REPUBLIC OF TÜRKİYE
KIRŞEHİR AHİ EVRAN UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF PHYSICAL THERAPY
AND REHABILITATION

INVESTIGATION OF THE RELATIONSHIP BETWEEN BALANCE AND BODY AWARENESS WITH PAIN AND FUNCTIONAL CAPACITY IN WOMEN WITH FIBROMYALGIA

MENSURE ASLAN

MASTER'S THESIS

KIRŞEHİR – MAY/2023

REPUBLIC OF TÜRKİYE
KIRŞEHİR AHİ EVRAN UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF PHYSICAL THERAPY
AND REHABILITATION

INVESTIGATION OF THE RELATIONSHIP BETWEEN BALANCE AND BODY AWARENESS WITH PAIN AND FUNCTIONAL CAPACITY IN WOMEN WITH FIBROMYALGIA

MENSURE ASLAN

MASTER'S THESIS

SUPERVISOR

Assist. Prof. Dr. Anıl ÖZÜDOĞRU

KIRŞEHİR - MAY/2023

ACCEPTANCE AND APPROVAL

Kırşehir Ahi Evran University, Institute of Health and Sciences, Department of Physiotherapy and Rehabilitation Master's thesis study named 'Investigation of the relationship between balance and body awareness with pain and functional capacity in women with fibromyalgia' prepared by our student Mensure ASLAN. It was accepted as a Master's thesis in the Department of Physiotherapy and Rehabilitation by the following jury in 09/05/2023.

Thesis Jury

Assist Prof. Dr. Anıl ÖZÜDOĞRU
Kırşehir Ahi Evran University
School of Physical Therapy and Rehabilitation
(Minister)

Assist. Prof. Dr. Abdulhamit TAYFUR
Kırşehir Ahi Evran University
School of Physical Therapy and Rehabilitation
(Member)

Assist. Prof. Dr. Hanife ABAKAY
Yozgat Bozok University
School of Physical Therapy and Rehabilitation Sarıkaya
(Member)

THESIS STATEMENT

I declare that all information in this thesis has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Mensure ASLAN

Pursuant to Articles 9/2 and 22/2 of the Graduate Education and Training Regulation published in the Official Gazette dated 20.04.2016; a report in accordance with the criteria determined by the Institute of Health Sciences was obtained by using the plagiarism software program for this postgraduate thesis.

Mensure ASLAN

PREFACE

I am sincerely grateful to my academic supervisor Assist. Prof. Dr. Anıl ÖZÜDOĞRU for his appreciable guidance, patience, supports and efforts throughout the thesis process.

I would like to thank lecturer Mehmet CANLI for generously transferring his knowledge and experience to me during my master thesis process. I would like to extend my sincere thanks to Assoc. Prof. Atahan TURHAN for his support and for his guidance with his academic knowledge. I am grateful to all my professors who contributed to my master's education.

My eternal grateful to my family who have provided me through endless support and moral to move on.

Thanks for all your encouragement and for giving me strength to reach this day.

May / 2023 Mensure ASLAN

CONTENTS

Page

LIST OF FIGURES

Page

LIST OF TABLES

Page

LIST OF SYMBOLS AND ABBREVIATIONS

FM: Fibromyalgia

ACR: The American College of Rheumatology

VAS: Visual Analogue Scale

6 MWT: Six Minute Walk Test

TUG: Timed Up and Go Test

FIQ: Fibromyalgia Impact Questionnaire

BAQ: Body Awareness Questionnaire

BBS: Biodex Balance System

EMG: Electromyography

MRI: Magnetic resonance imaging

5-HIAA: 5-hydroxyindole acetic acid

CSF: Cerebrospinal fluid

HPA: Hypothalamic-Pituitary-Adrenal

WPI: Widespread pain index

SSS: Symptom severity scale

SS: Symptom severity

SIQR: Symptom Impact Questionnaire

MPS: Myofascial pain syndrome

FDA: Food and Drug Administration

QoL: Quality of Life

EULAR: European Alliance of Associations for Rheumatology

CBT: Cognitive-Behavioral Therapy

MBS: Modified Borg Scale

CNS: Central Nervous System

OSI: Overall stability index

APSI: Anterior-posterior stability index

MLSI: Medial-lateral stability index

FRT: Functional Reach Test

MS: Mensendieck system

BBAT: Basic Body Awareness Therapy

BAI: Body Awareness Interventions

BA: Body Awareness

A-P: Anterior-Posterior

M-L: Medial-Lateral

±: Standard Deviation

N: Number of participants

X ± SS: Average

ABSTRACT

M.Sc. THESIS

IVESTIGATION OF THE RELATIONSHIP BETWEEN BALANCE AND BODY AWARENESS WITH PAIN AND FUNCTIONAL CAPACITY IN WOMEN WITH FIBROMYALGIA

Mensure ASLAN

Kırşehir Ahi Evran University

Institute of Health Sciences

Department of Physiotherapy and Rehabilitation

Supervisor: Assist. Prof. Dr. Anıl ÖZÜDOĞRU

In this study, it was aimed to examine the relationship between balance and body awareness with pain and functional capacity in female patients diagnosed with fibromyalgia and to compare them with healthy female. The research was conducted between 01.11.2022 - 01.02.2023. Individuals who applied to the Kırşehir Ahi Evran University Training and Research Hospital Physical Therapy and Rehabilitation Department and met the inclusion criteria were included in the study. Ethics committee permission was obtained before the study. A total of 66 participants who met the inclusion criteria were informed about the purpose of the study. Written informed consent form was obtained from the participants. 33 female patients diagnosed according to 1990 ACR diagnostic criteria and 33 healthy controls were included in the study. Pain was evaluated with Visual Analogue Scale (VAS) and algometer. Functional capacity and mobility was evaluated with the 6-minute walk test (6MWT) and the Timed Up and Go test (TUG). The impact of the fibromyalgia was assessed with the Fibromyalgia Impact Questionnaire (FIA). Body awareness was evaluated with Body Awareness Questionnaire (BAQ). Balance was evaluated with the Biodex Balance System (BBS).

The data obtained from the research were analyzed with the independent sample t-test. The mean age of the control group was 39±15.84 years, while the mean age of the FM group was 41±13.10 years. When the values of the FM group and the control group were compared, a statistically significant difference was found between TUG, 6MWT, FIQ score and in some pain variables, these are as follows occiput, supraspinatus, gluteal, trochanter, cervical, second costa, lateral epicondyle and knee on both sides ($p<0.05$). These differences were in favor of the control group. In addition, a moderately positive and significant relationship was found between functional capacity and balance in the FM group ($r= 0,434$, $p<0.05$). Moreover, a statistically significant relationship was found between pain in 16 trigger points except right and left trapezius and balance ($p<0.05$). In conclusion, it was determined that the 6 MWT score, TUG score and pain values were better in healthy female than female with FM. In conclusion, we suggest that balance and body awareness, pain and functional capacity should be assessed together when evaluating FM.

May/2023, 121 Pages

Keywords: Fibromyalgia, Body Awareness, Balance, Functional Capacity, Pain.

ÖZET

YÜKSEK LİSANS TEZİ

FİBROMYALJİLİ KADIN HASTALARDA DENGE VE VÜCUT FARKINDALIĞI İLE AĞRI VE FONKSİYONEL KAPASİTE ARASINDAKİ İLİŞKİNİN İNCELENMESİ

Mensure ASLAN

Kırşehir Ahi Evran Üniversitesi

Sağlık Bilimleri Enstitüsü

Fizyoterapi ve Rehabilitasyon Anabilim Dalı

Danışman : Dr. Öğr. Üyesi Anıl ÖZÜDOĞRU

Fibromiyalji (FM), idiyopatik, inflamatuar olmayan, kronik romatizmal bir hastalıktır. Fibromiyalji prevalansı yüksektir ve dünya nüfusunun %2,7'sini etkilmektedir. Fibromiyalji, osteoartrit ve bel ağrısından sonra en sık görülen üçüncü kas-iskelet sistemi hastalığıdır. Fibromiyalji prevalansı Asya'da %1,7, Kuzey Amerika'da %3,1 ve Avrupa'da %2,5'dir. Türkiye'de fibromiyalji prevalansı %2 ile %4 arasında değişmektedir. Genel popülasyonda, fibromiyalji kadınlarda erkeklerden daha yaygındır. Fibromiyalji, üç aydan uzun süren kronik yaygın ağrı, baş ağrısı, uyku sorunları, anksiyete, depresyon, bilişsel işlevlerde bozulma ve fiziksel bitkinlik ile karakterizedir. Bozulmuş yaşam kalitesi ve fonksiyonel yetersizlik, fibromiyaljinin (FM) çeşitli semptomlarıdır.

Fibromiyaljinin patofizyolojisi ve etiyolojisi hala tam olarak anlaşılamamış olsa da son yıllarda önemli ilerlemeler kaydedilmiştir. Trafik kazası, cerrahi operasyon, Lyme hastalığı, psikolojik ve fiziksel stres, parovirüs ve Ebstein Barr Virüsü gibi bulaşıcı hastalıkların fibromiyaljiye neden olabileceği ileri sürülmüştür. Genetik faktörlerle birlikte çevresel faktörler de fibromiyaljide önemli rol oynamakatdır. FM'nin etyopatogenezi 4 başlık altında incelenmektedir; genetik faktörler, immünolojik faktörler, çevresel teoriler, merkezi teoriler.

Fibromiyaljide halsizlik, anksiyete, parestezi, spastik kolon, huzursuz bacak sendromu, dismenore, yorgunluk, Raynaud fenomeni, sabah tutukluğu, yumuşak dokularda şişlik, uyku bozukluğu ve baş ağrısı gibi birçok semptom görülmektedir. FM tanısı için bir altın standart tanı yöntemi geliştirilmemiştir. FM için ilk tanı kriterleri 1990 yılında American College of Rheumatology (ACR) tarafından yayınlanmıştır. Fibromiyalji kriterleri, toplam 18 hassas noktanın 11'inde ağrıyı içerir. Bununla birlikte en az 3 aydır yaygın kas-iskelet ağrısı görülmektedir. Ayrıca hastalardan klinik laboratuvar testleri ve radyolojik görüntüleme istenebilir. Fibromiyalji hastalarında görülen semptomlar kişiden kişiye farklılık gösterdiğinden tüm hastalarda etkili olan standart bir tedavi yöntemi yoktur. Farmakolojik ve farmakolojik olmayan yöntemler, fibromiyalji için standart klinik tedavilerdir.

Bu çalışmada, fibromiyalji tanısı alan kadın hastalarda denge ve vücut farkındalığı ile ağrı ve fonksiyonel kapasite arasındaki ilişkinin incelenmesi ve sağlıklı bireylerle karşılaştırılması hedeflendi. Bu araştırma, Kırşehir Eğitim ve Araştırma Hastanesi Fizik Tedavi ve Rehabilitasyon polikliniğine başvuran ve dahil edilme kriterlerine uyan bireylerde 01.11.2022 – 01.02.2023 tarihleri arasında yapıldı. Çalışmaya başlamadan önce etik kurul izin belgesi alındı. Çalışmaya, 1990 ACR fibromiyalji kriterlerine göre ilk kez fibromiyalji tanısı alan, 3 aydan uzun süredir yaygın ağrısı olan, 18-65 yaş arası kadın dahil edilmiştir. Kontrol grubuna ise 18-65 yaş arası kadın gönüllü katılımcılar dahil edildi. Dışlama kriterleri olarak sistemik hastalıklar, nörolojik hastalıklar ve ağrıyı etkileyebilecek bir ilaç geçmişine sahip olmak olarak belirlendi.

Çalışmaya dâhil edilme kriterlerine uyan 66 kişiyle görüşüldü ve çalışmanın amacı hakkında bilgi verildi. Katılımcılardan bilgilendirilmiş gönüllü olur formu ile yazılı onam alındı. Katılımcıların demografik bilgileri kaydedildi. Ağrı, Vizüel Analog Skala (VAS) ve Algometre ile değerlendirildi. Fonksiyonel kapasite ve mobilite 6 dakika yürüme testi (6DYT) ve Zamanlı Kalk ve Yürü testi (ZKYT) ile değerlendirildi. Fibromiyalji sendromunun etkisi Fibromiyalji Etki Anketi (FEA) ile değerlendirildi. Vücut farkındalık durumu Vücut Farkındalık Anketi (VFA) ile değerlendirildi. Biodex Denge Sistemi (BDS) ile denge değerlendirildi. Araştırmadan elde edilen veriler ki-kare testi ve bağımsız örneklem T testi analiz edildi. Veriler normal dağıldığı için değişkenler arasındaki korelasyonun hesaplanmasında Pearson Korelasyon analizi kullanıldı.

Kontrol grubunun yaş ortalaması 39±15,84 yıl iken, FM grubunun yaş ortalaması 41±13,10 yıldı. Araştırma sonunda FM grubu ile kontrol grubun değerleri karşılaştırıldığında ZKYT, 6DYT, FEA ve 16 tetik noktanın ağrı değişkenleri (oksiput, supraspinatus, gluteal, trokanter, servikal, ikinci kosta, lateral epikondil ve diz) arasında istatistiksel olarak anlamlı bir fark bulundu ($p<0,05$). Bu fark kontrol grubu lehineydi. Ayrıca FM grubunda fonksiyonel kapasite ile denge arasında orta düzeyde pozitif ve anlamlı bir ilişki bulundu ($r= 0,434$, $p<0.05$). Mevcut tetik noktalardaki ağrı ile denge arasında istatistiksel olarak anlamlı bir ilişki bulundu ($p<0.05$). Çalışmamızda FM'nin vücut farkındalığı ve ağrı ile fonksiyonel kapasite arasındaki ilişkiyi olumsuz etkilediği görülmüştür. Fonksiyonel kapasite ve denge birbiriyle ilişkili olduğundan, FM'de fonksiyonel kapasite ve dengeyi geliştirmeye yönelik fizyoterapi programları planlanırken ve hastalar değerlendirilirken bu parametreler göz önünde bulundurulmalıdır. Özellikle ZKYT ve statik M-L ve dinamik M-L dengesinin FM hastalarının değerlendirilmesinde yer alması düşünülebilir.

Ayrıca çalışmamızda mevcut tetik noktalarda ağrı şiddeti ile dengenin birbiriyle ilişkili olduğu saptandı. Özellikle sağ supraspinatus ve dinamik overall denge; sağ ön servikal ve statik overall denge; statik overall ve statik A-P dengesi ile sağ servikal anterior. Bu veriler, FM tanı koymada ve değerlendirilmesinde yardımcı olacaktır. Bu çalışma, değerlendirme yöntemlerinin ve cihazların uygun şekilde seçilmesi ve bireylere uygulanmasında yardımcı olacaktır. Fibromiyalji henüz tam olarak anlaşılamamıştır, dünya popülasyonunda sağlığı iyileştirmenin en etkili yollarını anlamamız için çalışmalara ihtiyaç vardır. FM'yi etkileyebilecek faktörler hakkında çalışmalar yapılmaktadır. Sonuç olarak, FM hastalarını değerlendirirken ve rehabilitasyon programları planlanırken bulgularımız dikkate alınmalı ve uygun ölçümler yapılmalıdır.

May/2023, 121 Sayfa

Anahtar Kelimeler: Fibromiyalji, Vücut Farkındalığı, Denge, Fonksiyonel Kapasite, Ağrı.

1. INTRODUCTION

Fibromyalgia (FM) is an idiopathic non-inflammatory chronic rheumatic disease. The prevalence of Fibromyalgia is high and affects 2.7 % of the world population. Fibromyalgia is the third most common musculoskeletal disease after osteoarthritis and low back pain. The rate of fibromyalgia in Asia is 1.7%, in North America 3.1% and in Europe 2.5% (1, 2). In Türkiye, the prevalence of fibromyalgia ranges from 2 % to 4 % (3). In general population, fibromyalgia is most common in women than in men. Fibromyalgia is characterized by chronic widespread pain lasting longer than three months, headache, sleep problems, anxiety, depression, impairments in cognitive functions and physical exhaustion. Impaired quality of life and functional disability are various symptoms of fibromyalgia (FM) (4). With the increasing recognition of fibromyalgia by patients and health care workers, more and more people are seeking medical healthcare and visiting health care station more frequently. This has led to fibromyalgia become a common clinical problem and an economic burden on resources (4, 5).

The initial diagnostic criteria for FM were published in 1990 by the American College of Rheumatology. Criteria for Fibromyalgia include pain in 11 of the total of 18 tender points. Additionally, widespread musculoskeletal pain is present for at least 3 months (1). The pathogenesis and treatment of fibromyalgia are controversial. Being one of the most common chronic illness, the causes of fibromyalgia are unknown (6). Pharmacological and non-pharmacological interventions are standard clinical management for fibromyalgia. Swimming, walking, aerobic exercises, strengthening exercises, stretching and body awareness therapies are different interventions that are implemented (7, 8).

Pain is a frequent disorder in patients with fibromyalgia. In addition to pain balance problems, reduced muscle strength and reduced functional capacity are observed in patients with FM (6). In particular, last year's literature focused on the impact of body awareness and balance impairment on patients with Fibromyalgia (9, 10), (11-13). A few studies have noted that balance impairment and body awareness have a significant impact in the quality of life of people with Fibromyalgia (10), (14, 15). Moreover, physical impairment and balance problems increase the risk of falls and disability (16). Although many studies have been done on FM evaluation, a specific evaluation method has not been developed.

There are many studies showing that pain, balance, functional capacity and quality of life are affected (15, 16-21). However, there is no study that correlates these parameters with each other.

No studies investigating the relationship between balance and body awareness, pain and functional capacity in subjects with Fibromyalgia were found in the literature. This is the first study to examine the relationship between balance and body awareness with pain and functional capacity in women with fibromyalgia in comparison with the control group. The results of this study can have important implications in the evaluation of FM patients and in the clinical practice of the rehabilitation field. In future, body awareness and balance training can be included in physiotherapy program to reduce pain and to improve musculoskeletal pain and functional capacity in women with fibromyalgia.

In this study, it was aimed to investigate the relationship between balance and body awareness with pain and functional capacity in women with and without fibromyalgia.

Hypotheses

H0: There is no relationship between balance and body awareness with pain and functional capacity in women with fibromyalgia.

H1: There is a relationship between balance and body awareness with pain and functional capacity in women with fibromyalgia.

2. GENERAL INFORMARTION

2.1. Definition of Fibromyalgia

Fibromyalgia is a chronic pain syndrome characterized by widespread pain in the musculoskeletal system. Widespread pain lasts at least 3 months and becomes chronic (22), (23). The origin of the word fibromyalgia is Latin. It is a combination of fiber (fiber), mys (muscle), algos (pain) and ia (condition) (24). Low pain thresholds (hyperalgesia) and pain (allodynia) response to painless stimuli are observed in fibromyalgia. Symptoms such as sleep disorder, cognitive dysfunction, migraine, anxiety, fatigue, irritable intestinal syndrome, depression and stiffness are seen with widespread pain (22). In addition to these symptoms, numbness in the hands and feet, dysmenorrhea, restless legs syndrome, excessive sweating, dry eyes and mouth are present (23). Fibromyalgia causes inadequacy and poor performance in physical activities (22).

2.2. History of Fibromyalgia

Since the time of Hippocrates, it has been known that there is no organic pathology in the origin of musculoskeletal pain. In the 16th century European literature Guillaume de Baillou described the clinical manifestations of musculoskeletal pain as ‘rheumatism’. This term was used for several centuries (25).

Different terms have been used to describe Fibromyalgia from past to present. Symptoms of fibromyalgia began to be recognized in the 18th century. Soft tissue pain has been defined as muscle rheumatism. The first definition was made by Froriep in the 18th century. Froriep reported in a study that patients' muscles were sensitive when touched and used the term muscle calluses (24). In 1904, Gowers used the term ‘fibrositis’ and stated that tenderness and pain in the musculoskeletal system were due to inflammation (26). In 1970, Smyth and Moldofsky mentioned the term 'sensitive points' (25). Hench used the term 'fibromyalgia' instead of the term 'fibrositis' on the grounds that there is no inflammation in fibromyalgia (27). In 1981, Yunus et al. conducted the first controlled study. The study by Yunus et al. stated that fibromyalgia is not an inflammatory condition and used the term 'Fibromyalgia' instead of 'fibrositis' (25).

