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The Evaluation of the Frequency of Benign Joint Hypermobility in Patients with Myofascial Pain Syndrome

Miyofasiyal Ağrı Sendromlu Hastalarda Eklem Hipermobilitesi Sıklığının Değerlendirilmesi

Mustafa Tuna

Şanlıurfa Training and Research Hospital, Clinic of Physical Medicine and Rehabilitation, Şanlıurfa, Turkey

Abstract

Objective: The purpose of this study was to determine the prevalence of benign joint hypermobility syndrome (BJHMS) in patients suffering from myofascial pain syndrome (MPS) and whether BJHMS is a risk factor for MPS.

Materials and Methods: Forty-two patients who met the diagnostic criteria for MPS and 39 healthy volunteers with no musculoskeletal pain were included in the study. The Bringhton 1998 criteria were used to assess all participants for BJHMS. The short life scale was used to assess all patients' daily living activities (SF-36).

Results: The case group's mean age was 30,874 years, the control group's mean age was 28.4±4.8 years, and there was no significant difference in age between the groups (p=0.084). In terms of body mass index (p=0.092), gender (p=0.805), and employment status (p=0.296), there was no significant difference between the groups. The rate of hypermobility in the case group (69%) was significantly higher than that in the control group (23.1%) (p<0.001).

Conclusion: BJHMS can cause injuries by opening up tissues to trauma. This can lead to MPS by triggering trigger points, spasms, or degenerative changes in the tissues.

Keywords: Myofascial pain syndrome, benign joint hipermobility syndrome, trigger point, cronic pain

Öz

Amaç: Bu çalışmanın amacı, miyofasiyal ağrı sendromlu (MAS) hastalarda benign eklem hipermobilite sendromunun (BEHMS) sıklığını ve BEHMS'nin MAS için bir risk faktörü olup olmadığını araştırmaktır.

Gereç ve Yöntem: MAS tanı kriterlerini sağlayan 42 tane hasta ve kas iskelet sisteminde herhangi bir ağrısı olmayan 39 tane sağlıklı gönüllü dahil edildi. Tüm katılımcılara Bringhton 1998 kriterleri kullanarak BEHMS için değerlendirildi. Tüm hastaların günlük yaşam aktiviteleri kısa yaşam ölçeği (SF-36) ile değerlendirildi.

Bulgular: Olgu grubunun yaş ortalaması 30,8±7,4 yıl, kontrol grubunun yaş ortalaması 28,4±4,8 yıl olarak bulunmuş olup gruplar arasında yaş açısından anlamlı farklılık görülmemiştir (p=0,084). Gruplar arasında vücut kitle indeksi (p=0,092), cinsiyet (p=0,805) ve çalışma durumu (p=0,296) açısından anlamlı farklılık görülmemiştir. Olgu grubunda bulunanların hipermobilite olma oranı (%69) kontrol grubunda bulunanların oranından (%23,1) anlamlı şekilde yüksek bulunmuştur (p<0,001).

Sonuç: BEHMS dokuları travmalara açık hale getirerek yaralanmalara sebep olabilir. Bu da dokularda kısır döngü oluşturarak tetik nokta, spazm veya dejeneratif değişiklikler meydana getirerek MAS sendromuna neden olabilir.

Anahtar kelimeler: Miyofasiyal ağrı sendromu, benign eklem hipermobilite sendromu, tetik nokta, kronik ağrı

Introduction

The most frequent reason for musculoskeletal pain is myofascial pain syndrome (MPS), one of the soft tissue rheumatic illnesses of the musculoskeletal system. Hypersensitive trigger points in tense bands of muscle and/or connective tissue are a defining feature of MPS. These trigger points may result in discomfort, muscular spasm, soreness, stiffness, exhaustion, restriction of the joints motion, weakness, sleeplessness and in rare cases autonomic dysfunction. It can affect any muscle group, even though the shoulder, neck, and waist areas are more affected. Trigger points in the muscle or fascia are the main characteristic of MPS that sets it apart from other musculoskeletal illnesses. A

