics of subjects

	Patients (n=25)			Controls (n=23)			
	n	Range	Mean±SD	n	Range	Mean±SD	p
Age (years)			34.0±9.2			35.3±5.9	0.635
Height (m)			1.60±0.07			1.60±0.05	0.984
Weight (kg)			71.6±14.4			65.9±5.4	0.144
Body mass index (kg/m²)			27.3±3.3			25.5±2.8	0.125
Handgrip strength (kg)			22.2±4.9			27.3±5.2	0.011
Tender point count	16	14-18		4	0-10		<0.001
Total myalgia score			34.3±6.3			5.5±2.2	<0.001
Fibromyalgia impact questionnaire score			69.7±5.9			–	–

SD: Standard deviation.

Table 2. Comparison of clinical characteristics between moderate and severe fibromyalgia patients

	Moderate FM (n=14)			Severe FM (n=11)			
	n	Range	Mean±SD	n	Range	Mean±SD	*p*
Body mass index (kg/m^2)			24.41±1.27			29.78±2.21	0.003
Handgrip strength (kg)			22.58±5.98			21.92±4.21	0.616
Tender point count	16	14-18		4	0-10		0.213
Total myalgia score			30.33±3.88			37.71±6.15	0.021
Fibromyalgia impact questionnaire score			64.55±2.92			74.11±3.62	–

SD: Standard deviation.

subgroup were higher than those in the moderate subgroup (both $p<0.05$) (Table 2). Two subgroups were similar according to handgrip strength and TPC values.

DISCUSSION

In our study, handgrip strength values of the patients with FM were lower than those of the healthy controls. Although BMI and TMS values of patients with severe FM were higher than those of patients with moderate FM, we did not find any significant differences for handgrip strength values between these subgroups.

We did not detect any significant differences in handgrip strength values between patient subgroups. However, Aparicio et al.[2] reported that handgrip strength was a reliable tool both to determine patients with FM and discriminate patients with moderate and severe FM. A study on male FM patients showed worse handgrip strength in patients than the healthy controls, and it was also reported that handgrip strength was inversely proportional to severity of FM.[3] On the other hand, Panton et al.[7] found that handgrip strength values were similar in females without FM compared with females with FM. Ability to perform daily life activities might be adversely affected in FM patients due to moderate or severe pain, and this might result in decreased muscle strength. Similarly, characteristic fatigue and pain might affect handgrip strength performance negatively in those patients.[2] In our study, the reason for the absence of any difference in handgrip strength values in relation with the severity of FM might be related to differences of BMI in moderate and severe FM groups. We found that BMI was higher in severe subgroup, and there was a positive correlation between BMI and handgrip strength values, as shown in another study.[11]

Furthermore, we did not find any correlation between handgrip strength and TPC or TMS in the patient group. Patients with severe FM had higher TMS and BMI values, and as BMI might affect the handgrip strength, this might indirectly have resulted in a lack of correlation between handgrip strength and TMS. Yılmaz et al.[12] divided their FM patients into three subgroups in relation with their BMI (normal, overweight, and obese) and a comparison of those three groups revealed that BMI yielded significant differences for TPC and FIQ scores. They stated that this difference was due to significantly higher FIQ scores and TPC in the obese group, and they emphasized that obesity might be a factor to increase severity of FM. Moreover, obese patients were reported to have poor quality of life and high sensitivity for pain. Likewise, Segura-Jiménez et al.[13] reported that total and central body fat were positively associated with pain, fatigue, and the FIQ total score. In accordance with those studies, in our study, TMS and BMI values were higher in severe FM patients when compared to moderate FM patients. Our findings suggest that BMI and TMS were correlated with FM severity rather than TPC.

We found higher TPC and TMS in FM patients than those of the controls. But there was no significant difference for TPC of FM patients according to the disease severity. Tender points that manifest upon digital palpation are a good diagnostic tool for FM. However, its usefulness in assessing FM severity is uncertain.[14] Indeed, Wolfe et al.[15] established that the severity of FM is independent from the TPC.