The American College of Rheumatology (ACR) published the fibromyalgia classification criteria in 1990 and defined the common pain and tender points used today in detail. The classification criteria have over 85% sensitivity and specificity (5).

According to 1990 ACR criteria it has to be;

- widespread pain for at least 3 months
- the presence of ≥11 tender points at 18 points

The ACR criteria from 1990 were revised in 2010 as they were insufficient in defining the fibromyalgia. Examination of tender points were removed. Mental signs and symptom severity scales are included. The revised criteria include assessment of sleep disturbance, fatigue level, cognitive and somatic symptoms. The purpose of the 1990 ACR criteria revision was to aid diagnosis in health centers (28). In 2011, these criteria were modified (28). According to the 2011 criteria, patients are evaluated with their own reports. In addition to these criteria, the severity of depression, headache and abdominal pain over the last 6 months is evaluated. The modified 2010 criteria can be used for surveys and clinical studies, but they are difficult to use for clinical diagnosis (29). In 2013, the current diagnostic criteria were changed by Bennett et al. and the criteria were made more comprehensive. In these criteria, pain and symptoms are evaluated more detailed (29) .

2.3. Epidemiology of Fibromyalgia

Studies about the prevalence of fibromyalgia was done in four continents (Africa, Europe, Asia and the USA), in different countries and areas. The prevalence of FM varies depending on the diagnostic criteria used to define this syndrome. The global rate of fibromyalgia is 2.7%. The mean prevalence in women is 4.2% and in men 1.4%. The average female male ratio in the world is 3:1. The mean rate in Asia was 1.7%, in the USA 3.1% and in Europe 2.5%. The epidemiological studies in adults of the population using different criteria, worldwide, are shown in Table 2.1. (1, 2).

Some of the studies were done nationwide; the mean prevalence rate were estimated in Germany, Canada, Spain, France, Italy, Finland, Portugal and Israel. The USA, Thailand and Germany used the 2010 ACR criteria for diagnosing FM (1). One study of Türkiye using the 1990 ACR criteria estimated a general population prevalence of 8.8% in Türkiye. Another study of France, Germany, Italy, Spain and Portugal estimated a general prevalence of 4.7% (2).

Table 2.1: Global Prevalence of Fibromyalgia.

Continent	Country	Author	Case definition	N	Age range (y)	Prevalance %		
						O	F	M
Africa	Tunisia	Guermazi	LFESSQ	1,000	≥15	9.3	-	-
America	Canada	White	1990 ACR	3,395	≥18	3.3	4.9	1.6
	America	Wolfe	1990 ACR	3,006	≥18	2.2	3.4	0.5
Asia	China	Scudds	1990 ACR	1,467	-	0.8	-	-
	Thailand	Prateepavanich	2010 ACR	1,000	-	0.6	-	-
Europe	Germany	Wolfe	2010 ACR	2,445	≥14	2.1	2.4	1.8
	Turkey	Turhanoglu	1990 ACR	600	-	8.8	12.5	5.1

%: percentage; N: number of participants, y: year, O: overall; F: female; M: male, LFESSQ: London Female Epidemiology Study Screening Questionnaire, ACR: American College of Rheumatology.

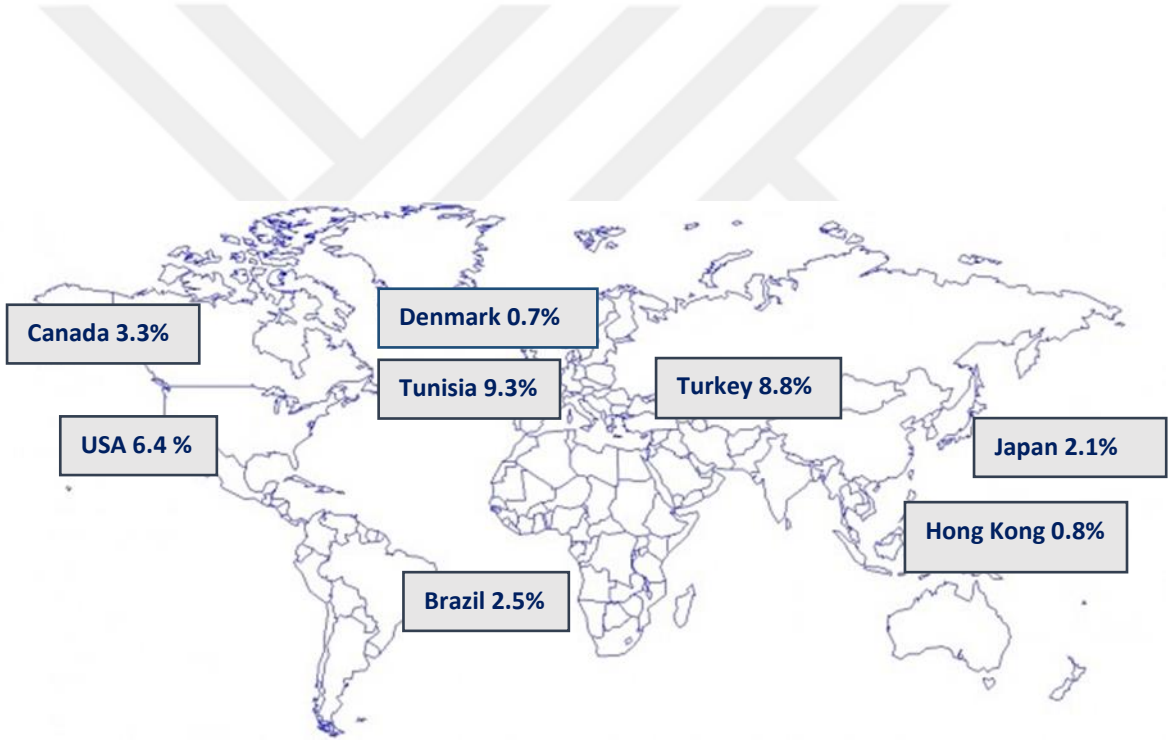


Figure 2.1: Prevalence of Fibromyalgia in Different Countries (30).

The mean rate of fibromyalgia was estimated in different populations. In women, the prevalence were 3.6% in Trabzon, Türkiye and 10.5% in Arendal, Norway. The mean rate was 1.2% in Mexican school children (1).

The prevalence of fibromyalgia can vary depending on the population; the rate of fibromyalgia among hospital workers in Japan was 0.5% in male and 2.0% in female. The study of Gallinaro et al. reported a 58.8% prevalence of fibromyalgia among assembly line workers with the diagnosis of repetitive strain injuries and 10.4% in those without repetitive strain injury. In textile workers in Türkiye, a rate of 7.3% was found. The rate was 9.0% in women and 0.8% in men. Turhanoğlu et al. showed a higher prevalence of FM in the urban population in Türkiye (6). In the study of Assumpção et al., the prevalence of fibromyalgia was found to be 4.4% in the population with a low socioeconomic level in São Paulo, Brazil (1).

2.4. Pathophysiology and Etiology of Fibromyalgia

Although the pathophysiology and etiology of fibromyalgia are still poorly understood, significant progress has been made in recent years. The etiology of fibromyalgia cannot be fully explained, but it has been suggested that traffic accident, surgical operation, Lyme disease, psychological and physical stress, infectious diseases such as parovirus and Ebstein Barr Virus may cause fibromyalgia. Environmental factors together with genetic factors play an important role in fibromyalgia (31). The etiopathogenesis of FM can be grouped under 4 headings; genetic factors, immunological factors, peripheral theories, central theories.

2.4.1. Genetic Factors

Studies showed that genetic factors are important in the etiopathogenesis of FM. Arnold et al. estimated that the risk of developing FM is 5 times higher and the odds of FM disease in first-degree relative of FM patients is 8 times higher than in patients with rheumatoid arthritis. In addition, more tender points were present in the relatives of FM patients (32).

Recent studies have shown that gene polymorphism is in serotonergic, dopaminergic and catecholaminergic systems in patients with fibromyalgia. It is thought that the inheritance pattern of fibromyalgia is polygenic and not sufficient to explain the etiopathogenesis alone. Offenbacher et al. found the frequency of the S/S genotype of the serotonin transporter gene (5-HTT) promoter region significantly high in FM patients than in control group. Moreover, a different genotype distribution with a decrease in T/T and an increase in T/C and C/C genotypes was found in FM patients.

Cohen et al. found an association between fibromyalgia and the 5-HTTLPR (serotonin transporter promoter region) polymorphism.

Studies were done about the genetic factor in FM. The research of Gürsoy et al. showed an involvement of catechol-O-methyltransferase (COMT) gene polymorphism in FM patients. Buskila et al. found a decrease in the frequency of the 7 repeat allele in exon III of the D4 receptor gene in patients with fibromyalgia (33). Yunus et al. reported a familial tendency in fibromyalgia and found a relationship between fibromyalgia and leukocyte antigen tissue groups (34). However, further studies are needed on the contribution of genetic predisposition to fibromyalgia.

2.4.2. Immunological Factors

Cytokines have been involved in research on fibromyalgia for the last twenty years. Studies have shown that cytokines such as interleukin 1β, IL-6, IL-8 and tumor necrosis factor-alpha (TNF-α) play a role in the formation of central and peripheral neuropathic pain (35), (36), (37). The study by Wallace et al. found a high level of IL-8 level in FM patients. An average increase of 55% in IL-1Ra serum level was found. It was suggested that IL-8 plays a role in promoting sympathetic pain and IL-6 inducing hyperalgesia, depression and fatigue (37). Bazzichi et al. demonstrated that cytokines are associated with inflammatory and neuropathic hyperalgesia in widespread pain (38). Although many studies examining the relationship of fibromyalgia with cytokines, the effect of immune system changes in FM is not clear due to the insufficient number of patients with FM, the use of different methods and the presence of conflicting results (39).

The detection of IgG deposits in skin biopsies and the positivity of anti-nuclear antibodies (ANA) in patients diagnosed with fibromyalgia, immunological factors were thought to be significant in the etiopathogenesis of fibromyalgia (40, 41).

It has been determined that infections such as immunodeficiency virus, Lyme disease, Eppstein-Barr virus, hepatitis C and B virus, parvovirus B19 and mycoplasmas can trigger fibromyalgia. In conclusion, FM is not directly associated with some of the infections and no correlation was found with the reduction of pain with treatment of the infection (42).

2.4.3. Peripheral Theories

2.4.3.1. Muscle and Muscle Dysfunction

Due to common widespread muscle pain in fibromyalgia, it was thought of pathological condition in the muscle. No muscle defect was detected in electromyography (EMG), biopsies, and magnetic resonance imaging (MRI). Nonspecific findings were observed in the muscle biopsy; fibrillary disorder, irregular crista pattern in mitochondria and atrophic fibrils (43).

Long-term tension of the muscles and ischemia causes pain symptom in patients with fibromyalgia. Decreased adenosine triphosphate (ATP) and phosphocreatinine levels, decreased muscle-blood flow and impaired muscle oxygenation were found in trigger points (44). The study by Bennet et al., determined low blood flow in the muscles of patients with fibromyalgia during exercise (45) .

In the study of Yunus et al., inflammation was not observed in the muscle tissue of patients with fibromyalgia. Piecemeal in type 1 fibers and atrophy in type 2 fibers were found in a group of patients, while myofibrillar necrosis and increased muscle glycogen levels were found in all patients (46).

Excessive tension in the muscles and dysfunction of sympathetic control were found to cause pain in patients with fibromyalgia, although pathology in muscle was not found in EMG. The results of the study stated that some of the pathologies mentioned were not specific to fibromyalgia, they were seen due to a sedentary life (47). In similar studies, some abnormalities of the muscles were seen and was attributed to the lack of fitness (48).

2.4.3.2. Autonomic Dysfunction

Studies showed changes in the autonomic nervous system caused by fibromyalgia. Some of the changes were parasympathetic hypoactivity, sympathetic hyperactivity, and decreased response to stress (49). A recent study found changes in the skin microcirculation of patients with fibromyalgia. This change suggests adrenergic hypofunction in peripheral sympathetic activity. A difference was not found between the FM group and the control group in muscle sympathetic activity studies. In the study, it was found that norepinephrine levels of patients with fibromyalgia decreased after exercise. This result was considered as sympathetic activity dysfunction (50, 51).

The study by Bengsston et al. showed a reduction in pain, trigger and tender points produced by a stellate ganglion blockade and sympathetic blockade. This change may be occurred due to the improvement in microcirculation (52).

2.4.4. Central Theories

2.4.4.1. Neuropeptide and Neurohormonal Disorders

Researches on central theories are being done and it has become the accepted theory in recent years. It is thought that Hypothalamic-Pituitary-Adrenal (HPA) Axis dysfunction may be present in patients with fibromyalgia. Studies have found high cortisol levels in patients. High cortisol level could not be suppressed with the usage of dexamethasone (53). One study found that adrenaline response decreased during rest and after exercise in patients with fibromyalgia; HPA axis response is decreased during exercise and therefore exercise intolerance exists (54) .

Musculoskeletal pain and fatigue symptoms are common in FM patients. Bennet et al. (55) found low circulating somatomedin C levels in patients with fibromyalgia. Chronic low somatomedin C levels cause a decrease in growth hormone secretion. Insufficient adrenal response or a disorder in the HPA axis may be seen. In particular, the decrease in growth hormone can cause microtrauma in the muscles and affect the healing process of them. Moreover, the study by Russell et al. found low levels of serum serotonin and 5-hydroxyindole acetic acid (5-HIAA), a serotonin metabolite, in the cerebrospinal fluid (CSF) of the patients (56). Vaerϕy et al. examined the levels of substance P in CSF and showed that it was higher in fibromyalgia patients as compared with the control group (57). Studies on serotonin and substance P may explain the better understanding of clinical symptoms seen in fibromyalgia and the low pain threshold in patients. Serotonin is responsible for deep sleep and pain perception. Low levels of plasma serotonin and 5-HIAA in CSF may contribute to sleep disturbance in patients (58).

In recent studies, it has been thought that there is a disorder in the hypothalamic-pituitary-thyroid axis in patients with fibromyalgia. The less than expected increase in secretion of thyroid hormones (TSH) and thyroid stimulating hormones in response to thyrotropin-releasing hormone (TRH) in patients indicates a decreased pituitary response to TRH (53).

Due to the high incidence of fibromyalgia in women, studies are being conducted to determine whether the disease is related to sex hormones. Studies have found a relationship between estrogen with substance P and serotonin. It has also been found that these two neurotransmitters are modulated by estrogen in the brain. (59) , (60). Okufuji and Turk found in their study that the role of sex hormones (total testosterone, estradiol, progesterone) in pain sensitivity is limited in patients with FM (61). It has suggested that gonadal steroids may play a role in the etiopathogenesis, due to the high incidence of fibromyalgia in the menopausal period (51). In addition, decreased level of Growth hormone (GH) and IGF-1 were found in patients with FM (55).

Melatonin acts as a mediator between the brain and the surrounding light-dark cycle and is associated with the synchronization of circadian rhythms. In a study, the plasma melatonin levels of fibromyalgia patients and control groups were examined and plasma melatonin level were found to be higher at night in patients with fibromyalgia (62).

2.4.4.2 Functional Activity of the Central Nervous System

It has been reported that there may be disorders in the functional activity of brain structures related to the perception of pain in patients with fibromyalgia. Studies were carried out especially on the caudate nucleus and thalamus. The thalamus is responsible for the perception and integration of pain. The stimuli regulating the HPA axis also originate from the thalamus. Mountz et al. measured the regional cerebral blood flow at rest with SPECT (SinglePhoton Emission Computed Tomography) in FM patients. They observed a significantly reduction in the amount of regional cerebral blood flow in the thalamus and caudate nucleus. This finding is thought to be related to the low pain threshold in FM patients (63). Kwiatek et al. found that the blood flow level decreased in the right hemithalamus and inferior pontine tegmentum (64).

2.4.5. Psychological Factors

Specific pathophysiology and laboratory findings have not yet been found in patients with FM. The presence of various psychological and behavioral factors suggested that the disease may be of psychological origin. Psychological impairment was observed in 30% of patients with fibromyalgia (65). It has been determined that patients with fibromyalgia have more psychiatric disorders than people who complain of other rheumatic diseases (66).

Somatic symptoms, including severe chronic pain, are more common in patients with depression. However, patients with fibromyalgia with and without depression were compared and no significant relationship was found between the number of tender points and the severity of psychological disorders (67, 68).

Some triggering factors are associated with the onset of FM symptoms. Among these triggering factors are endocrine disorders, infections, emotional distress, physical trauma, immunity activation and some periods of autoimmune diseases, which can be defined as causes of stress (69, 70). Stress factors such as psychological factors and trauma trigger the development of fibromyalgia in people who are genetically predisposed to fibromyalgia (71). The incidence of psychiatric comorbidity in patients with fibromyalgia is between 30-60%. Anxiety, depression, panic disorders, somatization, post-traumatic stress disorder and dysthymia are the most common disorders (44), (72).

Individuals with and without fibromyalgia were compared, fibromyalgia patients were five times more likely to have major depression. It has been determined that 50-70% of fibromyalgia patients have a lifelong history of major depression and 20-30% of these patients have major depression. In addition, the risk of recurrence of depression increases in patients with fibromyalgia (73). It has been shown that with the treatment of psychological factors fibromyalgia symptoms regressed, but do not cured the symptoms (74).

2.4.6. Sleep Disturbances

Studies about the role of sleep disturbances as etiological factor in fibromyalgia have been done. Sleep complaints (poor sleep quality, insufficient sleep, experience of unrefreshing sleep, a high rate of awakenings) are often reported in FM patients. Studies have found that a fragmented sleep, low sleep efficiency and high percentage of light sleep (a great time spent in non-REM N1 stage and N2 stage) are the most common symptoms in patients with FM (75). Moldofsky et al. applied the Electroencephalography (EEG) test to fibromyalgia patients and showed that these patients had abnormal patterns during sleep. While 1-2 waves per second should be seen in the 4th Period of sleep (non-REM), it has been found to be divided by an alpha wave current of 10-12 waves per second in patients. This abnormal pattern has been termed alpha non-REM anomaly. Alpha non-REM anomaly is known by superposition of fast alpha waves on slow delta waves. The sleep disorder that accompanies fibromyalgia is called alpha delta sleep. (76). Although the relationship between sleep and fibromyalgia is quite complex, it is known that psychological distress,

somatic factors and pain plays an important role in fibromyalgia (77). Increased cyclic alternating sleep pattern indicates that the quality of sleep is poor in FM patients. Therefore, sleep patterns also play an important role in treatment (78).

2.5. Signs and Symptoms of Fibromyalgia

2.5.1 The Signs of Fibromyalgia

The most common and important finding in fibromyalgia is the presence of multiple tender points. The assessment of tender points can be made by manual palpation. Another method to evaluate is digital pressure by using an approximate total force of 4 kg. Other physical signs that can be seen in fibromyalgia is skinfold tenderness. Skinfold tenderness can be evaluated by pinching a fold of skin and subcutaneous tissue on tender points. After the examination cutaneous hyperemia at this point and reticular discoloration can be seen (79).

2.5.2 The Symptoms of Fibromyalgia

The symptoms seen in fibromyalgia are diverse, these are as follows; weakness, anxiety, paresthesia, spastic colon, restless legs syndrome, dysmenorrhea, fatigue, Raynaud's phenomenon, morning stiffness, swelling in soft tissues, sleep disturbance and headache. (80).

Table 2.2: Clinical Findings of Fibromyalgia.

Musculoskeletal symptoms	• Pain • Subjective swelling in soft tissues or joints • Stiffness
Other symptoms	• Fatigue • Sleep disturbances • Psychological findings • Mental stress • Female urethral syndrome • Paresthesia symptoms • Headache • Dysmenorrhea • Raynaud’s phenomenon • Dry mouth and eyes • Intestinal disorder

Table 2.2 (continued): Clinical Findings of Fibromyalgia.