Address for Correspondence/Yazışma Adresi: Mustafa Tuna MD, Şanlıurfa Training and Research Hospital, Clinic of Physical Medicine and Rehabilitation, Şanlıurfa, Turkey
Phone: +90 553 594 33 15 **E-mail:** mustafa5tuna@gmail.com **ORCID ID:** orcid.org/0000-0002-6713-9352
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trigger point may develop in the muscle or fascia as a result of macro or micro traumas under conditions like protracted tension, spasm, pressure, weariness, chronic stress, and cold weather periods. When a tight band applies pressure to its location, it may induce pain that is felt both nearby and farther away. Unusual nociception mechanisms, neurohormonal problems, and disorders of muscle metabolism may contribute to the disease's occurrence even if the etiopathogenesis is unclear. Although it affects more women than males, the condition can strike anyone of any age and sex (1,2).

A genetically inherited condition known as benign joint hypermobility syndrome (BJHMS) is characterized by increased joint amplitude and connective tissue fragility brought on by anomalies in collagen tissue. There is a tendency for degeneration and tissue damage in the joint, depending on the joint stability problem. Due to a lack of collagen-based connective tissue support, BJHMS can impair the musculoskeletal system's tendons, ligaments, bones, and joints as well as induce symptoms in other tissues and organs. The most prevalent symptom is pain, but other symptoms include flu-like symptoms, stress incontinence, anxiety, clumsiness during daily activities, susceptibility to injury, myalgia, muscle cramps, delayed walking, varicose veins, palpitations, arrhythmia, paresthesia, low bone density, and impaired balance and coordination (3,4).

Although the prevalence of BJHMS varies by age, gender, and ethnicity, women are more likely to develop it. The condition is more prevalent in people between the ages of 30 and 60, but as people get older, its prevalence declines (3).

BJHMS slows tissue repair and traumatizes the musculoskeletal system. By causing ischemia, trigger points, and tight bands in the tissue, this might result in chronic pain. BJHMS is one of the main contributors of chronic pain. The literature only has one research that looked into the connection between BJHMS and pelvic discomfort. There isn't enough clinical evidence to prove that BJHMS may be a risk factor for pelvic discomfort, despite suggestions to this effect (5). We were unable to locate any study in the literature that suggests BJHMS is a risk factor for MPS or that looks at the connection between these two disorders. As a result, the current study is the first clinical investigation into the incidence of BJHMS in MPS patients and the connection between the two disorders.

Materials and Methods

Patients with MPS who applied to the Physical Therapy and Rehabilitation Outpatient Clinic between November 2021 and June 2022 were included in the study after the study was approved by the Harran University Clinical Research Ethics Committee (protocol no: HRÜ.22/04/22, date: 21.02.2022). Families of the patients who were in good health and hospital workers made up the control group. Both groups provided their written, informed permission to take part in the investigation.

Patients

The study comprised 42 patients who satisfied the diagnostic criteria for MPS and 39 healthy volunteers who served as the control group. Major and minor criteria make up the diagnostic standards for MPS, and the diagnosis of MPS requires the fulfillment of five major and at least one minor criterion (Table 1). The study excluded people with conditions including fibromyalgia, viral infections that might cause chronic pain in the musculoskeletal system, heart failure, hypertension, renal failure, hematological, gastrointestinal, endocrinological, and rheumatic disorders, as well as physically demanding employment. Participants in the research were those who had only MPS and no other diseases. According to the Brighton 1998 hypermobility criteria, all individuals were assessed. A health status survey is also included.