Reduced daily activities caused by widespread pain may have impact on the decreased grip

strength in FM patients. Thus, limitations of our study include lack of the assessment of daily life activities and the small sample size.

In conclusion, we showed that handgrip strength decreased in patients with FM when compared to healthy controls. On the other hand, we did not find any correlation between severity of FM and handgrip strength. We found that FM severity was correlated with BMI and severity of myalgia. The relationship between BMI and FM severity should be investigated in further studies with larger patient groups.

Declaration of conflicting interests

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REFERENCES

1. Bradley LA, Alarcon GS. Fibromyalgia. In: Kopman WJ, editor. Arthritis and Allied Conditions. 14th ed. Philedelphia. Lippincot & Williams & Wilkins; 2001. p. 1811-44.
2. Aparicio VA, Ortega FB, Heredia JM, Carbonell-Baeza A, Sjöström M, Delgado-Fernandez M. Handgrip strength test as a complementary tool in the assessment of fibromyalgia severity in women. Arch Phys Med Rehabil 2011;92:83-8.
3. Aparicio VA, Carbonell-Baeza A, Ortega FB, Ruiz JR, Heredia JM, Delgado-Fernández M. Handgrip strength in men with fibromyalgia. Clin Exp Rheumatol 2010;28:78-81.
4. Dombernowsky T, Dreyer L, Bartels EM, Danneskiold-Samsøe B. Muscular strength in patients with fibromyalgia. A literature review. Ugeskr Laeger 2008;170:217-24. [Abstract]
5. Lee SJ, Ahn DH, Jung JH, Kim YR, Lee YJ. Short-term change of handgrip strength after trigger point injection in women with muscular pain in the upper extremities. Ann Rehabil Med 2014;38:241-8.
6. Sahin G, Ulubaş B, Calikoğlu M, Erdoğan C. Handgrip strength, pulmonary function tests, and pulmonary muscle strength in fibromyalgia syndrome: is there any relationship? South Med J 2004;97:25-9.
7. Panton LB, Kingsley JD, Toole T, Cress ME, Abboud G, Sirithienthad P, et al. A comparison of physical functional performance and strength in women with fibromyalgia, age- and weight-matched controls, and older women who are healthy. Phys Ther 2006;86:1479-88.
8. Wolfe F, Smythe HA, Yunus MB, Bennett RM, Bombardier C, Goldenberg DL, et al. The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee. Arthritis Rheum 1990;33:160-72.
9. Cardoso Fde S, Curtolo M, Natour J, Lombardi Júnior I. Assessment of quality of life, muscle strength and functional capacity in women with fibromyalgia. Rev Bras Reumatol 2011;51:338-43.
10. Sarmer S, Ergin S, Yavuzer G. The validity and reliability of the Turkish version of the Fibromyalgia Impact Questionnaire. Rheumatol Int 2000;20:9-12.
11. Charles LE, Burchfiel CM, Fekedulegn D, Kashon ML, Ross GW, Sanderson WT, et al. Occupational and other risk factors for hand-grip strength: the Honolulu-Asia Aging Study. Occup Environ Med 2006;63:820-7.
12. Yılmaz H, Erkin G, Küçükşen S, Akkurt E. Fibromiyalji sendromunda vücut kitle indeksi ile klinik parametreler arasındaki ilişki. Selçuk Tıp Derg 2013;29:12-5.
13. Segura-Jiménez V, Castro-Piñero J, Soriano-Maldonado A, Álvarez-Gallardo IC, Estévez-López F, Delgado-Fernández M, et al. The association of total and central body fat with pain, fatigue and the impact of fibromyalgia in women; role of physical fitness. Eur J Pain 2015 Oct 22.
14. Ríos G, Estrada M, Mayor AM, Vilá LM. Factors associated with tender point count in Puerto Ricans with fibromyalgia syndrome. P R Health Sci J 2014;33:112-6.
15. Wolfe F, Anderson J, Harkness D, Bennett RM, Caro XJ, Goldenberg DL, et al. Health status and disease severity in fibromyalgia: results of a six-center longitudinal study. Arthritis Rheum 1997;40:1571-9.