Other symptoms	• Cognitive and behavioral disorders • Paresthesia • Irritable bowel syndrome • Restless leg syndrome • Temporomandibular joint problems • Tinnitus • Depression and anxiety • Periodic limb movement disorder

2.5.3. Musculoskeletal Pain

The most common and important finding in fibromyalgia is musculoskeletal pain. Neck, chin, front of the chest, back, waist, elbows and lower extremities are the areas where pain is frequently seen. Patients reported about widespread pain rather than localized pain. An increase in pain in the morning with stiffness is also seen (81). Various events can worsen fibromyalgia symptoms. The most common aggravating factors reported by patients are mental stress, emotional distress, strenuous activity, sleeping problems and weather changes. Physical inactivity, family or work related conflicts, allergies are also included (82). In general, it was reported that the type of pain to be burning, stinging and throbbing (83).

2.5.4. Sleep Disturbances

The incidence of non-restorative sleep in patients with fibromyalgia is common. More than 75% of patients reported sleep disturbances. The symptoms may be insomnia, light sleep and frequent awakening. Poor sleep may be an aggravating factor for pain and may also contribute to sleep problems.

In fibromyalgia, loss of stage three and four of sleep leads to the loss of restorative feelings on awakening. In comparison with healthy groups, patients with fibromyalgia reported loss of REM sleep and deep sleep, intrusion of alpha waves on delta rhythm and frequent awakening.

Studies found that sleep apnea syndrome affects 2% of women and 44% of men with fibromyalgia. In addition to apnea syndrome, other breathing types such as periodic breathing are also seen. However, apneas are probably not the cause of FM symptoms (79).

2.5.5. Morning Stiffness

Morning stiffness in rheumatoid arthritis is only in the affected joints, whereas in FM it is common. It is generally worse upon awakening and in the evening. Nearly 83% of patients reported morning stiffness lasting more than fifteen minutes. A correlation between morning stiffness and severity of fibromyalgia was not found. Additionally, a correlation between morning stiffness and pain was reported (79).

2.5.6. Fatigue

Fatigue affects 75% to 90% of fibromyalgia patients. It is generally worse in the morning after getting out of bed and in the following hours. This situation can continue throughout the day. It has been reported that fatigue affect patients' physical performance and daily live activities (84). Minor activities or being inactive for a long time increase patients' symptoms. Even if patients sleep 8-10 hours, they do not feel rested (85). Studies found an association between fatigue with pain severity and functional disabilities in FM patients (79).

2.5.7. Swelling in Soft Tissues

Approximately 50% of the patients have a feeling of soft tissue swelling, especially in the extremities. It can be located articular or extra-articular, even there is no obvious and objective joint swelling is present on physical examination (86). The swelling is sometimes accompanied by numbness and tingling (79).

2.5.8. Psychological Findings

It was reported that 30-40% of patients has a significant psychological disorder. In comparison with healthy controls and other pain patients, the rate of psychiatric disorder in FM patients was high. The prevalence of emotional neglect or abuse and physical maltreatment was high in individuals with FM. Moreover, the experience of childhood trauma was reported more frequently by fibromyalgia patients than healthy controls (79).

2.5.9. Female Urethral Syndrome and Dysmenorrhea

Complaints about the urinary system have been often described in fibromyalgia. Symptoms such as frequent urination, suprapubic tenderness and dysuria are seen. In one study, the incidence of urethral syndrome was reported to be 19% (87).

Premenstrual syndrome and dysmenorrhea are common complaints in fibromyalgia and is seen in 40-50% of patients (88). Gastrointestinal-related pelvic floor disorders are also common in patients with fibromyalgia. In comparison with control group, a high rate of anal distress and symptoms was found in FM patients (89).

2.5.10. Paresthesia Symptoms

It was found that paresthesia appeared in as many as 84% of fibromyalgia patients. It occurred especially in the extremities (79). Paresthesia complaints are mostly found in the upper extremity rather than the lower extremity (90). Although paresthesia symptom was severe in some patients, no sensory deficit on physical assessment was found. The electromyography and nerve conduction velocity of fibromyalgia patients were normal (79). Approximately 40-60% of patients with FM have tingling, numbness, pricking and burning complaints (90).

2.5.11. Headache

Migraine and other types of headaches have been reported in approximately 28-58% of patients with fibromyalgia (91). Especially episodic migraine is common. It has been shown that fibromyalgia comorbidity is correlated with anxiety, poor sleep, frequency of headaches, physical disability and pericranial migraine (85).

2.5.12. Cognitive and Behavioral Disorders

Cognitive and behavioral disorders are usually present in patients with fibromyalgia. Patients' complaints of cognitive overload, reduced performance speed, inability to multi-task, impaired concentration, distractibility and short term memory consolidation. Patients reported simple confusion or cognitive 'fog' also known as 'fibro fog'. Difficulty with mathematics and writing are also seen. Linguistic performance impairment word retrieval are especially common. Patients can easily lose track of things or forget things (88).

One study observed that the total gray matter volume was significantly less and the age-associated decrease in gray matter was 3.3 times greater in FM patients as compared with the healthy controls. This finding supported the acceleration of age-related brain changes. It has been found that the longer subjects have FM, the greater is gray matter loss (88).

2.5.13. Raynaud's Phenomenon

Subjects with fibromyalgia reported that their extremities change color and turn white in the cold. The rate of Raynaud's phenomenon was found 9% (88).

2.5.14. Irritable Bowel Syndrome

Irritable bowel syndrome can be found in more than 50% of patients. The main symptoms are constipation, diarrhea, abdominal distention and abdominal pain (92). The incidence of irritable bowel syndrome in patients with FM is 40% in women and 14% in men (84).

2.5.15. Restless Leg Syndrome

Studies reported an incidence of approximately 30% of restless leg syndrome in patients with fibromyalgia compared to 25% of control group. Restless leg syndrome or periodic limb movement disorder may contribute to sleep disturbances (79).

2.5.16. Depression and Anxiety

Depression and/or anxiety are present in 30 to 50 percent of patients at the time of diagnosis. Major depression symptom was found in 22% of the fibromyalgia group. Depression is associated with female gender, chronic diseases, younger age, celibacy, limitation in activities and reduced food insecurity (85).

Other factors/diseases that can be seen with fibromyalgia are dry mouth and eyes, temporomandibular joint dysfunction and tinnitus (79).

2.6. Diagnosis of Fibromyalgia

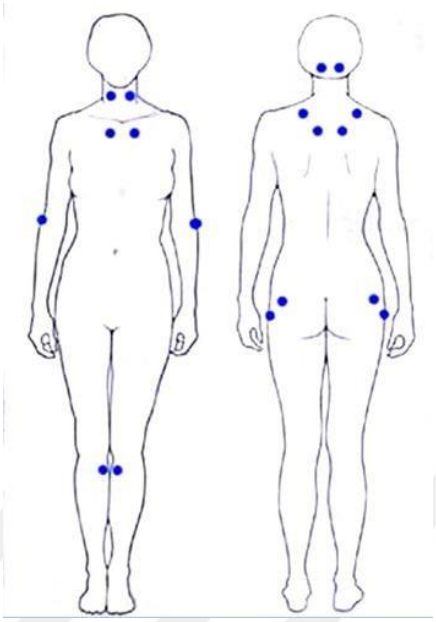
A current gold standard diagnostic method has not been developed for the diagnosis of FM. In the diagnosis of FM, the clinician's experience and the characteristics of clinical findings are significant.

2.6.1. Classification of Fibromyalgia

The American College of Rheumatology 1990 Criteria

The first classification criteria were published by the ACR in 1990. According to these criteria, widespread body pain lasting more than 3 months and 11 of 18 tender points are positive (5). The criteria are shown in table 2.3 below (93);

Table 2.3: The ACR 1990 Classification Criteria of FM.

1.	Widespread body pain persisting for at least 3 months
2.	Pain in 11 of 18 tender points (assessed by applying 4 kg of pressure with thumb):  • Occiput: Bilateral, in suboccipital muscle insertions • Lower cervical: Bilateral, anterior to C5-7 intertransverse regions • Trapezius: Bilateral, at the midpoint of the upper border • Supraspinatus: Bilateral, on the origos, near the medial edge on the spina scapula • Second rib: Bilateral, at the second costochondral junction, just lateral to their upper surface • Lateral epicondylitis: Bilateral, 2 cm distal to the epicondyles • Gluteal: Bilateral, upper outer quadrant of the gluteal region • Trochanter majus: Bilateral, posterior to the trochanteric process • Knee: Bilateral, on the medial fat pad proximal to the joint line

The ACR criteria from 1990 were found insufficient in defining fibromyalgia. The ACR 1990 criteria were revised by Wolfe et al in 2010. The assessment of tender points were removed, widespread pain index (WPI) and symptom severity (SS) scales were included (28). The new criteria from 2010 are shown in Table 2.4.

Table 2.4: 2010 ACR Diagnostic Criteria of Fibromyalgia.

Criteria	A patient has fibromyalgia diagnostic criteria if he/she meets the following 3 conditions: 1. Widespread pain index (WPI) ≥7 and symptom severity (SS) scale score ≥5 or WPI 3-6 and SS scale score ≥9. 2. Symptoms present at a similar level for at least 3 months 3. The patient should not have any other disorder that explains the pain.
Ascertainment	1. **WPI:** Note the number of areas where the patient has had pain in the past week. The score must be between 0 and 19. • Shoulder girdle (left and right) • Upper arm (left and right) • Lower arm (left and right) • Left and right hip (buttock, trochanter) • Upper leg (left and right) • Lower leg (left and right) • Jaw (left and right) • Chest • Abdomen • Neck • Upper and lower back 2. **Symptom Severity Scale Score**: - Waking unrefreshed, fatigue, cognitive symptoms - For each of the 3 symptoms above, determine the level of severity in the past week using the scale below: 0: no problem 1: mild or temporary problems 2: moderate, significant problems, often present and/or moderate level 3: severe, pervasive, persistent, life complicating problems Assess the somatic symptoms in general and determine which symptom the patients has*: 0: no symptoms 1: few symptoms 2: moderate symptom 3: lots of symptoms The SS scale score is the sum of the severity of the 3 symptoms (waking unrefreshed, fatigue, cognitive symptoms) plus the overall extent (severity) of somatic symptoms. The final score ranges from 0 to 12.
*__Somatic symptoms__: sun sensitivity, muscle pain, nausea, remembering problem, thinking problem, muscle weakness, headache, abdominal pain/cramps, numbness/tingling, heartburn, dizziness, insomnia, depression, upper abdominal pain, nervousness, chest pain, blurred vision, fever, diarrhea, dry mouth, fatigue, itching, Raynaud's phenomenon, hives/swells, tinnitus, vomiting, constipation, oral ulcers, change or loss in taste, seizures, dry eyes, shortness of breath, loss of appetite, rash, wheezing, , hearing difficulties, easy bruising, hair loss, frequent urination, painful urination and bladder spasms, irritable bowel syndrome.	

The current diagnostic criteria were changed by Bennett et al. in 2013 (29). The alternative criteria are shown in Table 2.5

Table 2.5: Alternative Criteria 2013 for the Diagnostic of Fibromyalgia.

1. Symptoms and pain localization must persist for at least the last 3 months
2. Pain localization score is ≥17
3. SIQR symptom score is ≥21

Pain location inventory (PLI)

Locations of persistent pain during the past 7 days. The sore will be between 0 and 28.

Right jaw		Mid-waist		Left wrist		Right knee	
Left jaw		Front chest		Right hand		Left knee	
Right back		Right shoulder		Left hand		Right ankle	
Left back		Left shoulder		Right hip		Left ankle	
Right waist		Right arm		Left hip		Right foot	
Left waist		Left arm		Right thigh		Left foot	
Mid-back		Right wrist		Left thigh			

10-item SIQR symptoms:

The intensity of the common symptoms felt over the last 7 days is evaluated between 0-10 (scoring: 0-100). The score obtained is divided by 2.

Criteria:

			0	1	2	3	4	5	6	7	8	9	10	
1.	Pain	No pain												Unbearable pain
2.	Energy	Lots of Energy												No energy
3.	Stiffness	No Stiffness												Severe stiffness
4.	Sleep	Awoke Rested												Awoke very tired
5.	Depression	No Depression												Very depressed
6.	Memory problems	Good memory												Very poor
7.	Anxiety	Not Anxious												Very anxious
8.	Tenderness to touch	No tenderness												Very tender
9.	Balance problems	No imbalance												Severe imbalance
10.	Sensitivity to loud, noises, bright, lights, odors &cold	No sensitivity												Extreme sensitivity

* SIQR: Symptom Impact Questionnaire

Due to the misclassification when applying 2010 criteria to regional pain syndromes, a modified widespread pain criterion ('extensive pain in at least 4 or 5 regions') was added to eliminate the misclassification. Wolfe et al. developed 2016 revision criteria to the 2010 FM criteria. Subjects may be diagnosed with fibromyalgia when the following criteria are met showed in Table 2.6. (94).

Table 2.6: Fibromyalgia ACR 2016 Diagnostic Criteria.

Criteria	To be diagnosed with ACR 2016 criteria, the following first 3 conditions must be met; 1. Presence of symptoms of similar severity for about 3 months 2. Widespread pain index (WPI) ≥7 and Symptom Severity Scale (SSS) ≥5 points, or WPI of 4-6 and SSS ≥9 points 3. Generalized pain should be in 4 of the regions. Pain in the jaw, chest and abdomen are excluded in generalized pain definition. 4. A diagnosis of fibromyalgia does not exclude the presence of other illnesses.
Ascertainment:	(1) Note the number of areas where the patient has had pain over the last week. The score ranges from 0-19. (2) **Region 1 (Left upper region):** jaw, shoulder girdle, upper arm, lower arm **Region 2 (Right upper region):** jaw, shoulder girdle, upper arm, lower arm **Region 3 (Left lower region):** hip, upper leg, lower leg **Region 4 (Right lower region):** hip, upper leg, lower leg **Region 5 (Axial region):** neck, upper back, lower back, chest (1) Symptom severity scale (SSS): For the each of the 3 symptoms (cognitive symptoms, waking unrefreshed, fatigue), determine the level of severity over the past week using the following scale: 0:No problem 1:Mild or slight problems 2:Moderate, considerable problems, often present and/or moderate level 3: Severe, pervasive, continuous, life disturbing problems The SS scale score is; ▪ The sum of the severity scores of the 3 symptoms (fatigue, waking unrefreshed, and cognitive symptoms) (0–9) ▪ Sum (0–3) of the number of the following symptoms occurred during the previous 6 months: (1) Headaches (0–1) (2) Pain or cramps in lower abdomen (0–1) (3) And depression (0–1) The final symptom severity score is between 0 and 12. The fibromyalgia severity (FS) scale is the sum of the WPI and SSS.

2.6.2. Differential Diagnosis

Various symptoms of fibromyalgia can mimic conditions and diseases. Among the diseases that should be considered in the differential diagnosis of fibromyalgia are myofascial pain syndrome (MAS), rheumatoid pain, chronic fatigue syndrome, myositis, neuropathies, polymyalgia rheumatica, hypothyroidism, rheumatic diseases such as Syörgen syndrome and autoimmune diseases such as lupus. Comorbid conditions can be found with fibromyalgia. The presence of another disease does not exclude the diagnosis of fibromyalgia. (95).

FM and myofascial pain syndrome are often confused with each other. Local pain is seen in MAS. In addition, when palpating trigger points in MAS, local twitching and jumping response are seen, but these symptoms are not seen in fibromyalgia. Differential diagnosis of rheumatic diseases is made by physical examination, laboratory and radiologic findings (96). In general, medical history, physical assessment and laboratory tests are sufficient to differentiate fibromyalgia from the other conditions and diseases (85).

2.6.3. Physical Findings

In physical examination of fibromyalgia, presence of sensitive points are significant symptoms. The 18 tender points were assessed with algometer or by applying 4 kg of pressure with thumb. Pressure is applied with the pulp of the thumb until a whitening occurs on the sub-nail skin. It is expressed as 'painful' by patients when pressure is applied. (5). Although fibromyalgia does not cause swelling or erythema of soft tissue or joints, they should be assessed. Due to the minor sensory and motor abnormalities in the absence of another condition, neurological evaluation are performed to differentiate the diagnosis of patients with fibromyalgia (85).

2.6.4. Laboratory and Radiological Findings

Some tests such as routine clinical laboratory testing, Magnetic Resonance Imaging (MRI) plain radiography, computerized tomography (CT), scintigraphy and electromyography (EMG) may be required to exclude differential diagnosis in patients. C-reactive protein (CRP), hemogram, creatine kinase, erythrocyte sedimentation rate (ESR), thyroid function test and standard blood biochemistry test may be performed to exclude an associated illness (97). Moreover, skin biopsy may be required in patients with FM, due to the small-fiber neuropathic changes on skin biopsies (85).

Studies found low vitamin D levels in patients with chronic pain, but a correlation between vitamin D level and the diagnosis of fibromyalgia was not found (85).

2.6.5. Prognosis

The prognosis of patients with fibromyalgia who are seen in primary care tend to be good compared with patients seen in tertiary care who have a poor prognosis. One study found little change in FM symptoms over time and no change in functional capacity and health satisfaction (31).

It has been reported that the rate of function loss is 9-44% in patients with fibromyalgia. A significant relationship was found between prognosis and variables such as mood disorder, education status, pain and presence of depression (98, 99).

2.7. Treatment of fibromyalgia

The pathophysiology of the diseases in fibromyalgia is uncertain, therefore treatment methods are applied according to the patient rather than the disease. As the symptoms seen in people with fibromyalgia vary from person to person, there is no standard treatment method that is effective in all patients.

2.7.1. Pharmacological Treatment

Studies reported that the aim of pharmacological treatment should be mechanism-oriented analgesia. Centrally acting medications such as antidepressants and anticonvulsants can be effective in fibromyalgia. They can increase the level of pain-inhibitory neurotransmitters by facilitating descending pathways and reduction dorsal horn sensitization or decreasing systemic hyperexcitability. An important point in pharmacological treatment is that drug intolerance may occur in patients, therefore treatment is started at low doses and as monotherapy. The dose is gradually titrated. It is beneficial to regulate the medication according to the patient's symptoms. The most commonly prescribed drugs for fibromyalgia are shown below (2),(100);

Anticonvulsants

The effect of anticonvulsants for fibromyalgia treatment are most frequently studied. While the benefits of gabapentin among gabapentinoids are unclear, many meta-analysis studies suggest that pregabalin is effective and safe for patients with FM.

Although side effects such as dizziness may occur, pregabalin is the only anticonvulsant approved by the Food and Drug Administration (FDA) (2). Studies showed that pregabalin improves pain, sleep disorders, fatigue and quality of life (QoL) (101).

Antidepressants

As a result of the studies, amitriptyline is among the first recommended pharmacology agent in treatment, and it is recommended to use 25-50 mg / day before going to bed (100). Studies reported that the effect of amitriptyline on sleep is moderate and on fatigue low. Moreover, duloxetine and milnacipran are both FDA-approved for FM. It is shown that both of them are more effective than placebo but in treating only fibromyalgia pain. It has no effect on other symptoms of fibromyalgia. One systematic review reported that adverse effects of duloxetine can lead to dropouts, another randomized controlled study noted that milnacipran were unfavorable in terms of global pain, allodynia, cognition, pain modulation, mechanical and thermal thresholds (2).

Muscle Relaxants

Cyclobenzaprine is approved as a muscle relaxant and used to improve pain and the quality of life in FM. Although Tizanidine is used for myofascial pain disorder treatment, it can be helpful in treatment of fibromyalgia (2). For the usage, it was started with 10 mg and increased to 30 mg dose. Tizanidine was found to be effective in morning stiffness, fatigue, pain and sleep disturbance in patients (100).

Analgesic Drugs

Studies showed that FM patients have a high concentration of opioid peptides in their biological fluids but endogenous opioid activity with little opioid receptor availability. This may explain why the use of opioids are avoided with regard to risk-to-benefit profile. Tramadol, alone or in combination with paracetamol is the only opioid which is proved to be effective in fibromyalgia treatment (2).

Hypnotic and Antipsychotic Drugs

Benzodiazepines and zolpidem are hypnotic drugs and improve sleep in the short term. Another antipsychotic drug for fibromyalgia treatment is quetiapine. It is suggested that this drug is effective in treating fibromyalgia pain, sleep disturbances, depression and anxiety. It may have adverse effect such as weight gain and constipation.

Due to the low quality of evidence of the trials, it is recommended to take quetiapine for a short time. When quetiapine compared with amitriptyline, no difference between the two drugs was found in reducing various fibromyalgia symptoms (2).