Scale Used to Measure Benign Joint Hypermobility

Criteria for assessing generalized joint laxity were first defined by Carter and Wilkinson (6) in 1964, modified by Beighton and Horan (7) in 1969, and revised in 1973 by Beighton et al. (8). The Beighton and Horan index is easy to use, requires no special equipment other than a goniometer, and takes 1 minute to complete. The index includes 5.methocarpal joint dorsiflexion >90°, passive thumb touches the inner surface of the forearm, hyperextension of elbow >10°, knee hyperextension >10° and

Table 1. Diagnostic standards for MPS

Major criteria
1. Localized pain
2. The trigger point to a specific point reflected pain and sensory alterations
3. Feeling the muscle's tight band with your hand
4. The taut band has trigger points at any location
5. Reduced range of motion in regions that can be evaluated
Minor criteria
1. Trigger point pressure palpation, the presence of clinical pain, and/or sensory alterations
2. Retrieving the local twitching reaction by palpating or needling the tight band's sensitive spot
3. Injection of trigger points or muscle stretching to reduce pain

MPS: Myofascial pain syndrome

Table 2. Beigthon diagnostic scoring for benign joint hypermobility syndrome

	Left	Right
5.methocarpal joint dorsiflexion >90°	1	1
Passive thumb touches the inner surface of the forearm	1	1
Hyperextension of elbow >10°	1	1
Knee hyperextension >10°	1	1
The palm of the hand touches the ground while standing and knee extended	1	
	9	

the palm of the hand touches the ground while standing and knee extended (8).

The Beighton Scoring System were developed to diagnose hypermobility and have been widely accepted due to their ease of use (Table 2). The Beighton Scoring System measurement tool consists of five items. The first four items are evaluated separately as the right and left sides, and each item related to hypermobility is scored as 0 or 1 point. A score of 4 out of 9 points is considered hypermobile. We applied the above index to our patients. We gave 1 point for each criterion to be positive and zero point for it to be negative.

This scoring system was changed in 1998 and the Brighton diagnostic criteria were formed since it only evaluates certain body regions (Table 3). According to the Brighton criteria, BJHMS is diagnosed when 2 major or 1 major + 2 minor or 4 minor or 2 minor criteria are present in first-degree relatives.

Table 3. Brighton diagnostic criteria for benign joint hypermobility syndrome

Major criteria
1. Beighton criteria scoring 4/9 and above (+)
2. Presence of arthralgia lasting more than 3 months in more than 4 joints
Minor criteria
1. Beighton score 1, 2 or 3/9 (0.1.2 or 3/9 if age 50+)
2. Joint or back pain in one of the three joints or spondylosis, spondylolisthesis
3. Dislocation, subluxation in more than one joint
4. Three or more soft tissue disorders (bursitis, tenosynovitis, epicondylitis)
5. Marfanoid appearance (tall, thin, long sleeved, upper extremity/lower extremity ratio less than 0.89, arachnodactyly)
6. Striaes on the skin, hyperextensibility, thin skin, abnormal scarring
7. Eye symptoms: droopy eyelid or myopia or antimongoloid slope
8. Varicose veins or hernia or uterine/rectal prolapse

Statistical Analysis

Analysis results were assessed using 22 SPSS package modules (Statistical Package for Social Sciences; SPSS Inc., Chicago, IL). In the study, descriptive data were presented as n and % values for categorical data and mean standard deviation and median interquartile range (numbers between the 25th and 75th percentiles) for continuous data. To compare categorical variables between groups, Pearson chi-square analysis was performed. The Shapiro-Wilk test was used to assess how closely continuous variables adhered to the normal distribution. In the comparison of paired groups, Student's t-test was used for normally distributed variables, and Mann-Whitney U test was used for non-normally distributed variables. Pearson correlation test was used for those with normal distribution, and Spearman correlation test was used for those who did not show normal distribution. The statistical significance level in the analyzes was accepted as $p<0.05$.

Power Analysis

Power analysis is used in medical research to determine the smallest sample size required to detect a clinically significant effect at a given statistical significance level. We used to post-hoc power analysis program. According to the post-hoc power analysis performed using the G*Power 3.1.9.2 program, the actual power was found to be 0.989 with a 5% margin of error.