Cannabis and Cannabinoids

The cannabis plant contains more than 100 different active cannabinoids including tetrahydrocannabinoil (THC) and cannabidiol (CBD) which have been extensively investigated for fibromyalgia treatment. Due to the moderate effect on chronic non-cancer pain condition, it was thought that cannabis could be effective in fibromyalgia treatment as well. More studies and clinical trials are still needed (2).

As a result, there is no gold standard in pharmacological treatment for fibromyalgia. Agents with proven efficacy in pharmacological treatment used in fibromyalgia are cyclobenzaprine, pregabalin and gabapentin, tricyclic antidepressants, serotonin norepinephrine inhibitors (SNRIs), selective serotonin reuptake inhibitors (SSRIs), and tramadol (100).

2.7.2. Non-pharmacological Management

There is a wide range of non-pharmacological treatments in FM and can be defined as ‘complementary’ or ‘alternative’ therapies (2). Non-pharmacological treatment aims to increase the patient's physical function and activity level, and to improve the general health status (100). Non-pharmacological treatments for fibromyalgia are described below;

Patient Education

In the treatment of fibromyalgia, it is important that the patients understand their illness and to make them clear that this pathological condition is not progressive. Patients have an important role in management, they should develop their own approaches and methods to improve their life quality. ‘Self-management’ strategies are recommended. Stress factors, sleep disorders and mood are playing an important role in the pathophysiology of fibromyalgia. Patients should learn to sleep well, to find relaxation techniques or participate in formal programs to reduce stress. Patients are encouraged to continue with non-pharmacological treatment according to the need of patients pharmacological treatment might be useful in reducing symptoms (2).

Fitness

According to the latest European Alliance of Associations for Rheumatology (EULAR), primarily the use of non-pharmacological prevention especially exercise is recommended. Fitness, including loss of weight, aerobic exercises, strengthening activities and nutrition factors are important. Aerobic exercise may improve pain and physical function in FM and weight loss leads to posture and well-being. Due to physical factors and deconditioning in patients it can be difficult for patients' to start with aerobic exercise.

For cardiovascular fitness it is recommended to do 20 minutes of aerobic exercise three times a week. Although the rate of nutritional deficiencies in patients with fibromyalgia is high, there is no clear protocol for nutrition (2).

Hypnosis

In recent years, studies have been conducted on the effect of hypnosis in patients with fibromyalgia. The systematic review by Zech et al. reported that this method improved pain and sleep disturbances after applying and also after 3 months of follow-up (102). Despite this report more studies about the effect of hypnosis in FM are needed.

Physical Therapy Modalities

Various physical therapy modalities are used in fibromyalgia treatment. While heat application and cryotherapy are recommended for use in the acute phase of fibromyalgia, there is low-level evidence of their effectiveness. Cold, hot and electrotherapy applications improve pain and increase exercise compliance of patients (100) .

Acupuncture

Acupuncture is recommended by EULAR. Some studies reported the effect on decreasing pain and stiffness (2). One study found that real acupuncture improves FM symptoms such as pain, pain threshold and morning stiffness than sham acupuncture but long-term follow-up was not reported (103).

Electrotherapy

The study by Honda showed positive effect of thermal therapy on fibromyalgia pain intensity, tender point and status of patients with fibromyalgia.

Electrotherapy such as transcutaneous nerve stimulation (TENS) and electromagnetic therapy have a significantly effect on fibromyalgia related pain intensity (104).

Manipulation/Massage, Biofeedback, Balneotherapy

Another physical therapy modality is massage and manipulation. There is moderate evidence that massage improves sleep quality and reduces anxiety. Manipulation has been reported to reduce pain. There is B-level evidence in studies on the effectiveness of balneotherapy. In one study, 10 sessions of 20 minutes of balneotherapy were applied to patients and an increase in pain threshold values and a decrease in pain intensity were found.

Heart Rate Variability Biofeedback (HRV-BF) has been found to have positive effects on sleep disturbance, depression, pain severity, anxiety, fatigue and physical function (100).

Tai chi, Qigong and Yoga

Alternative therapies such as tai chi, qigong and yoga are based on physical movement including mental relaxation and breathing methods. Some studies showed that these exercises might be safe and effective in fibromyalgia treatment. An improvement in pain, depression, fatigue, quality of life and sleep was reported (2). Another study underlined the positive effect of tai chi on various symptoms of fibromyalgia. Due to the high improvement in symptoms, tai chi can be seen as a therapeutic method in the multidisciplinary treatment of fibromyalgia (105).

Spa Therapy

Spa therapy has a long history and has been used in various conditions. In Europe, it is a popular treatment. Spa therapy is based on the curative effects of thermal water and includes approaches such as hydrotherapy, balneotherapy and mud packs. It is thought that spa therapy has an effect on decreasing pain, improving function and quality of life (106). Although the mechanism of action of balneotherapy is uncertain, it might be recommended as a first-line treatment combined with patient education and aerobic exercise (2).

2.7.3. Psychotherapy

Cognitive-Behavioral Therapy (CBT)

In psychotherapy, the practice of cognitive-behavioral therapy is common and can be used for a long period of time.

The aim of this therapy is primarily to determine condition-related maladaptive thoughts and secondarily to develop coping strategies and behavior. Dysfunctional pain modulation is an important factor in protracting and exacerbating pain. It has been shown that improvement in pain, mood and physical functioning is higher in cognitive-behavioral therapy than other non-pharmacological treatment methods and usual care (2). The study by Alda et al. found a high effect of CBT in FM including QoL and pain than recommended pharmacological treatment and treatment as usual (107).

2.7.4. Physical Therapy and Rehabilitation

Exercise

The aim of exercise in FM treatment are improving the condition, gaining strength, increasing resistance to microtrauma, endurance and flexibility. Studies found a decreased physical and aerobic performance capacity with a limitation in daily activities in patients with fibromyalgia. There are strong evidence that cardiovascular exercise is effective for patients with FM. Although the mechanism of action is uncertain, it is thought that cardiovascular exercise helps functional rehabilitation by improving aerobic fitness, increasing strength and flexibility. Systematic review by Busch et al. found a significant improvement in aerobic capacity, pain and tender point pain pressure threshold in exercise groups than in control group. Moderate-intensity exercise at last twice a week has been observed to improve aerobic capacity and physical function and decrease sensitivity. It is reported that aerobic exercise prescriptions should be individual based on patient's symptom severity and exercise tolerance (108).

Walk

Walking is an inexpensive, easily applicable and safe exercise alternative method (108). The study by Bucklew et al. showed an improvement in physical function, tender point assessment and self-efficacy function in FM patients and this condition continued for one year.

They combined non-specific home program with a 6-week once-weekly aerobic walking (109). Meyer et al. found a higher improvement in functions in the low intensity walk group than high intensity group (110). Another study on FM patients mentioned the significant positive effect of walking in maximum oxygen uptake, depression, vital capacity and mental health compared with stretching exercise group (108).

Pool Exercises

Pool exercises are based on aerobic, flexibility and endurance exercises. Pain and stiffness are reduced at a water temperature of 30-34 degrees. With the buoyancy of water the body awareness may improve, movement performance may increase and patients may learn to relax (108). Gowers et al. have combined pool exercise (6 week, twice a week) with training program and found an increase in aerobic capacity, sleep, fatigue and well-being status in FM patients than untreated group. These positive effects continued 6-month follow-up after exercise. One study found that physical and social status, anxiety, and depression was significantly improved after 6 month pool exercise applied (108).

Strengthening Exercise

The effects of programs with strengthening exercises are to improve the ability to perform daily activities by increasing the ability to contract and muscle strength. Studies observed an improvement in muscle strength and mood. Muscle motor units have been activated at a higher rate with electromyography. Strengthening exercise was applied twice a week by gradually increasing the exercise program. In general, studies suggested that low-intensity strengthening programs increase muscle strength, decrease fatigue and have low effect on pain and tender points (108). The study by Valkeinen et al. found an increase in muscle strength, quadriceps cross-sectional area and voluntary muscle activation in FM patients participating in a strengthening exercise program than control group (111).

Stretching Exercises

There is insufficient evidence regarding the effect of stretching exercise in the treatment of fibromyalgia. The effect of stretching and aerobic exercise was investigated and both groups showed improvement in aerobic capacity, physical function and pain. Aerobic exercise was found to be superior in terms of efficiency. Stretching exercise was found to be ineffective in decreasing depression (100) .

Hereby, fibromyalgia treatment needs to be holistic and comprehensive. The patient should be evaluated holistically. In the evaluation, findings such as depression, sleep disorders, physical capacity and fatigue can be assessed. Accordingly, a multidisciplinary treatment approach that includes pharmacological and non-pharmacological treatment modalities can be arranged (112).

2.8. Body Awareness (BA)

The term awareness describes the state in which a person passes through the mental stages of her/his experiences and signals originating from her/his body (113). Sensory inputs such as exteroceptive, interoceptive, vestibular and proprioceptive play a role in body awareness (114). In order to be aware of our body, we must perceive the sensory inputs coming from these sub-components together. Our body's implicit knowledge of space and movement is called exteroceptive awareness or 'the body schema' (115).

As exteroceptive inputs are vital for daily life, they are carried to the cognitive level (114). Vision, sound or touch are exteroceptive signals (115). Interoceptive awareness is the conscious perception of the senses that create the body's physiological sensations such as heartbeat, satiety, respiration, and the autonomic nervous system senses related to emotions. The interoceptive component includes both afferent and efferent mechanisms. The conscious perception of joint angle, muscle tone, posture, movement and balance defines the proprioceptive awareness (116).

Examining the relationship between awareness and body awareness; it is reported that awareness skills such as concentration, unresponsiveness, and constant attention play a role in shaping body awareness. BA can be defines as the bodily aspect of awareness (117). BA is the subjective and phenomenological aspect of interoception and proprioception that can be modified by mental processes, including memories, interpretation, attention, beliefs, evaluation, attitudes, interaction, and enters conscious awareness (11, 118). In physiotherapy, body awareness is defined in two ways: body experience and behavior and action in movements and activities. Another definition in physiotherapy texts; it is a form of therapy for awareness of how the body works in terms of body function, behavior, and interaction with oneself and others (11). The aim of body awareness therapies (BAT) is to normalize the posture, breathing, balance and muscle tension seen and experienced in movement behavior (13).

Body awareness involves the attention toward the body in motion and at rest. It refers to awareness of both sensory inputs and motor control associated with the integration of breath and movements, coordination, and balance. Studies reported decreased body awareness in patients suffering from musculoskeletal disorders, depression and anxiety (12). Fibromyalgia has an impact on subject's relationship with their bodies. Patients felt pain and fatigue and the body becomes an unfamiliar presence that has an effect on QoL, social life, function and prevents daily life activities.

The study by Valenzuela-Moguillansky observed the bodily experience in FM during a pain crisis. With increasing pain changes in patients' body perception were found. Changes in the body size perception and its relationship with space was reported; the feeling that their body becomes larger and the space is shrinking. Akkaya et al. found a disruption of body image in patients with fibromyalgia (115).

2.9. Balance

Balance is the control of the center of gravity. The Central Nervous System (CNS) controls posture while standing or moving to control the center of gravity (119). Balance is divided into two subgroups, the static balance and dynamic balance. The first one refers to maintaining the static position specific to the individual. Postural performance (dynamic balance) is the ability to actively control body posture in order to be able to move effectively without falling in different situations, whether at rest or while moving (120). Balance underlies our performance to undertake daily life activities and forms the base for all voluntary motor skills (121).

The factors affecting the balance are as follows; the support surface, the stability limit, the work to be done and the location of the center of gravity. The center of gravity is in front of the second sacral vertebra and the forces acting on the body at this point are zero. The body surface carries the pressure created by the sum of body weight and gravity, this surface is called the support surface. The thighs and hips are the support area when sitting, and the feet when standing (122). The stability limit is also expressed as the body swing angle. While the swing in the anterior-posterior plane is 12.5 degrees, it is 16 degrees in the lateral plane. If the average stability is exceeded, the person will fall. The inability of the person to stand in a stable position and the increase in postural oscillations indicate poor balance or low stabilization (123).

Information's from the visual, vestibular and somatosensory systems are very important in maintaining balance (120). The three major sensory systems plan locomotion, senses linear and angular acceleration, and the last system senses the position and velocity of body parts, their contact with external objects, and the direction of gravity, respectively (124). Balance disorder is frequently seen in patients with FM. The incidence of balance disorder in FM patients is between 45-68%. Previous studies have found an association between impaired balance and increased fall risk and/or higher fall frequency in female patients with fibromyalgia than healthy group. The incidence of falling per individual each six months was found to be 1.75. It was reported that balance problems have a negative effect on gait, QoL and physical function in FM patients (18). Furthermore, a correlation between the impact of FM symptoms and the ability maintaining balance was found. It is expected that the impact of fibromyalgia may be reduced with an improvement in balance (125).

2.10. Pain

Studies reported the rate of chronic regional pain is 20-25% in the population. Chronic regional pain and regional is commonly seen in women as in men. Factors such as greater age, family history, low socioeconomic status predicts the development of regional or widespread pain (126).

Pain is a hallmark of fibromyalgia. FM is characterized by the presence of chronic widespread musculoskeletal pain and tender points (17). The pain seen in fibromyalgia is different from rheumatoid arthritis pain as FM pain is not due to inflammation or tissue damage (126). Studies reported that chronic pain is inheritable. One study reported that initial FM pain was focal in 90% of the patients especially in the hands (%25.2) and in the back (%19.4). Moreover, it was pointed out that pain in FM is not just 'longer-lasting pain' (127). It is known that FM symptoms limits daily life activities of patients. Decreased physical performance and functionality is present (17).

2.11. Functional Capacity

Functional capacity is a domain of everyday functioning. It can be evaluated through performance-based assessments. In recent years functional capacity has become the basis for the evaluation of everyday functioning. The vulnerability of functional capacity to be influenced from environmental factors is less, therefore studies focused on functional capacity (128).

It is found that patients with FM have a reduced capacity of upper and lower limb physical performance and effects their daily life activities. Due to the pain and stiffness after exercise, the performance of high intensity exercise is limited in FM patients. Various studies have reported that the aerobic capacity in patients with FM is lower than in healthy subjects. This reduced functional aerobic capacity have an effect on independence in performing daily life activities (129). Studies reported that regular physical activity improves functional capacity in patients with FM. Physical activity in rehabilitation programs are recommended, and therefore, it is essential to have information about the patients' functional capacity levels (17).

3. MATERIALS AND METHODS

3.1. Study Design

This is a cross-sectional study conducted between November 2022 and February 2023 in the Physical Therapy and Rehabilitation Unit of Kırşehir Training and Research Hospital in Kırşehir, Türkiye.

3.1.1. Sample Size

The sample size of the study was calculated as at least 30 individuals in a group, with a 95% confidence interval and 90% power. Analyze made in the G Power program (ver 3.1.9.7) by looking at the literature (130). Against the probability of 10 % drop out, this number was determined as 33 individuals for each group and totally 66 individuals for 2 groups.

3.1.2. Ethic Committee Approval

This study was approved by Kırşehir Ahi Evran University Faculty of Medicine Clinical Research Ethics Committee (2022-18/164). All of the participants were asked to sign an informed consent form. The study was carried out in accordance with the Declaration of Helsinki.

3.2. Participants

The participants were referred by physicians from November 2022 to Feburary 2023. Due to the low prevalence of FM among men, the study was conducted with just women (160). A total of 82 potentially eligible participants responded, 16 of the participants were later excluded based on the exclusion criteria: 5 of the participants had been diagnosed with other diseases, 3 participants were older than 65 years and 8 participants had a medication history that may affect pain and balance. The study included a total of 66 study subjects, 33 women with FM diagnosed according to American College of Rheumatology 1990 (ACR) and 33 healthy women. Participants were between the ages of 18 – 65 years. The inclusion and exclusion criteria used were the following;

3.2.1. Inclusion Criteria (For The Fibromyalgia Group)

- To be diagnosed with fibromyalgia for the first time by a physician according to the 1990 ACR fibromyalgia criteria; presence of widespread pain for more than 3 months (5),
- To be between the ages of 18-65 years
- Volunteering to participate in the study
- To be a female patient

3.2.2. Inclusion Criteria For The Control Group

- To be between the ages of 18-65 years
- Volunteering to participate in the study
- To be a female participant.

3.2.3. Exclusion Criteria

- Systemic diseases (heart diseases, respiratory system diseases, gastrointestinal diseases, renal or inflammatory rheumatic diseases),
- Neurological diseases,
- Having a medication history that may affect pain.

The participants were informed about the purpose and structure of the study. They were directed to sign consent form (Appx. 5) prior to participate according to Declaration of Helsinki. The study has been approved by the Ethic Committee of Clinical Researches of Kırşehir Ahi Evran University Faculty of Medicine with the decision number 2022-18/164 and dated 11.10.2022 (Appx 1).

3.3. Assessment Methods

Both study groups went through the same assessment. Sociodemographic data of all participants, including their age, height, education status and medical history were recorded as a baseline assessment. Pain was evaluated with Visual Analogue Scale and algometer. Functional capacity and mobility was evaluated with the 6-minute walk test and the Timed Up and Go test. The impact of the fibromyalgia was assessed with the Fibromyalgia Impact Questionnaire. Body awareness was evaluated with Body Awareness Questionnaire. Balance was evaluated with the Biodex Balance System.

3.3.1. Obtaining Personal and Demographic Information

Demographic data such as age (year), body weight (kg), height (meter), educational status, profession of the subjects included in the study were recorded (Appx 2).

3.3.2. Visual Analogue Scale (VAS) / Pain

The pain intensity felt by the participants was evaluated with VAS. VAS is a scale that is easy to use due to the absence of any language and is frequently used in clinics. In addition, this scale is one of the most valid pain assessment scales today and is used safely in pain measurement (131), (132), (133). Subjects were asked to describe the pain they felt as '0' (no pain) and '10' (unbearable pain/the most intense pain imaginable) on a 10 cm scale (134).

3.3.3. Algometer / Mechanical pain sensitivity

For the assessment of mechanical pain sensitivity an analogical pressure algometer was used. The 18 tender points were described in 1990 ACR criteria (5). These tender points are at the left and right side of the body. Tender points are evaluated by digital palpation and an algometer. In the determination of tender points with digital palpation, pressure is applied with the intensity of whitening the thumb of the hand. For a point to be considered painful, the patient must describe the pressure as "painful". In addition, the pain threshold is evaluated numerical with the algometer (135).

The measurements were made with the algometer produced by JTECH MEDICAL INDUSTRY (Figure 3.1). Algometer is a device that measures mechanical pressure. This device consists of a spring-loaded cylinder with a circular tire at the end. The device has a pressure surface of 1 cm^2 diameter. Values are measured in kg/cm^2. Pressure was applied to 18 sensitive points with the algometer. In this case, only the device was touched to the tissue, no force was applied. Then force was applied to cause pain. The patient was asked to report when he/she felt pain while applying force (kg/cm^2) with the device. This evaluation was repeated three times and the average of the measurements was taken. There was a duration of at least 20 seconds between each measurement.

Figure 3.1: Evaluation of trigger point pain threshold with algometer.

3.3.4. Modified Borg Scale / Fatigue

Borg Rating of Perceived Exertion (RPE) scale was developed by Gunnar Borg in 1970 to measure the effort and exertion, shortness of breath and fatigue of an individual during physical activity. It is mostly used to evaluate resting dyspnea severity and effort dyspnea severity (136).

In this study, Modified Borg Scale was used to measure fatigue level in FM patients at the end of 6MWT and compared the findings with healthy women. The MBS is easy to use (137). The MBS is a self-administered scale and ranges from 0 to 10 points (Figure 3.2). Higher score represents higher physical exertion (138). It has been shown that the MBS is a valid tool to determine intensity in fibromyalgia patients (139). Participants were asked to rate their fatigue level on the scale and to circle the appropriate number.

0	None
0,5	Very, very light
1	Very light
2	Light
3	Moderate
4	A little intense
5	Intense
6	
7	Very intense
8	
9	Very, very intense
10	Maximum

Figure 3.2: Modified Borg Scale (MBS) (140).

3.3.5. Six Minute Walk Test (6MWT) / Functional Capacity

The 6 Minute Walk Test was developed by the American Thoracic Society and the guideline was officially introduced in 2002. The test is sub-maximal exercise test to evaluate aerobic endurance and functional capacity. The 6 Minute Walk Test was initially used in the assessment of patient with cardiopulmonary disease. Today it is used in fibromyalgia, in other conditions (stroke (141, 142), arthritis (143), spinal cord injury (144), geriatrics (145) and in different age groups to evaluate the functional capacity of the individual. It provides information during physical activity, including blood circulation, cardiovascular system, peripheral circulation and pulmonary system (146).

The 6 Minute Walk Test is simple to apply and is common used as clinical parameter. In addition, the 6MWT is an inexpensive method. Several studies shows that the 6MWT is reliable in patients with FM (147). In our study functional capacity was measured through the 6 MWT. Participants were asked to walk as fast as possible at their own walking speed for 6 minutes on a 30-meter straight and unimpeded corridor. The corridor length was marked every 3m. Cones were placed to the end of the 30 meter stretch and to turning points. The start and end points are marked with a band. Chairs were set up to the side along the walkway. In this way the patient could easily reach a chair to rest as necessary.

Time was measured with a stopwatch. The participants were asked to wear comfortable clothes and not engage in heavy physical activity in the 2 hours before the test. In addition, the patient was asked not to talk during the test. A warm-up period was performed before starting the test. Standard expressions were used to encourage the patient during the test. At the end of each tests, the walked distance was recorded in meters (147, 148).

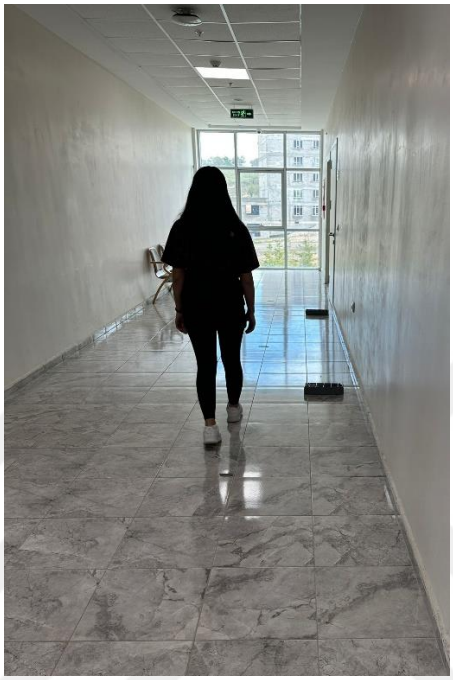


Figure 3.3: Six Minute Walk Test.

3.3.6. Timed Up and Go Test (TUG) / Mobility

The Timed Up and Go Test was developed by Podsiadlo and Richardson in 1991. Mobility and functional capacity of the participants were assessed using the TUG test. At the beginning of the test the participants sat on a standard chair with a back support. They were instructed that, on the word ‘go’, they have to stand up from the chair, walk to a mark, turn around, return to the chair and sit down again as quickly as possible. The distance between chair and mark were three meters. The participants walked without running (Figure 3.4). The score is given by the time spent on the course. The time was measured in seconds with a chronometer (149). Participants were instructed to wear comfortable clothing, not to eat two hours prior to the tests and not to take medication on the day of the evaluation (150-152).

Figure 3.4: Timed Up and Go Test.

3.3.7. Biodex Balance System (BBS) / Balance

In this study we used the Biodex Balance System SD (Biodex Medical System Inc., Shirley, USA) to evaluate balance of the individuals. The BBS is a stabilometry platform and measures three indices: the overall stability index (OSI), anterior-posterior stability index (APSI) and the medial-lateral stability index (MLSI). The OSI was determined based on the APSI and MLSI. The APSI shows the variance in foot plate displacement for motion in the sagittal plane. The MLSI measures the foot place displacement for motion in the frontal plane.

With the postural stability index the patient's ability to maintain balance was assessed. In our study, dynamic and static postural balance was measured. The test was applied with eyes open. Primarily, the platform remains static in the medial-lateral axes and anterior-posterior axes, which measures the OSI, APSI, and MLSI. Secondarily, three variables (OSI, APSI, and MLSI) of dynamic balance was measured.

The test was conducted with the participant standing on the platform, taking off her shoes (Figure 3.5). The arms were at the side of the trunk. The foot soles, toes and the heel maintained contact with the platform in both the static and dynamic postural balance test. Each test consists of three trials of 20 seconds and 30 seconds duration between each trial. In static postural balance test the participants tried to align their centers of gravity to the center of the platform. During the test, the point of the gravity was shown on the monitor.

The dynamic postural balance test involved free tilting of the platform depending upon weight shifting. The BBS calculated the average value of the three trials for each index (APSI, OSI and MLSI). A higher score indicated low balance ability (153, 154).

Figure 3.5: Biodex Balance System.

3.3.8. Fibromyalgia Impact Questionnaire (FIQ)

The Fibromyalgia Impact Questionnaire (Appx. 3) was developed by clinicians at Oregon Health and Science University in 1980 and was published in 1991 (155). The Turkish validity and reliability of the questionnaire was performed by Sarmer et al. (156). The FIQ was used to evaluate the health and functional status of the participants diagnosed with fibromyalgia (157). The questionnaire consists of 10 items and is a self-assessment scale. The FIQ measures 10 different characteristics, including physical function, well-being, pain, work status, difficulty at work, anxiety, morning tiredness, fatigue, depression and stiffness. The score range is 0-100. The maximum possible score of each sub-title is 10. Higher scores indicate low level of functionality.

The first item consists of 10 Likert-type sub-items and measures individual's ability to do tasks. Each question are scored between 0-3 points.

The answers and scores are as follows;

Always (able to do) = 0

Often (able to do) = 1

Rarely (able to do) = 2

Never (able to do) = 3 and it is measured with a Likert-type scale.

In the following two items, 'being affected by the disease' and 'not being able to go to work' are evaluated. The participant is asked to circle the number of days. The last seven items evaluates fatigue, pain, stiffness, ability to do job, depression, anxiety and morning tiredness for the past week. The participant is asked to mark the appropriate category on the 100-mm horizontal scale. Each item ranges from 0 to 10 with 10 indicates greater impairment (155-157).

3.3.9. Body Awareness Questionnaire (BAQ)

The Body Awareness Questionnaire (Appx. 4) was used to evaluate body awareness in patients and healthy individuals. The BAQ was developed by Shields, Mallory & Simon in 1989. It was developed to examine self-reported attentiveness to normal none-motive body processes. In addition, the ability to detect changes in normal functioning and the sensitivity to body cycles and rhythms were assessed. Moreover, the ability to anticipate bodily reactions were assessed. The BAQ was found to be a reliable method for measuring self-reported attentiveness to normal body processes. The test-retest reliability of the BAQ was acceptable (158). Validity and reliability of Turkish version of the BAQ was done by Karaca and Bayar.

The aim of the BAQ is to determine the normal and abnormal sensitivity level of body composition. BAQ includes 18 items. It consists of four subgroups (sleep-wake cycle, estimation of illness onset, prediction of body responses and pay attention to changes and reactions in the body process. The participant is asked to rate each statement with numbers from 1 to 7 (1=not all true for me, 7= completely true for me). The highest score to be obtained from the questionnaire is 126 points and the lowest score is 18 points. Higher total scores represents a better body sensitivity (158, 159).

3.4. Statistical Analysis

SPSS 22.0 package program (IBM Corp., Armonk, NY, USA) was used for statistical analysis of the data. Descriptive statistical information is given as mean and standard deviation (X±SD). The normality of the data was examined using visual test. Chi-square test was used to compare the percentage values obtained by counting between the two groups. Pearson Correlation analysis was used to calculate the correlation between variables, since the data were normally distributed. Independent Sample t-test was used for comparison between the two groups. Significance of the variables was accepted as p value of <0.05. In our study, the threshold values of the correlation levels were <0.2, 0.2-0.4, 0.4-0.6, 0.6-0.8 and >0.8 being very weak, weak, moderate, high and very high correlation, respectively.

4. RESULTS

Chi-square test was used to compare the percentage values obtained by counting between the two groups. There was no significant difference between the groups in terms of the descriptive characteristics of the participants. ($p>0.05$) (Table 4.1).

Table 4.1: Comparison of the Mean Values of Education Status and Work Status.

		Control Group n (%)	FM Group n (%)	Chi-square P
Education Status	Primary school	8 (24.2)	11 (33.3)	0.861[x]
	Middle school	4 (12.1)	4 (12.1)	
	High school	7 (21.2)	8 (24.2)	
	Undergraduate	12 (36.4)	9 (27.3)	
	Postgraduate	2 (6.1)	1 (3.0)	
	Doctor's Degree	-	-	
Work Status	Yes	6 (18.2)	6 (18.2)	1.000 [x]
	No	26 (78.8)	26 (78.8)	
	Retirement	1 (3.0)	1 (3.0)	

[x]:Chi-square test, *:in statistical analysis, the significance value was accepted as $p<0.05$, FM: fibromyalgia group, %: percentage, n: number of participants.

The descriptive statistics of women in fibromyalgia group and control group were assessed by the means and standard deviations. According to our findings, when the values of the FM group and the control group were compared, a statistically significant difference was found between TUG, 6MWT, FIQ and in pain variables of the 16 trigger points except the trigger point in trapezius right and left ($p<0.05$).

Table 4.2: Comparison of the Descriptive Statistics and Mean Values of Balance, Pain, Functional Capacity, Modified Borg Scale, FIQ score and BAQ score.

Variables	FM group	Control group	p-value
Age (years)	41,15±13,10	39,18±15,84	2,281
Height (cm)	161,39±6,59	162,12±4,78	1,148
Static Overall	1.4±0.96	1.30±0.95	0.62
Static A-P	0.87±0.70	0.90±0.74	0.813
Static M-L	0.91±0.81	0.72±0.71	0,309
Dynamic Overall	1.69±1.11	1.26±0.82	0.085
Dynamic A-P	1.31±0.99	0.94±0.70	0.091
Dynamic M-L	0.86±0.56	0.69±0.40	0.159
TUG (sec)	9.41±2.29	7.95±2.28	**0.012***
6 MWT (m)	440.77±112.81	503.80±98.12	**0.018***
Modified Borg Scale	1.09±1.20	0.62±0.96	0.085
BAQ score	95.12±14.55	101.66±17.25	0.101
FIQ score	62.09±12.15	25.63±10.08	**0.000***
VAS score	6,93±1,91	-	-
Pain Threshold			
Occiput (R) (kg/cm^2)	12.11±8.54	18,67±6,23	**0.001***
Occiput (L) (kg/cm^2)	12.98±8.48	17,6±7,61	**0.021***
Trapezius (R) (kg/cm^2)	19,43±11.23	23,98±11.51	0.109
Trapezius (L) (kg/cm^2)	19.25±12.11	24,28±12,50	0.101
Supraspinatus (R) (kg/cm^2)	18.86±10.53	33,61±11,58	**0.000***
Supraspinatus (L) (kg/cm^2)	20.67±10.89	33,91±12,85	**0.000***

A-P: Anterior-Posterior, M-L: Medial-lateral, TUG: Timed Up and Go Test, 6MWT: 6 Minute Walk Test, BAQ: Body Awareness Questionnaire, FIQ: Fibromyalgia Impact Questionnaire, (sec): second, (m): meter, (R): right, (L): left, kg: kilogram, cm^2: square centimeter, ± Standard Deviation; *in statistical analysis, the significance value was accepted as $p<0.05$. Independent Sample t-test was used.

Table 4.2 (continued) : Comparison of the Descriptive Statistics and Mean Values of Balance, Pain, Functional Capacity, Modified Borg Scale, FIQ score and BAQ score.

Variables	FM Group	Control Group	p-value
Cervical (R) (kg/cm^2)	1.19±3.70	9,33±3.72	**0.000***
Cervical (L) (kg/cm^2)	1.42±3.95	9.70±3.52	**0.000***
Second Costa (R) (kg/cm^2)	3.86±6.70	16.29±7.28	**0.000***
Second Costa (L) (kg/cm^2)	4.62±7.81	15.16±6.36	**0.000***
Lateral Epicondyle (R) (kg/cm^2)	15.39±34.64	33.25±13.11	**0.007***
Lateral Epicondyle (L) (kg/cm^2)	9.03±7.39	31.97±12.23	**0.000***
Knee (R) (kg/cm^2)	13.53±12.04	43,52±10.80	**0.000***
Knee (L) (kg/cm^2)	14.75±11.97	42.73±9.11	**0.000***

A-P: Anterior-Posterior, M-L: Medial-lateral, TUG: Timed Up and Go Test, 6MWT: 6 Minute Walk Test, BAQ: Body Awareness Questionnaire, FIQ: Fibromyalgia Impact Questionnaire, (sec): second, (m): meter, (R): right, (L): left, kg: kilogram, cm^2: square centimeter, ± Standard Deviation; *in statistical analysis, the significance value was accepted as $p<0.05$. Independent Sample t-test was used.

There was no statistically significant relationship between balance and body awareness with pain in FM group ($p>0.05$) (Table 4.3). Moreover, there was no relationship between balance and body awareness with functional capacity (6MWT) ($p>0.05$). A moderate positive and significant relationship was found between TUG and Static M-L ($r=0.43$, $p=0.01$) andDynamic M-L ($r= 0.40$, $p=0.02$). The relationship between right supraspinatus tender point and dynamic overall was found moderate positive ($r=0.37$, $p=0.03$). A moderate positive relationship was found between right cervical tender point and static overall ($r=0.35$, $p=0.04$). A moderate positive relationship was found between left cervical tender point and static overall ($r=0.34$, $p=0.04$). Additionally, the relationship between left cervical tender point and static A-P was found moderate positive ($r=0.36$, $p=0.04$)). The obtained results are shown in Table 4.3.

Table 4.3: The Relationship between Balance and Body Awareness with Pain and Functional Capacity in Fibromyalgia Group.

Variables		Static Overall	Static A-P	Static M-L	Dynamic Overall	Dynamic A-P	Dynamic M-L	BAQ
Occiput (R) (kg/cm^2)	r	-0,090	0,059	-0,200	-0,133	-0,092	-0,203	0,141
	p	0,617	0,742	0,264	0,460	0,611	0,257	0,435
Occiput (L) (kg/cm^2)	r	-0,211	-0,138	-0,173	-0,200	-0,179	-0,205	0,136
	p	0,238	0,443	0,337	0,264	0,318	0,254	0,449
Trapezius (R) (kg/cm^2)	r	-0,089	0,035	-0,194	-0,184	-0,153	-0,319	0,196
	p	0,622	0,848	0,280	0,305	0,395	0,071	0,274
Trapezius (L) (kg/cm^2)	r	-0,048	0,014	-0,132	-0,062	-0,001	-0,266	0,135
	p	0,792	0,938	0,463	0,732	0,997	0,135	0,455
Supraspinatus (R) (kg/cm^2)	r	0,023	0,101	0,021	0,372	0,370	0,299	-0,008
	p	0,901	0,578	0,908	**0,033***	0,034	0,091	0,964
Supraspinatus (L) (kg/cm^2)	r	-0,005	0,119	-0,053	0,258	0,255	0,157	-0,407
	p	0,977	0,508	0,772	0,148	0,153	0,383	0,794
Gluteal (R) (kg/cm^2)	r	-0,199	-0,232	-0,113	-0,194	-0,115	-0,261	0,035
	p	0,268	0,195	0,533	0,280	0,524	0,143	0,845
Gluteal (L) (kg/cm^2)	r	-0,133	-0,254	-0,007	-0,099	-0,009	-0,286	0,094
	p	0,461	0,155	0,969	0,582	0,961	0,107	0,603
Trochanter (0R) (kg/cm^2)	r	0,168	0,088	0,190	0,079	0,050	0,271	0,211
	p	0,350	0,627	0,289	0,663	0,782	0,126	0,238
Trochanter (L) (kg/cm^2)	r	0,148	0,029	0,171	-0,141	-0,137	0,013	0,189
	p	0,412	0,871	0,341	0,434	0,446	0,943	0,293
Cervical (R) (kg/cm^2)	r	0,359	0,352	0,258	0,066	0,099	0,033	-0,197
	p	**0,040***	0,044	0,147	0,715	0,583	0,857	0,272
Cervical (L) (kg/cm^2)	r	0,346	0,360	0,337	0,015	0,029	0,103	-0,178
	p	**0,049***	**0,040***	0,055	0,936	0,871	0,568	0,322
Second costa (R) (kg/cm^2)	r	0,002	0,063	-0,092	0,159	0,125	0,165	-0,154
	p	0,990	0,726	0,609	0,377	0,488	0,359	0,393
Second costa (L) (kg/cm^2)	r	-0,012	0,082	-0,140	0,078	0,043	0,101	-0,154
	p	0,949	0,651	0,436	0,667	0,811	0,577	0,391
Lateral Epicondyle (R) (kg/cm^2)	r	-0,258	-0,216	-0,188	-0,172	-0,169	-0,146	0,147
	p	0,148	0,227	0,296	0,338	0,348	0,417	0,415
Lateral Epicondyle (L) (kg/cm^2)	r	-0,259	-0,177	-0,209	-0,188	-0,212	0,045	-0,303
	p	0,146	0,325	0,243	0,296	0,237	0,803	0,086

VAS: Visual Analogue Scale, 6 MWT: 6 Minute Walk Test, TUG: Timed Up & Go Test, A-P: Anterior-Posterior, M-L: Medial-Lateral, BAQ: Body Awareness Questionnaire; sec: second, m: meter, kg: kilogram, cm^2: square centimeter, (L): left, (R): right, kg: kilogram, cm^2: square centimeter *in statistical analysis, the significance value was accepted as ($p<0.05$). Pearson Correlation analysis was used.

Table 4.3 (continued) : The Relationship between Balance and Body Awareness with Pain and Functional Capacity in Fibromyalgia Group.

Variables		Static Overall	Static A-P	Static M-L	Dynamic Overall	Dynamic A-P	Dynamic M-L	BAQ
Knee (R)	r	-0,118	-0,202	-0,042	-0,204	-0,174	-0,191	-0,020
(kg/cm^2)	p	0,514	0,259	0,818	0,254	0,334	0,287	0,911
Knee (L)	r	-0,137	-0,146	-0,108	-0,057	-0,044	-0,038	0,128
(kg/cm^2)	p	0,447	0,418	0,550	0,751	0,807	0,833	0,476
VAS score	r	0.095	0.168	-0.109	-0.259	-0.297	-0.221	0.013
	p	0.600	0.351	0.546	0.146	0.093	0.216	0.945
6 MWT (m)	r	0.003	0.030	-0.103	-0.151	-0.092	-0.246	0.008
	p	0.985	0.866	0.570	0.400	0.612	0.168	0.967
TUG (sec)	r	0.310	0.161	0.434	0.296	0.254	0.398	-0.098
	p	0.080	0.370	**0.012***	0.095	0.154	**0.022***	0.589

VAS: Visual Analogue Scale, 6 MWT: 6 Minute Walk Test, TUG: Timed Up & Go Test, A-P: Anterior-Posterior, M-L: Medial-Lateral, BAQ: Body Awareness Questionnaire; sec: second, m: meter, kg: kilogram, cm^2: square centimeter, (L): left, (R): right, kg: kilogram, cm^2: square centimeter *in statistical analysis, the significance value was accepted as ($p<0.05$). Pearson Correlation analysis was used.

In control group, a significant and moderate positive relationship was found between the trigger point right supraspinatus and BAQ (r=0.37, p=0.03). In addition, a significant and moderate positive relationship was found between right trochanter and static overall (r=0.39, p=0.02) with static A-P (r=0.35, p=0.04). The relationship between right trochanter and dynamic overall was found significantly moderate and positive (r=0.41, p=0.01). A moderate negative relationship was found between right cervical and BAQ (r=- 0.42, p=0.01). A moderate positive relationship was found between right second costa and dynamic overall (r=0.38, p=0.02). The relationship between left second costa and static A- P was moderately positive (r=0.34, p=0.04). Additionally, the relationship between left second costa and dynamic overall (r=0.40, p=0.01) with dynamic A-P (r=0.36, p=0.03) wasmoderate positive. A moderate negative and significant relationship was found between 6MWT and dynamic overall (r=-0.06, p=0.00), A-P (r=-0.63, p=0.00) and M-L (r=-0.36, p=0.03). There were significant correlations between TUG and dynamic overall (r=0.58, p=0.00), A-P (r=0.49, p=0.00) and M-L (r=0.50, p=0.00). The relationship between TUG and BAQ was found moderate positive (r=0.44, p=0.00). The obtained results are shown in Table 4.4.