Results

The research comprised 81 people in all, 42 cases and 39 controls. There was no discernible difference in age between the groups (p=0.084) as the mean age of the case group was 30.8±7.4 years and the mean age of the control group was 28.4±4.8 years. Body mass index (BMI), gender, and work status did not significantly differ across the groups (p=0.092, p=0.805, and p=0.296, respectively).

It was discovered that the case group's rate of hypermobility (69%) was substantially greater than the control group's rate of 23.1% (p<0.001) (Table 4, Figure 1).

Men in the case group had substantially higher sub-dimension ratings for physical function (p=0.004), social health (p=0.011), and general health (p=0.014) than women. Regarding other

Table 4. Comparison of the sociodemographic characteristics of the groups and the presence of hypermobility

		Case (n=42)		Control (n=39)		Total (n=81)		p-value
		Number	%	Number	%	Number	%	
Age, mean ± SD		30.8±7.4		28.4±4.8		28.8±6.7		0.084*
BMI, mean ± SD		24.0±3.7		22.6±3.6		23.3±3.7		0.092*
Gender	Male	14	33.3	12	30.8	26	32.1	0.805**
	Female	28	66.7	27	69.2	55	67.9	
Working status	Yes	21	50.0	24	61.5	45	55.6	0.296**
	No	21	50.0	15	38.5	36	44.4	
Hypermobility	Yes	29	69.0	9	23.1	38	46.9	<0.001**
	No	13	31.0	30	76.9	43	53.1	

*Student's t-test, **Chi-square analysis was performed. SD: Standard deviation, BMI: Body mass index

sub-dimensions, there was no discernible gender difference (Table 5).

There was no discernible difference between working status and the quality of life sub-dimensions in the case group studied (p>0.05) (Table 6).

Regarding the sub-dimensions of quality of life, there was no statistically significant difference between the case group studied and the presence of hypermobility (p>0.05) (Table 7).

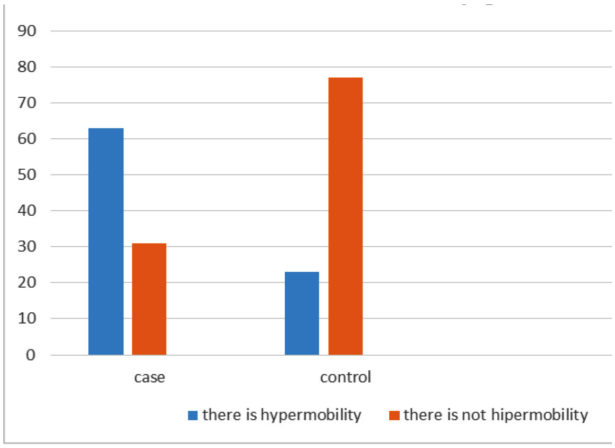

Figure 1. Comparison of hypermobility frequency between both groups

In the case group, there was a sizable positive connection between age and BMI. Physical function sub-dimension and physical role difficulty, emotional role difficulty, energy vitality, social health, pain, and overall health were found to be positively and significantly correlated. Physical and emotional role challenges, as well as mental and social health, were found to be positively and significantly correlated. The energy vitality sub-dimension and pain, general health, social health, and mental health were found to be positively and significantly correlated. The association between the mental health sub-dimension, social health, and overall health was shown to be both favorable and substantial. The social health sub-dimension, pain, and overall health were found to have a favorable and substantial association (Table 8).

When the whole cohort was analyzed, there was no discernible difference in the presence of hypermobility between the sexes (p=0.295), with hypermobility being found in 38.5% of males and 50.9% of women.

Males in the case group had a rate of hypermobility of 57.1%, which was determined to be substantially greater than the rate of hypermobility in the control group of men (16.7%) (p=0.034). Women in the case group had a rate of hypermobility of 75%, which was determined to be considerably greater than the rate of hypermobility in the control group of women (24.9%) (p<0.001) (Table 9).