Table 4.4: The Relationship between Balance and Body Awareness with Pain and Functional Capacity in Control Group.

Variables		Static Overall	Static A-P	Static M-L	Dynamic Overall	Dynamic A-P	Dynamic M-L	BAQ
Occiput (R)	r	0.087	0.203	-0,103	0,098	0,077	0,105	0,100
(kg/cm²)	p	0,628	0.258	0,570	0,588	0,670	0,560	0,580
Occiput (L)	r	-0,080	-0,009	-0,177	0,093	0,080	0,024	0,275
(kg/cm²)	p	0,656	0,971	0,324	0,607	0,656	0,893	0,121
Trapezius (R)	r	-0,007	0,000	-0,071	0,027	-0,043	0,179	0,116
(kg/cm²)	p	0,971	0,999	0,695	0,883	0,813	0,318	0,521
Trapezius (L)	r	0,031	0,072	-0,074	0,053	0,009	0,138	0,139
(kg/cm²)	p	0,866	0,691	0,680	0,768	0,962	0,444	0,442
Supraspinatus	r	-0,022	0,010	-0,046	0,253	0,237	0,162	0,375
(R) (kg/cm²)	p	0,904	0,955	0,799	0,156	0,183	0,368	**0,032***
Supraspinatus	r	-0,066	-0,062	-0,044	0,240	0,178	0,210	0,289
(L) (kg/cm²)	p	0,715	0,731	0,807	0,178	0,322	0,241	0,103
Gluteal (R)	r	0,062	0,009	0,205	-0,153	-0,147	0,009	-0,128
(kg/cm²)	p	0,733	0,962	0,252	0,396	0,415	0,962	0,477
Gluteal (L)	r	0,018	-0,055	0,212	-0,1851	-0,174	-0,008	-0,181
(kg/cm²)	p	0,922	0,761	0,235	0,312	0,334	0,967	0,313
Trochanter	r	0,392	0,356	0,257	0,417	0,325	0,308	0,018
(R) (kg/cm²)	p	**0,024***	**0,042***	0,148	**0,016***	0,065	0,081	0,920
Trochanter	r	0.325	0,322	0,234	0,160	0,181	0,035	0,025
(L) (kg/cm²)	p	0,065	0,970	0,190	0,373	0,315	0,849	0,889
Cervical (R)	r	0,166	-0,007	-0,106	-0,234	-0,217	-0,173	-0,423
(kg/cm²)	p	0,356	0,278	0,558	0,190	0,226	0,336	**0,014***
Cervical (L)	r	0,181	0,088	0,120	0,213	0,238	0,067	0,068
(kg/cm²)	p	0,313	0,626	0,505	0,233	0,183	0,711	0,706
Second costa	r	0,282	0,305	0,095	0,381	0,339	0,239	-0,066
(R) (kg/cm²)	p	0,111	0,084	0,601	**0,029***	0,054	0,180	0,717
Second costa	r	0,341	0,347	0,150	0,407	0,368	0,244	-0,204
(L) (kg/cm²)	p	0,052	**0,048***	0,404	**0,019***	**0,035***	0,172	0,895
Lateral	r	-0,155	-0,013	-0,187	-0,165	-0,093	-0,082	-0,004
Epicondyle	p	0,388	0,944	0,298	0,358	0,605	0,649	0,981
(R) (kg/cm²)								
Lateral	r	-0,193	-0,048	-0,204	-0,220	-0,134	-0,131	-0,014
Epicondyle	p	0,281	0,789	0,254	0,219	0,459	0,467	0,938
(L) (kg/cm²)								

VAS: Visual Analogue Scale, 6 MWT: 6 Minute Walk Test, TUG: Timed Up & Go Test, A-P: Anterior-Posterior, M-L: Medial- Lateral, BAQ: Body Awareness Questionnaire; sec: second, m: meter, kg: kilogram, cm^2: square centimeter, *in statistical analysis, the significance value was accepted as ($p<0.05$). Pearson Correlation analysis was used.

Table 4.4 (continued) : The Relationship between Balance and Body Awareness with Pain and Functional Capacity in Control Group.

Variables		Static Overall	Static A-P	Static M-L	Dynamic Overall	Dynamic A-P	Dynamic M-L	BAQ
Knee (R)	p	0,198	-0,060	0,425	0,127	0,049	0,222	-0,324
(kg/cm^2)	r	0,268	0,740	0,140	0,481	0,786	0,214	0,066
Knee (L)	r	0,176	-0,071	0,419	0,104	0,050	0,162	-0,280
(kg/cm^2)	p	0,327	0,693	0,150	0,563	0,783	0,368	0,115
6 MWT (m)	r	-0.307	-0.157	-0.208	-0.654	-0.639	-0.362	-0.265
	p	0.082	0.384	0.245	**0.000***	**0.000***	**0.038***	0.136
TUG (sec)	r	0.190	0.179	-0.016	0.589	0.495	0.509	0.448
	p	0.290	0.318	0.930	**0.000***	**0.003***	**0.002***	**0.009***

VAS: Visual Analogue Scale, 6 MWT: 6 Minute Walk Test, TUG: Timed Up & Go Test, A-P: Anterior-Posterior, M-L: Medial-Lateral, BAQ: Body Awareness Questionnaire; sec: second, m: meter, kg: kilogram, cm^2: square centimeter, *in statistical analysis, the significance value was accepted as ($p<0.05$). Pearson Correlation analysis was used.

5. DISCUSSION AND CONCLUSION

The study was designed to investigate the relationship between balance and body awareness with pain and functional capacity in women with fibromyalgia.

The results of our study showed that FM had negative effects on TUG, 6MWT and certain trigger points on both sides. These trigger points are as follows; occiput, supraspinatus, gluteal, trochanter, cervical, second costa, lateral epicondyle and knee. In addition, a relationship was found between static and dynamicbalance with pain score in some trigger points and functional capacity in FM. Moreover, it was observed that FM negatively affects the relationship between body awareness and painwith functional capacity.

Recent studies performed in the general population showed a strong association between FM and education status (3, 88, 161). Several studies have found a prevalence of low educational level in FM patients (161-163). Mas et al. (164) estimated the prevalence of FM and some descriptive epidemiological data from the general population. They stated that FM is associated with a low educational level and to a low social class. Theprevalence of FM increased among persons with no studies or elementary level, while the prevalence decreased among persons with studies at university level. The rate of primary school level in individuals with FM was significantly higher than school oruniversity level (3, 88, 161). Our results were similar to the literature, a predominance oflow education status especially a high rate of elementary status was found in FM group.

The prevalence of fibromyalgia was found to be 4.4% in the population with a low socioeconomic level in Sao Paulo, Brazil (1). In the study of Senna et al. (165), nearly 70% of the patients with FM were classified in the intermediate socioeconomic level. The study by Mas et al. (164) found that the prevalence of active workin individuals with FM was lower compared with general population, the rate of housewives among FM cases were high. Moreover, the proportion of unemployed among FM individualsand with temporary work disability was higher than that of the general population.

Another reason for unemployed individuals with FM may be the low rate of active work, loss of work due to sick leave. Studies have shown that individuals with FM stopped working 5 years after FM onset (2). The study by Cobankara et al. (166) found that FM is high present in workers with lower income levels. Low income may lead to leave work so the rate of unemployed FM individuals is increasing. Previous studies stated that FM mayhave negative impact on productivity of workers (167, 168). In line with these findings, in our study the majority of patients were not working and therefore common symptoms ofFM such as widespread pain, cognitive disorder and psychological disturbance may lead toloss of work status.

When the studies in the literature on people with FM are examined, it is stated that the incidence of FM and those diagnosed with symptomatic FM are at the highest rates in adults aged between 30-50 years (165). Senna et al. (165) estimated the prevalence of rheumatic diseases of 3038 people. The highest prevalence was found in the group aged 35-54 years, the mean agewas 43.29 years. The study of Mas et al. (164) reported that FM is significantly more frequent in the 40-49 years interval. Cobankara et al. (166) found that the prevalence of FMwas significantly higher in the middle aged population. White et al. (169), concluded that the incidence of FM is increasing with age. In line with these findings, in our study the average age of patients was 41,15±13,10 years in FM group. Therefore the incidence of fibromyalgia may increase with higher age.

There was no significant difference between the FM group and the control group in terms ofage, education level and employment status. The homogeneity in the age, educational status,and work status of the individuals in both groups provided a significant advantage for the gains and comparisons obtained as a result of the evaluation. In conclusion, the clinical picture of FM were generally similar to those previously reported in the literature. FM prevalence was found higher at higher ages, at the lower education status and work status.

A correlation between balance disorder and increased fall risk in female FM patients was reported. In addition, a higher frequency of falls was found in FM patients with reduced balance than healthy subjects (170). Another study evaluated balance,fall risk and the fall clinical parameters related to fall risk in female patients with FM. Pain was measured by VAS. Balance and fall risk were measured by Berg Balance Scale. It was reported that Berg Balance score were significantly lower in FM group than in the control group (171).

The study by Jones et al. (172) assessed the balance ability and fall frequency on 34 patients with FM. They showed that FM is associated with balance disorder and increased fall incidence compared to healthy controls. Moreover, it was reported that FM has a negative effecton gait (173). Chronic pain is one of the FM symptoms which may trigger a process of central sensitization. One study reported that central sensitization is present in FM patients. These process may be a factor for lack of balance which could affect the information process from postural afferences. Additionally, the development of neuromuscular strategies to maintain balance was affected (18). Other studies reported that visual and vestibular scores were significantly lower in patients with FM compared to healthy individuals. This situation may led to difficulties in maintaining balance (174, 175). Another explanation for the lack of balance may be a significant decrease in the volume and density of CNS gray matter (176). Apart from the findings provided by previous studies, the study by Thorpe et al. (177) reported that balance problems were seen secondary to drug treatment in FM patients. Contraryto our study a significant difference between balance and fibromyalgia was not found. The reason for different finding may be that previous studies assessed either static balance or dynamic balance. Additionally, different assessment tools for balance was used. Previous studies used 8FGT, OLST, TUG to assess balance (18), while in our study BBS was used. Balance disorder could be related with the increase in pain (173), while the participants in our study were referred directly after newly diagnosed without taking any drug. Since the patients are in the early stage of FM, the Central Nervous System may not be affected.

The study by Costa (178) evaluated functional performanceand kinematic parameters of gait in female FM patients. It was reported that FM patients took more time to get-up and to walk 3 meters in comparison with pain-free participants. Disturbances in the motor control system may lead to an increased fall risk. The study by Tavares et al. (179) compared functional and isokinetic performance between female FM patients and healthy women (n=40). Functional performance were assessed by TUG, 6MWT, Sit and Reach Test, Chair Stand Test. It was reported that TUG and 6MWT scores were lower in FM group than in the control group. In accordance with the literature, we found that FM has an effect onmobility and functional capacity. Our results showed significant difference in TUG score between FM patients and healthy subjects. In line with the literature, FM patients took moretime to stand up and to walk. It was reported that TUG is significantly related to pain (180). Widespread pain in trigger points in patients may had a negative affect on TUG score.

Chronic pain is a common symptom of FM, therefore, patients may be afraid to exacerbate their pain when performing movements with maximum effort. They could demonstrate kinesiophobia (179). Further studies showed that 6MWT score were lower in FM than in healthy control group (130, 179, 181). Studies have conducted that reduced walking speed is present in women with FM which may be related to bradykinesia and to decrease in cycle frequency and stride length. In addition, it is suggested that FM patients may use their hip flexors instead of their ankle plantar flexors which may led to altered functional performance in FM patients (178). Costa et al. (178) showed less distance walked in 6MWT in FM patients than participants without pain. It was reported that step length, gait velocity, stride length, cadence, percentage of single support, are significantly reduced, and gait duration is significantly increased as compared with subjects without pain. Generalized pain may limit the single support of the body with that an increaseof the double support time occurred. Aparicio et al. (182) compared functional capacity in obese control women with obese FM patients. Totally 316 participants were included in thestudy. Functional capacity tests were worse in obese FM patients than obese control group. Loss of function may be strongly associated with work disability in FM patients (178). In accordance with the literature, we found that FM has an effect on functional capacity. Our results showed significant difference between patients with FM and healthy controls forfunctional capacity measurement. FM patients showed poor 6 MWT scores as compared with healthy subjects. Patients with FM may be fearful of movement and activity (183, 184). Generalized pain in patients may limit walking and decrease stride length, cycle frequency and step length. During gait more attention of postural stability and balance is required, therefore, patients with poor balance may show a slowing of walking. Moreover, the work status of the participants may led to loss of function.

The evaluation and improvement of BA is beneficial inindividuals with FM, pain, sleep problems, chronic fatigue, balance disorder and depression(185). Since neurological and orthopedic diseases, genetic disorders, traumas has an affect on sensory and motor development, BA is also negatively affected (19, 186). Pain presencemore than 3 months was defined as chronic pain. Individuals experience complications, andhave decreased physical or mental function. This situation leads to behavioral changes that are reflected in the body language and communication of the patient (185). A pilot study byKendall et al. (187) applied BAT in FM patients and compared it with the Mensendieck system (MS).

The aim of BAT was to raise body consciousness, to increase body management and daily functional capacity. It was reported that the results in BAT group were lower than MS group. In general, focus on emotion is important in BAT. The patients have to become awareof emotions in the body. With the encouragement of physiotherapist, patients may be awareof the emotions and sensations. Learning to express emotions may increase self-awareness and may lead to produce self-help of patients (19). The study by Russek and Fulk (184) reported that FM patients have problems in postural control, sensory cortex and balance, BAT provides stability in the vertical axis by improving balance (188). Contrary to the literature, in our studya significant difference in BAQ score was not found between FM group and control group. A change in the body's response was not found in FM group. In our study, patients with neurological disorder and orthopedic problems were not included which may be the reason for our finding. In our study, the patients were seen for the first time for evaluation and therefore, patients could not express themselves completely. Another explanation may be that there was no difference in balance between FM group and control group, with that BA may be not affected.

The sociodemographic features of the participant has an effect on FIQ score (169). It was reported that higher age, work, no depression, high educational status and lower degree of illness was associated with lower FIQ score such as increased daily functional level and lower symptoms in FM patients (189). Another study showed that low socio-economic status are associated with FM (190). Tangen et al. (189) examined theassociation between pain acceptance and its impact on function and symptoms in patients with FM. An association between higher levels of pain acceptance and less pain, higher level in daily functional activities, better social, emotional and physical functioning was found. Moreover, a positive effect of pain acceptance on other co-occurring symptoms was reported. Seto et al. (193) examined the role of personality, fibromyalgia impact and health related outcomes in patients with FM. Moreover, anxiety and depression were also tested to show the effect on personality on FM impact. Worse health outcomes represented a high level of FM impact, symptom severity, depression, anxiety and stress. Depression was significantlyassociated with FM impact. Previous studies showed that certain personality trait are associated with depression and anxiety (191, 192). Personality may be associated with the clinical symptoms of FM impact. Personality may lead to the development of mood disorders, therefore, it may impair patients' ability to cope with theirFM symptoms (193).

In addition, the high level of neuroticism were significantly associated with higher score in FM impact. An association between high neuroticism and high levels of anxiety, depression, symptom severity and low QoL was also found (193). In accordance with the literature, in our study theFIQ score of FM group was significantly higher as compared with the control group. This result of FIQ score was expected. Due to higher level of pain, the FM impact may be higher.

The study by Wennemer et al. (194) assessed disability and function before and after treatment in 23 FM patients. While an improvement in physical function and 6MWT was found, a change in perceived exertion measured by Borg scale was not reported. A randomized, single-blind clinical trial was conducted to show the effects of non-pharmacological treatment on different parameters such as pain, flexibility, balance, QoL including Borg scale. A total of 141 women with FM were divided into three groups and randomized to exercise programs or to control group. A statistically significant change in perceived exertion measured with the Borg scale was not reported (195). The cross-sectional case-control study by Nielens et al. (196) evaluated cardiorespiratory fitness and perceived exertion in FM patients. They reported that the cardiorespiratory fitness of female FM patients seems to be normal than control group, therefore, aerobic fitness may be not the first goal of therapeutic programs. The intensity of perceived exertion in female FM patients were higher than healthy subjects. Overlapping of exertion and peripheral pain in FM patients may be the reason for it. Another randomized control study (197) evaluated the effect of high and low intensity aerobic fitness training in thirty-seven female FM patients at the beginning and after 20 weeks of training. The perception Borg score was not changed during the study. In our study, a negative impact of FM on Borg scale was not observed. A significant difference between FM group and control group was not found.-In the literature, Borg scale was predominantly used in exercise programs on FM patients and was measured to show participants' perceptions of effort during exercises (195, 198, 199).

Many studies about the relationship of tender points to chronic painful phenomena were present and were of great importance in the literature (200-203). Literature showed that tender points are particular in some diseases or may be the cause of some disorders. Moreover, at tender points, there is a physiological and anatomical abnormality (202). The study by Tunks et al. (204) reported a significantly lower tenderness thresholds of tender points in FM patients than healthy subjects. It may be due to slight differences in angle of the examiner's approach or due to slight postural movement of the participant.

The study by Scudds et al. (205) on 20 FM patients reported that the pain tolerance and thresholdto tenderness was lower than normal controls. Didier Maquet et al. (206) evaluated the 18 tender points in their study with algometer and reported lower cutoffs in 14 tender points inFM group than control group. The lowest scores were present in trapezius, second rib, occiput and anterior cervical. Another study reported an average of 15,4±2,3 tender points present in FM group. Moreover, the values of pain measured by algometer were significantly lower in FM patients than control group (6). The literature about the finding is fully in accord with clinical experience and observation that the pain threshold in tender points of patients with FM could be significantly lower than healthy subjects (200, 201, 203). In line with these findings, the results of our study showed that FM had negative effecton trigger points. Our results were similar to the literature, the effected number of tender points were more in FM patients. In left and right trapezius, a significant difference was notfound between the groups. The reason may be that tender points are inherently tender not only in patients with FM but also in healthy subjects. The tenderness may be due to different sensitivity to stimuli of various tissues. The FM patients in our study may had a low pain threshold, and therefore, they experienced more pain. We were of the opinion to evaluate each person individual and to give the averaged data from all points due to high rate of variability in tenderness between both sides of the body and between the tender points in FM (204). Moreover, when examining the participants, the angle of the examiner's approach and postural stability of the participant are important which can make a difference.

Pain and Balance

Different results have been reported in literature on pain and balance in patients with fibromyalgia. Santo et al. (207) in a pilot study researched the association between balance and pain in FM and found a negative correlation between themin FM group (r=-0,48, p=0.020). Ulus et al. (208) included 60 FM patients and 30 healthy subjects in their study. Pain was evaluated by using VAS and balance was assessed by usingthe one-legged balance test (open eyes) in addition with the Berg Balance Scale. No significant correlation between pain and balance was showed in FM patients. In another study, a correlation between VAS and one-legged balance test was not found in women with and without FM (130).

In a study by Jones et al. (209) a relationship between balance disorder with poor strength, dyscognition, lower-extremity myofascial trigger points, and medication use was reported. Previous studies showed that there is a relationship between pain acceptance and impact of illness in FM. It was reported that higher levels of pain acceptance is related withbetter day-to-day functioning and decreased disability and symptoms (189). An increase in function and decrease in pain related to pain acceptance in fibromyalgia (210). In line with these findings, in our study a correlation was not found between pain and balance in FM group. Patients with FM may have accepted their pain, and therefore, a negative affect of pain on balance could not found.