Table 5. Comparison of the quality of life scores of those in the case group by gender

	Male (n=14)	Female (n=28)	p-value
	Median (IQR)	Median (IQR)	
Physical function	90.0 (80.0-95.0)	55.0 (50.0-82.5)	**0.004***
Physical role difficulties	37.5 (0-75.0)	25.0 (0-75.0)	0.722*
Emotional role difficulties	33.3 (33.3-100.0)	33.3 (0-66.6)	0.553*
Energy vitality vitality	46.4±10.1	42.7±18.5	0.400**
Mental health	57.4±17.5	52.1±20.4	0.413**
Social health	64.3±18.3	47.3±19.9	**0.011****
Pain	40.7±22.3	32.3±17.8	0.193**
General health	62.5 (60.0-75.0)	47.5 (30.0-60.0)	**0.014***

*Mann-Whitney U test, **Student's t-test done. IQR: Interquartile range

Table 6. Comparison of the quality of life scores of those in the case group by gender

	Working (n=21)	Not working (n=21)	p-value
	Median (IQR)	Median (IQR)	
Physical function	80.0 (55.0-90.0)	55.0 (50.0-85.0)	0.138*
Physical role difficulties	25.0 (0-75.0)	25.0 (0-75.0)	0.765*
Emotional role difficulties	33.3 (0-66.6)	33.3 (0-33.5)	0.764**
Energy vitality vitality	44.3±13.6	43.6±18.7	0.888**
Mental health	54.9±19.7	53.0±19.6	0.755**
Social health	54.2±22.5	51.8±19.5	0.716**
Pain	35.0±15.9	35.2±23.1	0.967**
General health	55.0 (45.0-60.0)	55.0 (30.0-75.0)	0.950*

*Mann-Whitney U test, **Student's t-test done. IQR: Interquartile range

Table 7. Comparison of the quality of life scores of those in the case group according to the presence of hypermobility

	There is hypermobility (n=29)	No hypermobility (n=13)	p-value
	Median (IQR)	Median (IQR)	
Physical function	75.0 (50.0-85.0)	90.0 (55.0-95.0)	0.122*
Physical role difficulties	25.0 (0-75.0)	50.0 (0-100.0)	0.280*
Emotional role difficulties	33.3 (0-66.6)	33.3 (33.3-100.0)	0.519*
Energy vitality vitality	42.4±14.1	47.3±20.2	0.370**
Mental health	51.3±16.8	59.7±24.1	0.200**
Social health	50.4±18.1	58.7±25.7	0.241**
Pain	35.9±18.6	33.5±22.3	0.719**
General health	55.0 (30.0-65.0)	60.0 (45.0-65.0)	0.872*

*Mann-Whitney U test, **Student's t-test done. IQR: Interquartile range

Table 8. Correlation of age, BMI and scale scores of those in the case group

		Age	BMI	FF	FRG	ERG	EVV	MH	SH	p-value
BMI	r	**0.468**								
	p	**0.002**								
Physical function	r	-0.148	0.130							
	p	0.350	0.414							
Physical role difficulty	r	-0.189	0.111	**0.474**						
	p	0.231	0.482	**0.002**						
Emotional role difficulty	r	-0.152	0.145	**0.330**	0.627					
	p	0.335	0.358	**0.033**	0.000					
Energy vigor vitality	r	0.091	0.099	**0.325**	0.297	-0.028				
	p	0.565	0.535	**0.036**	0.056	0.858				
Mental health	r	0.110	0.211	0.222	**0.307**	0.058	**0.546**			
	p	0.489	0.180	0.158	**0.048**	0.717	**0.000**			
Social health	r	-0.012	0.232	**0.561**	**0.454**	0.280	**0.386***	**0.357**		
	p	0.939	0.140	**0.000**	**0.003**	0.072	**0.012**	**0.020**		
Pain	p	-0.086	0.289	**0.376**	0.107	0.014	**0.376**	0.295	**0.492**	
	r	0.590	0.064	**0.014**	0.499	0.928	**0.014**	0.058	**0.001**	
General health	r	-0.022	0.128	**0.528**	0.203	-0.021	**0.555**	**0.390**	**0.545**	**0.431**
	p	0.888	0.417	**0.000**	0.197	0.894	**0.000**	**0.011**	**0.000**	**0.004**