Studies about the relationship between pain threshold andbalance in healthy subjects was found. Previous studies have shown the negative effect of musculoskeletal pain on physical functioning. The study by Yagci et al. (211) observed the relationship between balance performance and musculoskeletal pain in lower body among healthy adults. The effect of pain on balance was analyzed in subjects with pain and no pain.Results showed that there was no significant difference between the groups. Moreover,some studies showed a common prevalence of balance problems and musculoskeletal pain in the older population (212, 213). It may be due to normal aging process and loss of sensory elements and therefore loss of musculoskeletal function is present. Balance problems are common in elderly people and gait disorder is a common risk factor for falls in them (211). One study shows an association between fall factors and aging process including movement, cognitive and attention deficits (215). Complaints of disequilibrium isincreasing with age (216). Daubney and Culham (217) reported the disorders which may affect balance, these are cerebral, cerebellar, spinal cord disorders, postural hypotension, psychological factors, cerebrovascular disease, musculoskeletal disorders, intervertebral disc disorders. In our study, a statistically significant correlation was not found between pain and balance in control group. In accordance with the literature, the participantsreported low trigger point pain intensity. A successful aging may have positive effect on maintaining function and minimizing suffering.

Pain and Body Awareness

In the literature, there are less studies on BAQ and pain in FM and therefore comparisons are made with studies on BAT.

The study by Trainer et al. (218) on 339 patients with FM, predominantly women, reported that higher level of general psychological acceptance of FM is associated with better functioning. Another study by Lami et al. (219) observed a significant relationship between catastrophizing and pain and depression/anxiety. A lower prevalence of anxiety, functional impairment and depression was correlated with higher pain acceptance. The cross- sectional study by Rodero et al. (210) reported an increase in function and decrease in pain relatedto pain acceptance in FM patients. A randomized controlled study was conducted about the effect of BAT on FM in 52 women. Participants were randomly allocated in two groups. Both treatments, physiotherapy and BAT, had the same effect on pain intensity. When comparing the follow up results, a significant difference in pain was not reported (220). Apart from these studies, the argument of McCracken and Ecleston (221) is that level of pain, social or mood setting at the time of assessment may influence the way a patient responds to self-report questionnaires. This could lead them to fill the questionnaire consistently on separate measures which does not report the reality. In line with these findings, a significant correlation was not found between pain and body awareness in FM group. Participants may accepted their pain level and the measurement maybe applied at that time where participants felt no pain and their mood were well. For this reason, we think that the evaluation in patients with fibromyalgia should not be done in a single day. This process can be spread out over days. Additionally, most of the studies evaluated on different gender and in different countries which may be the reason we found a different result. In our study, only women participants were included and therefore the groups are homogeneous and specific.

Studies showed positive effects of BA increasing methods on pain severity in healthy individuals (9, 222. The study by Mehling et al. (11, 118) reported a positive effect of BA on chronic pain. Another study reported a decrease in low back pain and anxiety level with BAT. Erden et al. (225) assessed the relationship between BA and pain intensity among healthy people. 100 participants predominantly women aged between 20-40 years without any disease were included. Mean age was 36,88±10,45 years.They concluded that pain intensity and emotional status effect indirectly the body awareness. In our study, a statistically significant correlation was only found between right supraspinatus trigger point and BA in control group. In line with these studies, it was expected that pain threshold scores were low and with that the BAQ score were high in the control group.

Functional Capacity (6MWT) and Balance

Another condition investigated in this study was the relationship between functional capacity and balance. It is suggested that the distance walked during the 6MWT reflects the ability to performed daily life activities, as these activities are performed at submaximal levels (226). The distance walked can be limited by several types of diseases. Patients with increased mortality and morbidity disorders has walked less than 335m during the 6MWT. In contrast, patients with milder forms of disorders walked more than 500 m (227). Enright and Sherrill (228), in their study with a total of 290 healthy subjects found an average of 576m distance for men and 494m distance for women. They reported that anthropometric data such as age, height, and weight were independently associated with the distance walked for men. Studies showed a high correlation between 6MWT with heart rate, SaO2 and workloads compared with different tests. The reduction of muscle mass and strength, and the increased prevalence of diseases with aging could be the reason for low distance walked in elderly people (228). The cross-sectional study by Homann et al. (226) found that FM patients walked significantly shorter distances as compared with the control group. A negative correlation between 6MWT score and FIQ, QoL and Health Assessment Questionnaire (HAQ) was reported. Moreover, it was observed that the pain intensity was increased during the 6MWT in the FM group. Other authors reported that there is a moderate to strong correlations between 6MWT and FIQ (226). Another study reported an association between tender points and 6MWT. Moreover, an association of algometer score with 6MWT was observed (229). Notaro et al. (230) assessed balance (Berg Balance Scale) and functional capacity (6MWT) of FM patients' with and without migraine and reported no difference between two groups. In accordance with the literature, 6MWT can be conducted in different diseases including FM. In our study, a statistically significant relationship was notfound between functional capacity and balance in FM group. The observed findings of this study may be due to different sample size, gender and population diversity. Our results weresimilar to the literature, the distance walked of FM patients was lower than the control group.It is reported that FM patients showed exercise intolerance. Mostly pain after exercise program was reported. It may be a challenge for patients to participate in functional capacity measurement. Another reason for the relatively low walking distance may be the lack of practice of participants. They had perform it for the first time.

The study by Foley et al. (231) showed that age, pain, stiffness and functional capacity were also correlated with fall risk among women in the age range of 50-80 years. Özsoy et al. (232) reported that a significant positive correlations were present between balance, functional exercise and peripheral muscle strength in individuals. They concluded that balance disorder is associated with low functional exercise capacity. Moreover, elderly individuals with higher aerobic performance had better postural balance. Another study reported a significant relationship between 6MWT and TUG, Tinetti and BBS (232). Özalp and Algun (233) conducted balance and physical performance in prisoner and non-prisoner males. When both groups were compared, a statistically significant difference was found between the groups in the distance of 6MWT and BBS score ($p>0.05$). When both groups were assessed according to 6MWT scores, a statistically significant difference were found ($p<0.05$). The 6MWT scores of the prisoner group was significantly better as compared with the non-prisoner group. Long time walking of the prisoner may be the reason for better 6MWT scores. The study by Uyar (234) found a significant correlation between the physical activity levels and static balance; a significant correlation was found between the distance walked in total and static balance ($p<0,05$). In our study, a significant correlation was found between functional capacity and dynamic balance in the control group. Our results were similar to the literature, the score of age, pain, stiffness were low and the score of 6MWT were high with that balance performance were good in the control group. As a result, our result showed that FM negatively affects the relationship between functional capacity and dynamic balance.

Functional capacity (6MWT) & Body Awareness

Similar to our study, studies examining the relationship between functional capacity and BA in FM patients could not found in the literature. Studies examining the relationship between functional capacity and BAT were present and therefore comparisons were made with studies on BAT. The effect of psychological factors on motor disturbance in chronic pain is still unknown. It is assumed that catastrophizing and fear of pain, avoidance of pain exacerbate activities and hypervigilance might lead to reduce physical activity. In addition, it might contribute to alteration in gait and balance parameters such as muscle weakness, slowing of walk, shortening of step length, higher activity of trunk muscle or shortening of stride time (235, 236). Previous studies on patients with musculoskeletal pain and FM reported an increase in QoL and movement with BAT (237).

The study by Costa (178) on 26 female patients with FM and control subjects found that FM groupexhibited objective alterations in balance and gait. These conditions were associated with pain, fatigue, anxiety, depression and stiffness. They suggested that deficit in balance and gait may also be associated with subjective FM complaints. Body sway was positively associated with anxiety and pain intensity. In our study, a significant correlation was not found between functional capacity (6MWT) and BA in FM group. The general health status according to sleep-wake cycle, body reactions and responses to BAQ might be not affected due to be diagnosed for the first time. As the patients were in the early stages in our study, an association between functional capacity and BA could not reported.

Body awareness defines the ability to identify the body and perceive the body's sensory, physiological and physical stimuli. Individuals with good perception ability shows decreased pain values, better emotional status and less depressive symptoms. A higher BA score is in relationship with high energy status and well health status. The study by Erden et al. (225) showeda positive relationship between BA status and QoL and general health status in healthy subjects. Housework, sports, and activities at school can be seen as different forms ofphysical activity. Exercise and physical activity have positive effects on body composition and energy balance. Moreover, it was reported physical activity has positive effects on mood, self-esteem and BA. One study investigated the relationship between BA and physical activity, depression, and QoL in 378 healthy adults aged 18-30 years. Participants with high BA had a higher QoL (240). The study by El Ansari et al. (241) concluded a positive correlation between BA and physical activity level. Another study on women reported low level of physical activity in women with low BA (240). In our study a significant correlation wasnot found between functional capacity and BA in control group. The general health status and pain level were better in the control group, and therefore a high BAQ score was not expected. When the results of both groups were compared, our study showed no affect of FM on relationship between functional capacity and BA.

Functional Capacity (TUG) and Balance

Previous studies showed an impaired dynamic balance in FM patients as compared with the control group (181, 182, 242). Ulus et al. (208) showed a significant difference between FM patients and30 healthy controls with regard to static balance.

The scores in FM were worse as compared with control group. The study by Roman et al. (243) observed the effect of functional training on different parameters including static and dynamic balance. A significant improvement in dynamic-balance was reported. The cross-sectional study by Cerón-Lorente et al. (244) assessed the influence of dynamic and static balance on physical activities at different times on 34 patients with FM. An impaired balance and low level of functional performance was reported in women with FM. Work physical activity was related to the impaired dynamic balance. Moreover, Costa et al. (178) observed an impaired balance in FM patients. They reported a significant difference between FM group and control group on body sway in the medial-lateral and anterior-posterior axes. Some parameters of balance and gait were associated with pain, depression, stiffness, fatigue and anxiety in FM. Disturbances in the motor control system may be the reason for it.Chronic pain reduces muscle strengths of women with FM. Deficits in lower limb in patientswith FM was reported. Reduced muscle strengths may lead to difficulties in maintaining balance performance (242). In the literature, a worse lower-body muscle strength and balance were found in FM patients. Moreover, peripheral and central components of balance may be affected in FM patients. Balance disorder could be related to proprioception, deficits of muscle strength, and vestibular function (245). Altered somatosensory inputs to the CNSand multiple pain processing dysfunctions may be the negative effect of FM on dynamic balance (209). In our study, a significant and positive correlation was found between functional capacity (TUG) and static M-L and dynamic M-L balance in FM patients. In accordance with the literature, the balance scores may be worse in FM group than the controlgroup due to high pain level. Moreover, decrease in lower limb muscle strength in FM patients could lead to both, the balance disorder and decreased functional capacity. According to the literature proprioception and vestibular function may also have an effect on functional capacity and balance.

The study by Herman et al. (246) showed a relationship between functional capacity (TUG) and cognitive ability in their study on 265 healthy adults. In addition, an association was found between digit span and verbal fluency and the TUG. Moreover, the turning and transferring components of the TUG are of cognitive resources and makes the task more complex. The time of TUG test above 13.5s may be a good indicator of decreased mobility for healthy elderly subjects. Another study found that TUG score was lower in individuals with anxiety, and therefore the time to complete the task were higher.

Balance disorder and reduced muscle strength may result in reduced gait speed(247). The randomized cross-sectional study by Lopes et al. (248) showed a moderate correlation between TUG and dynamic balance in their study on 147 healthy adults, predominantly women. In addition, a statistically significant correlation was found between fear of falling and TUG with balance and age was conducted. Some authors reported that the fear of falling may be related to simultaneously recruitment of the agonist and antagonist muscles, and with this insecurity, abnormal gait, postural rigidity can be seen. Moreover, it was reported that there was an association between deficits in lower-limb strength with restrictions to physical activity. These restrictions were correlated with decreased maximal muscle strength and low physical performance. Another author reported that balance was an important parameter for stability and to maintain a standing position (248). In our study, in both groups, FM and control group, a statistically significant relationship were found between functional capacity (TUG) and balance. In accordance with the literature, balance performance and TUG score of the control group were better as compared with the FM group. The higher balance performance may be related to high muscle strength which lead to increased gait speed. Our results were similar to the literature, due to increased gait speed, the TUG test could be done in short time.

Functional Capacity (TUG) and Body Awareness

In the literature, there are less studies on body awareness and functional capacity in FM, and therefore our results are compared with studieson BAT. Anderson et al. (249) reported that follow-up psychomotor physiotherapy based on BA training might lead to improvement in symptoms. Additionally, the rate of returning to work was high in individuals with widespread pain. The study by Bravo et al. (188) reported thatBAT therapy lead to significant improvement in pain, movement and anxiety in FM patients.The research by Russek and Fulk (184) showed that BAT might lead to an improvement in balanceand efficacy of the motor muscles and with this a vertical axis stability is provided in FM patients. Moreover, Skjaerven (188) reported an improvement in bio-psycho-social andphysiological aspects with BAT. As in BAT daily life movements are integrated, FM patientscould learn how to handle FM symptoms and develop strategies. Another study showed the positive effect of BAT on physical function, pain and social function than exercise therapy in individuals with chronic whiplash-associated disorder (250).

Yılmaz et al. (251) compared the effect of BAT on balance with conventional treatment in individuals with chronic neck pain. As a result of the study, one treatment was not superior to the other in terms of balance. The exercises for discovering the stability limits, weight transfer and balance performed in the BAT might be more compatible with the Sensory Organization Test (SOT) which was used to assess balance performance of the participants. Apart from these studies, one study examined the body awareness interventions (BAI) in FM and chronic fatigue syndrome. It was found thatBAI had positive effects on FIQ score, pain, depression and anxiety (252). In our study, a statistically significant correlation between functional capacity (TUG) and body awareness in FM patients was not found as compared with the control group. As the patients in our study were diagnosed for the first time, both parameters, functional capacity and body awareness, may not affect each other. Body process including body reaction, onset of illness and body cycles might be not worse in FM group, as FM patients at theearly stages were included in our study. Contrary to the literature, in our study only female patients were included and therefore the results cannot be generalized to all individuals withFM. Due to low pain intensity, the sensitivity to body rhythms and body reaction may be notaffected in control group, and therefore the time to complete the TUG test were shorter andthe BAQ score were higher.

Limitations of the study

Some limitations can be found in this study. Recommendations for future work;

- In this study, the relationship between balance and body awareness with pain and functional capacity in women between the ages of 18-65 was examined. In future studies, the results may be evaluated on different age groups.
- This study was conducted just only in women because of the significant high rate ofFM in female patients. The generalization of the results to men with FM should be avoided. Moreover, the sex may affect the results and thereforethis study could be done in different specific populations.
- In this study, we used field tests to determine the functional capacity levels of individuals. Laboratory-based tests can be used to obtain more objective data.

In summary; this study is the first study in the literature investigating the relationship between balance and body awareness with pain and functional capacity in women with fibromyalgia.

As a result of the study, it was found that FM has a negative impact on functional capacity. Additionally, pain threshold level was found very low in FM patients. In general, scores of all parameters were worse in FM patients. As functional capacity and balance are related to each other, these parameters should be considered when evaluating and planning rehabilitation programs to improve functional capacity and balance in FM. In particular, TUG test and static M-L and dynamic M-L balance may be considered to include in the assessment of FM patients.

Moreover, in our study it was found that pain in current trigger points and balance are related to each other. Particularly right supraspinatus and dynamic overall balance; right cervical anterior and static overall balance; right cervical anterior with static overall and static A-P balance. These data will assist decision-making efforts in the evaluation and diagnosis of FM. This study will help in the appropriate selection and application of evaluation methods and use of devices. Fibromyalgia is not yet fully understood, studies are needed for our understanding of the most effective ways to improve health in the world population. It is of great interest to find out more about the factors which can influence FM. In addition, our findings needs to be considered when clinically assessing FM patients and planning rehabilitation programs for them and appropriate measurements should be performed.

REFERENCES

1. Queiroz LP. Worldwide epidemiology of fibromyalgia. Curr Pain Headache Rep. 2013;17(8):356.

2. Sarzi-Puttini P, Giorgi V, Marotto D, Atzeni F. Fibromyalgia: an update on clinical characteristics, aetiopathogenesis and treatment. Nat Rev Rheumatol. 2020;16(11):645-60.

3. Topbas M, Cakirbay H, Gulec H, Akgol E, Ak I, Can G. The prevalence of fibromyalgiain women aged 20-64 in Turkey. Scand J Rheumatol. 2005;34(2):140-4.

4. Arnold LM, Clauw DJ, Dunegan LJ, Turk DC. A framework for fibromyalgia management for primary care providers. Mayo Clin Proc. 2012;87(5):488-96.

5. 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(2):160-72.

6. Çetin N, Yalbuzdağ ŞA, CabioŞlu MT, Turhan N. Fibromiyalji Sendromunda Yaşam Kalitesi Üzerine Etkili Faktörler. Turkish Journal of Rheumatology. 2009;24(2):13-29.

7. Kwiatek R. Treatment of fibromyalgia. Aust Prescr. 2017;40(5):179-83.

8. Offenbächer M, Stucki G. Physical therapy in the treatment of fibromyalgia. Scand JRheumatol Suppl. 2000;113:78-85.

9. Apel U. The Feldenkrais method: awareness through movement. WHO Reg Publ EurSer. 1992;44:324-7.

10. Gard G. Body awareness therapy for patients with fibromyalgia and chronic pain. Disability and rehabilitation. 2005;27(12):725-8.

11. Mehling WE, Gopisetty V, Daubenmier J, Price CJ, Hecht FM, Stewart A. Bodyawareness: construct and self-report measures. PLoS One. 2009;4(5):e5614.

12. Gyllensten AL, Hui-Chan CW, Tsang WW. Stability limits, single-leg jump, and bodyawareness in older Tai Chi practitioners. Arch Phys Med Rehabil. 2010;91(2):215-20.

13. Gyllensten AL, Skär L, Miller M, Gard G. Embodied identity--a deeper understanding of body awareness. Physiother Theory Pract. 2010;26(7):439-46.

14. Collado-Mateo D, Gallego-Diaz JM, Adsuar JC, Domínguez-Muñoz FJ, Olivares PR, Gusi N. Fear of Falling in Women with Fibromyalgia and Its Relation with Number of Falls and Balance Performance. Biomed Res Int. 2015;2015:589014.

15. Sarıhan K, Uzkeser H, Erdal A. Evaluation of balance, fall risk, and related factors in patients with fibromyalgia syndrome. Turk J Phys Med Rehabil. 2021;67(4):409-15.

16. Jones CJ, Rutledge DN, Aquino J. Predictors of physical performance and functional ability in people 50+ with and without fibromyalgia. Journal of aging and physical activity. 2010;18(3):353-68.

17. Carbonell-Baeza A, Aparicio VA, Sjöström M, Ruiz JR, Delgado-Fernández M. Pain and functional capacity in female fibromyalgia patients. Pain Medicine. 2011;12(11):1667-75.

18. Núñez-Fuentes D, Obrero-Gaitán E, Zagalaz-Anula N, Ibáñez-Vera AJ, Achalandabaso- Ochoa A, López-Ruiz MDC, et al. Alteration of Postural Balance in Patients with Fibromyalgia Syndrome-A Systematic Review and Meta-Analysis. Diagnostics (Basel). 2021;11(1):258-272.

19. Gard G. Body awareness therapy for patients with fibromyalgia and chronic pain. Disabil Rehabil. 2005;27(12):725-8.

20. Eisinger J. [Clinical evaluation of fibromyalgia]. Rev Med Interne. 2003;24(4):237-42.

21. Ughreja RA, Venkatesan P, Balebail Gopalakrishna D, Singh YP. Effectiveness of myofascial release on pain, sleep, and quality of life in patients with fibromyalgia syndrome: A systematic review. Complement Ther Clin Pract. 2021;45:101477.

22. Clauw DJ. Fibromyalgia: a clinical review. Jama. 2014;311(15):1547-55.

23. Akkus S. Fibromiyalji. Romatizmal Hastalıkların Tanı ve Tedavisi. Baskı sayısı:1. Yayın yeri:Yuce Yayım; 2002.

24. Yunus M, Masi A. Fibromyalgia, restless legs syndrome, periodic limb movement disorder, and psychogenic pain. Arthritis and allied conditions: a textbook of rheumatology. 1993;2:1396-8.

25. Inanici F, Yunus MB. History of fibromyalgia: past to present. Curr Pain Headache Rep. 2004;8(5):369-78.

26. Mease P, Buskila D, Sarzi-Puttini P. The fibromyalgia conundrum. Clinical & Experimental Rheumatology. 2009;27(5):S2.

27. Hench P. Nonarticular rheumatism, 22nd rheumatism review: review of the American and English literature for the years 1973 and 1974. Arthritis Rheum. 1976;19(Suppl):1081-9.