BMI: Body mass index

Table 9. Comparison of hypermobility status by gender

		There is hypermobility		No hypermobility		p-value*
		Number	%	Number	%	
Male	Case	8	57.1	6	42.9	0.034
	Control	2	16.7	10	83.3	
Female	Case	21	75.0	7	25.0	<0.001
	Control	7	25.9	20	74.1	

*Chi-square analysis was done

Discussion

BJHMS is a disease that occurs due to increased fragility of connective tissue and fibrogenic tissue disorder. These illnesses cause joints, tendons, and muscles to become more flexible, making the tissues more susceptible to micro and macro traumas. This may cause in tissue degeneration, ischemia, spasm, and inflammation (9). BJHMS is an important cause of musculoskeletal pain and may be an important risk factor for MPS.

In this investigation, the incidence of BJHMS in MPS patients and healthy controls with comparable sociodemographic features was evaluated. According to our findings, the case group had considerably higher rates of hypermobility, which had a strong statistical significance.

MPS can be brought on by a variety of conditions, including diabetes, hypothyroidism, infection, electrolyte imbalances, endochronological, hematological, rheumatological, and cardiovascular illnesses. Additionally, physical employees performing demanding professions might be tested for MPS (10). Anyone with a sickness or who does hard work was excluded from the research in order to better understand the association between MPS and BJHMS. MPS and BJHMS can affect either gender, albeit they are more frequent in women. By adding men and women with MPS in the research, we hoped to strengthen the link between MPS and BJHMS. The prevalence of BJHMS was observed to be higher in our study's case group of both men and women, indicating the link between MPS and BJHMS.

Many studies have found that hypermobility is common in females (11,12). However, when the whole group was evaluated in our study, hypermobility was observed in 38.5% of men and 50.9% of women, and no significant difference was found between the genders in terms of the presence of hypermobility. In the literature, only one study investigated the relationship between pelvic pain and BJHMS, and it was suggested that BJHMS may be a predisposing factor for pelvic pain (5). In our study, an increase in the frequency of BJHMS was found in people with regional pain syndrome, indicating that it is a risk factor for MPS.

Numerous studies demonstrate that people with MPS have much lower quality of life than healthy controls (13). In contrast, neither men nor women in our research performed significantly worse on the short-life function test than the healthy group. The physical function, social health, and general health sub-dimension scores of the males in the case group were found to be considerably higher than the scores of the women when we analyzed both sexes separately. Additionally, we did not discover a connection between hypermobility and the efficiency of living functions.

Study Limitations

The limitations of our study are the small number of patients and the limited number of studies on this subject in the literature. Studies with a large patient group will help to clarify the relationship between MPS and BJHMS.

Conclusion

In patients with MPS, we observed an increase in the incidence of BJHMS. BJHMS may harm tissues by making them more susceptible to damage. This can result in a vicious cycle in the tissues, triggering trigger points, spasms, or degenerative changes that can lead to MPS.

Ethics

Ethics Committee Approval: Patients with MPS who applied to the Physical Therapy and Rehabilitation Outpatient Clinic between November 2021 and June 2022 were included in the study after the study was approved by the Harran University Clinical Research Ethics Committee (protocol no: HRÜ.22/04/22, date: 21.02.2022).

Informed Consent: Families of the patients who were in good health and hospital workers made up the control group. Both groups provided their written, informed permission to take part in the investigation.

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