28. Wolfe F, Clauw DJ, Fitzcharles MA, Goldenberg DL, Häuser W, Katz RS, et al. Fibromyalgia criteria and severity scales for clinical and epidemiological studies: a modification of the ACR Preliminary Diagnostic Criteria for Fibromyalgia. J Rheumatol. 2011;38(6):1113-22.

29. Bennett RM, Friend R, Marcus D, Bernstein C, Han BK, Yachoui R, et al. Criteria for the diagnosis of fibromyalgia: validation of the modified 2010 preliminary American College of Rheumatology criteria and the development of alternative criteria. Arthritis Care Res (Hoboken). 2014;66(9):1364-73.

30. Platformu ADDpçvAti. Dwg indir2007 [Internet]. Available from [Erişim Tarihi 10 Mart 2023]. Erişim adresi: http://www.dwgindir.com/puanli/puanli-2-boyutlu-dwgler/puanli-semboller/autocad-dunya-haritasi-cizimi.html.

31. Schmidt-Wilcke T, Clauw DJ. Fibromyalgia: from pathophysiology to therapy. Nat RevRheumatol. 2011;7(9):518-27.

32. Arnold LM, Hudson JI, Hess EV, Ware AE, Fritz DA, Auchenbach MB, et al. Family study of fibromyalgia. Arthritis Rheum. 2004;50(3):944-52.

33. Buskila D, Sarzi-Puttini P. Biology and therapy of fibromyalgia. Genetic aspects of fibromyalgia syndrome. Arthritis Research & Therapy. 2006;8(5):218.

34. Yunus MB, Khan MA, Rawlings KK, Green JR, Olson JM, Shah S. Genetic linkage analysis of multicase families with fibromyalgia syndrome. J Rheumatol. 1999;26(2):408-412.

35. Salemi S, Rethage J, Wollina U, Michel BA, Gay RE, Gay S, et al. Detection of interleukin 1beta (IL-1beta), IL-6, and tumor necrosis factor-alpha in skin of patients with fibromyalgia. The Journal of rheumatology. 2003;30(1):146-50.

36. Gür A, Karakoç M, Nas K, Remzi, Cevik, Denli A, et al. Cytokines and depression in cases with fibromyalgia. J Rheumatol. 2002;29(2):358-61.

37. Wallace D, Linker-Israeli M, Hallegua D, Silverman S, Silver D, Weisman M. Cytokines play an aetiopathogenetic role in fibromyalgia: a hypothesis and pilot study. Rheumatology.2001;40(7):743-9.

38. Bazzichi L, Rossi A, Massimetti G, Giannaccini G, Giuliano T, De Feo F, et al. Cytokinepatterns in fibromyalgia and their correlation with clinical manifestations. Clinical and experimental rheumatology. 2007;25(2):225.

39. Menzies V, Lyon DE. Integrated review of the association of cytokines with fibromyalgia and fibromyalgia core symptoms. Biol Res Nurs. 2010;11(4):387-94.

40. Dinerman H, Goldenberg DL, Felson DT. A prospective evaluation of 118 patients with the fibromyalgia syndrome: prevalence of Raynaud's phenomenon, sicca symptoms, ANA, low complement, and Ig deposition at the dermal-epidermal junction. J Rheumatol. 1986;13(2):368-73.

41. Kaufmann I, Eisner C, Richter P, Huge V, Beyer A, Chouker A, et al. Lymphocyte subsets and the role of TH1/TH2 balance in stressed chronic pain patients. Neuroimmunomodulation. 2007;14(5):272-80.

42. Jiao J, Vincent A, Cha SS, Luedtke CA, Kim CH, Oh TH. Physical Trauma and Infection as Precipitating Factors in Patients with Fibromyalgia. Am J Phys Med Rehabil. 2015;94(12):1075-82.

43. Giacomelli C, Sernissi F, Sarzi-Puttini P, Di Franco M, Atzeni F, Bazzichi L. Fibromyalgia: a critical digest of the recent literature. Clin Exp Rheumatol. 2013;153-7.

44. Genç A. Fibromiyalji Sendromu. Fiziksel Tıp ve Rehabilitasyon. 2014;11(1): 438–450.

45. Bennett RM, Clark SR, Goldberg L, Nelson D, Bonafede RP, Porter J, et al. Aerobic fitness in patients with fibrositis. A controlled study of respiratory gas exchange and 133xenon clearance from exercising muscle. Arthritis Rheum. 1989;32(4):454-60.

46. Yunus MB, Kalyan-Raman UP, Masi AT, Aldag JC. Electron microscopic studies of muscle biopsy in primary fibromyalgia syndrome: a controlled and blinded study. J Rheumatol. 1989;16(1):97-101.

47. Dönmez A, Erdoğan N. Fibromiyalji sendromu. Klinik Gelişim. 2009;22(3):60-4.

48. Wallace DJ. Is there a role for cytokine based therapies in fibromyalgia. Curr Pharm Des. 2006;12(1):17-22.

49. Goldenberg DL, Schur PH, Romain PL. Pathogenesis of fibromyalgia. Clinical manifestations and diagnosis of fibromyalgia in adults Treatment of fibromyalgia in adults Up to Date. 2008;14.

50. Sack U, Kinne RW, Marx T, Heppt P, Bender S, Emmrich F. Interleukin-6 in synovial fluid is closely associated with chronic synovitis in rheumatoid arthritis. Rheumatol Int. 1993;13(2):45-51.

51. Çapacı K, Hepgüler S. Fibromyalji Sendorumu: Etiyopatogenez. Ege Fizik Tıp RehberiDergisi. 1998;4(3):219-26.

52. Bengtsson A, Bengtsson M. Regional sympathetic blockade in primary fibromyalgia. Pain. 1988;33(2):161-7.

53. Gür A. Fibromiyaljide Etiyopatogenez. Turkish Journal of Physical Medicine & Rehabilitation/Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi. 2008;54(2).

54. Kadetoff D, Kosek E. Evidence of reduced sympatho-adrenal and hypothalamic-pituitary activity during static muscular work in patients with fibromyalgia. J Rehabil Med. 2010;42(8):765-72.

55. Bennett RM, Clark SR, Campbell SM, Burckhardt CS. Low levels of somatomedin C in patients with the fibromyalgia syndrome. A possible link between sleep and muscle pain. Arthritis Rheum. 1992;35(10):1113-6.

56. Russell IJ, Orr MD, Littman B, Vipraio GA, Alboukrek D, Michalek JE, et al. Elevated cerebrospinal fluid levels of substance P in patients with the fibromyalgia syndrome. Arthritis Rheum. 1994;37(11):1593-601.

57. Vaerøy H, Helle R, Førre Ø, Kåss E, Terenius L. Elevated CSF levels of substance P and high incidence of Raynaud phenomenon in patients with fibromyalgia: new features for diagnosis. Pain. 1988;32(1):21-6.

58. Wolfe F, Russell IJ, Vipraio G, Ross K, Anderson J. Serotonin levels, pain threshold, and fibromyalgia symptoms in the general population. J Rheumatol. 1997;24(3):555-9.

59. Bethea CL, Pecins-Thompson M, Schutzer WE, Gundlah C, Lu ZN. Ovarian steroids and serotonin neural function. Mol Neurobiol. 1998;18(2):87-123.

60. Dufourny L, Warembourg M. Estrogen modulation of neuropeptides: somatostatin, neurotensin and substance P, in the ventrolateral and arcuate nuclei of the female guinea pig. Neurosci Res. 1999;33(3):223-8.

61. Okifuji A, Turk DC. Sex hormones and pain in regularly menstruating women with fibromyalgia syndrome. J Pain. 2006;7(11):851-9.

62. Korszun A, Sackett-Lundeen L, Papadopoulos E, Brucksch C, Masterson L, Engelberg NC, et al. Melatonin levels in women with fibromyalgia and chronic fatigue syndrome. J Rheumatol. 1999;26(12):2675-80.

63. Bradley LA, Sotolongo A, Alberts KR, Alarcón GS, Mountz JM, Liu H-G, et al. Abnormal regional cerebral blood flow in the caudate nucleus among fibromyalgia patients and non-patients is associated with insidious symptom onset. Journal of Musculoskeletal Pain. 1999;7(1-2):285-92.

64. Kwiatek R, Barnden L, Tedman R, Jarrett R, Chew J, Rowe C, et al. Regional cerebral blood flow in fibromyalgia: single-photon-emission computed tomography evidence of reduction in the pontine tegmentum and thalami. Arthritis Rheum. 2000;43(12):2823-33.

65. Bennett R. Fibromyalgia, chronic fatigue syndrome, and myofascial pain. Curr Opin Rheumatol. 1998;10(2):95-103.

66. Giesecke T, Williams DA, Harris RE, Cupps TR, Tian X, Tian TX, et al. Subgrouping of fibromyalgia patients on the basis of pressure-pain thresholds and psychological factors. Arthritis Rheum. 2003;48(10):2916-22.

67. Okifuji A, Turk DC, Sherman JJ. Evaluation of the relationship between depression and fibromyalgia syndrome: why aren't all patients depressed? J Rheumatol. 2000;27(1):212-9.

68. Sherman JJ, Turk DC, Okifuji A. Prevalence and impact of posttraumatic stress disorder- like symptoms on patients with fibromyalgia syndrome. Clin J Pain. 2000;16(2):127-34.

69. Waylonis GW, Perkins RH. Post-traumatic fibromyalgia. A long-term follow-up. Am JPhys Med Rehabil. 1994;73(6):403-12.

70. Middleton GD, McFarlin JE, Lipsky PE. The prevalence and clinical impact of fibromyalgia in systemic lupus erythematosus. Arthritis Rheum. 1994;37(8):1181-8.

71. Ay S. Fibromiyalji sendromunun patogenezi. Türkiye Klinikleri J PM&R-Special Topics. 2015;8(3):5-9.

72. Bellato E, Marini E, Castoldi F, Barbasetti N, Mattei L, Bonasia DE, et al. Fibromyalgia syndrome: etiology, pathogenesis, diagnosis, and treatment. Pain Res Treat. 2012;2012:426130.

73. Sancassiani F, Machado S, Ruggiero V, Cacace E, Carmassi C, Gesi C, et al. The management of fibromyalgia from a psychosomatic perspective: an overview. Int Rev Psychiatry. 2017;29(5):473-88.

74. Beyazova M, Kutsal YG. Fiziksel tıp ve rehabilitasyon. Baskı sayısı:1. Yayın yeri: Güneş Tıp Kitabevleri; Yayın yılı: 2016.

75. Diaz-Piedra C, Di Stasi LL, Baldwin CM, Buela-Casal G, Catena A. Sleep disturbances of adult women suffering from fibromyalgia: a systematic review of observational studies. Sleep Med Rev. 2015;21:86-99.

76. Moldofsky H, Scarisbrick P, England R, Smythe H. Musculosketal symptoms and non- REM sleep disturbance in patients with “fibrositis syndrome” and healthy subjects. Psychosomatic medicine. 1975;37(4):341-51.

77. Nicassio PM, Moxham EG, Schuman CE, Gevirtz RN. The contribution of pain, reported sleep quality, and depressive symptoms to fatigue in fibromyalgia. Pain. 2002;100(3):271-9.

78. Rizzi M, Sarzi-Puttini P, Atzeni F, Capsoni F, Andreoli A, Pecis M, et al. Cyclic alternating pattern: a new marker of sleep alteration in patients with fibromyalgia? J Rheumatol. 2004;31(6):1193-9.

79. Cassisi G, Sarzi-Puttini P, Alciati A, Casale R, Bazzichi L, Carignola R, et al. Symptomsand signs in fibromyalgia syndrome. Reumatismo. 2008;60 Suppl 1:15-24.

80. Hayta E, Doğan Ö, Doğan SC, Akdeniz T, Şencan D, Karakaşlı S, et al. Fibromiyalji tanısı konan 100 kadın olgunun klinik özellikleri. Cumhuriyet Medical Journal. 2010;32(1):74-9.

81. Wolfe F, Clauw DJ, Fitzcharles MA, Goldenberg DL, Katz RS, Mease P, et al. The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. Arthritis Care Res (Hoboken). 2010;62(5):600-10.

82. Bennett RM, Jones J, Turk DC, Russell IJ, Matallana L. An internet survey of 2,596 people with fibromyalgia. BMC Musculoskelet Disord. 2007;8-27.

83. Fitzcharles MA, Boulos P. Inaccuracy in the diagnosis of fibromyalgia syndrome: analysis of referrals. Rheumatology (Oxford). 2003;42(2):263-7.

84. Yunus MB, Inanici F, Aldag JC, Mangold RF. Fibromyalgia in men: comparison of clinical features with women. J Rheumatol. 2000;27(2):485-90.

85. Goldenberg DL, Schur P, Romain P. Clinical manifestations and diagnosis of fibromyalgia in adults. Up to date [Internet]. 2016 [Erişim Tarihi 12 Mart 2023]. Erişim adresi:http://www.uptodate.com/contents/clinicalmanifestations-and-diagnosis-of-fibromyalgia-in-adults (pristupljeno: 125 2017). 2016.

86. Yunus M, Masi A, Aldag J. A controlled study of primary fibromyalgia syndrome: clinical features and association with other functional syndromes. The Journal of rheumatology Supplement. 1989;19:62-71.

87. Akkuş S, Koşar A, Bayazıt O. Fibromiyalji tanısı konan 220 vakanın klinik özellikleri.Türkiye Fiziksel Tıp ve Rehabilitasyon Dergisi. 1998;1(1):41-46.

88. Wolfe F, Ross K, Anderson J, Russell IJ, Hebert L. The prevalence and characteristics of fibromyalgia in the general population. Arthritis Rheum. 1995;38(1):19-28.

89. Thornton KGS, Robert M. Prevalence of Pelvic Floor Disorders in the Fibromyalgia Population: A Systematic Review. J Obstet Gynaecol Can. 2020;42(1):72-9.

90. Simms RW, Goldenberg DL. Symptoms mimicking neurologic disorders in fibromyalgia syndrome. J Rheumatol. 1988;15(8):1271-3.

91. Bennett RM. Emerging concepts in the neurobiology of chronic pain: evidence of abnormal sensory processing in fibromyalgia. Mayo Clin Proc. 1999;74(4):385-98.

92. Triadafilopoulos G, Simms RW, Goldenberg DL. Bowel dysfunction in fibromyalgia syndrome. Dig Dis Sci. 1991;36(1):59-64.

93. Clinic M. Tender points [Internet]. 2015. [Erişim Tarihi:15 Şubat 2023]. Erişim adresi:https://www.mayoclinic.org/tender-points/img-20007586.

94. Wolfe F, Clauw DJ, Fitzcharles MA, Goldenberg DL, Häuser W, Katz RL, et al. 2016 Revisions to the 2010/2011 fibromyalgia diagnostic criteria. Semin Arthritis Rheum. 2016;46(3):319-29.

95. NC C. Fibromiyalji Sendromunda Klinik. Tanı, Ayırıcı Tanı: Türkiye Klinikleri J PM&R-Special Topics. 2015;8(3):15-21.

96. Cüzdan C. Fibromiyalji Sendromunda Klinik, Tanı, Ayırıcı Tanı [Clinical Manifestations, Diagnosis and Differential Diagnosis of Fibromyalgia Syndrome]. Turkiye Klin J PM&R-Special Top 2015;8(3):15– 21. 2015:15-21.

97. Çetin A, Kaymak B. Fibromiyaljili hastaya yaklaşım. Türkiye Tıp Dergisi Dahili Tıp Bilimleri. 2004;11(2):77-83.

98. MacFarlane GJ, Thomas E, Papageorgiou AC, Schollum J, Croft PR, Silman AJ. The natural history of chronic pain in the community: a better prognosis than in the clinic? J Rheumatol. 1996;23(9):1617-20.

99. Wolfe F, Anderson J, Harkness D, Bennett RM, Caro XJ, Goldenberg DL, et al. Healthstatus and disease severity in fibromyalgia: results of a six-center longitudinal study. Arthritis Rheum. 1997;40(9):1571-9.

100. Sindel D, Saral İ, Esmaeilzadeh S. Fibromiyalji Sendromunda Uygulanan Tedavi Yöntemleri. Journal of Physical Medicine & Rehabilitation Sciences/Fiziksel Tıp ve Rehabilitasyon Bilimleri Dergisi. 2012(4);58:136-42.

101. Goldenberg DL. Pharmacological treatment of fibromyalgia and other chronic musculoskeletal pain. Best Pract Res Clin Rheumatol. 2007;21(3):499-511.

102. Zech N, Hansen E, Bernardy K, Häuser W. Efficacy, acceptability and safety of guided imagery/hypnosis in fibromyalgia - A systematic review and meta-analysis of randomized controlled trials. Eur J Pain. 2017;21(2):217-27.

103. Berman BM, Ezzo J, Hadhazy V, Swyers JP. Is acupuncture effective in the treatmentof fibromyalgia? J Fam Pract. 1999;48(3):213-8.

104. Honda Y, Sakamoto J, Hamaue Y, Kataoka H, Kondo Y, Sasabe R, et al. Effects of Physical-Agent Pain Relief Modalities for Fibromyalgia Patients: A Systematic Review andMeta-Analysis of Randomized Controlled Trials. Pain Res Manag. 2018;18:29-30.

105. Wang C, Schmid CH, Fielding RA, Harvey WF, Reid KF, Price LL, et al. Effect of tai chi versus aerobic exercise for fibromyalgia: comparative effectiveness randomized controlled trial. Bmj. 2018;360-851.

106. Guidelli GM, Tenti S, De Nobili E, Fioravanti A. Fibromyalgia syndrome and spa therapy: myth or reality? Clin Med Insights Arthritis Musculoskelet Disord. 2012;5:19-26.

107. Alda M, Luciano JV, Andrés E, Serrano-Blanco A, Rodero B, del Hoyo YL, et al. Effectiveness of cognitive behaviour therapy for the treatment of catastrophisation in patients with fibromyalgia: a randomised controlled trial. Arthritis Res Ther. 2011;13(5):173.

108. Zinnuroğlu M. Fibromiyalji Tedavisi: Rehabilitatif Yaklaşım. Romatizma/Rheumatism. 2007;22(3):22.

109. Buckelew SP, Conway R, Parker J, Deuser WE, Read J, Witty TE, et al. Biofeedback/relaxation training and exercise interventions for fibromyalgia: a prospective trial. Arthritis Care Res. 1998;11(3):196-209.

110. Meyer BB, Lemley KJ. Utilizing exercise to affect the symptomology of fibromyalgia: a pilot study. Med Sci Sports Exerc. 2000;32(10):1691-7.

111. Valkeinen H, Häkkinen K, Pakarinen A, Hannonen P, Häkkinen A, Airaksinen O, et al. Muscle hypertrophy, strength development, and serum hormones during strength training in elderly women with fibromyalgia. Scand J Rheumatol. 2005;34(4):309-14.

112. Carville SF, Arendt-Nielsen L, Bliddal H, Blotman F, Branco JC, Buskila D, et al. EULAR evidence-based recommendations for the management of fibromyalgia syndrome. Ann Rheum Dis. 2008;67(4):536-41.

113. Ateş Çöl I, Sönmez MB, Vardar ME. Evaluation of Interoceptive Awareness in Alcohol-Addicted Patients. Noro Psikiyatr Ars. 2016;53(1):17-22.

114. Ferentzi E, Köteles F, Csala B, Drew R, Tihanyi BT, Pulay-Kottlár G, et al. What makes sense in our body? Personality and sensory correlates of body awareness and somatosensory amplification. Personality and Individual Differences. 2017;104:75-81.

115. Valenzuela-Moguillansky C, Reyes-Reyes A, Gaete MI. Exteroceptive and Interoceptive Body-Self Awareness in Fibromyalgia Patients. Front Hum Neurosci. 2017;11-117.

116. Mehling WE, Price C, Daubenmier JJ, Acree M, Bartmess E, Stewart A. The Multidimensional Assessment of Interoceptive Awareness (MAIA). PLoS One. 2012;7(11):482-30.

117. Lööf H, Johansson UB, Henriksson EW, Lindblad S, Bullington J. Body awareness in persons diagnosed with rheumatoid arthritis. Int J Qual Stud Health Well-being. 2014;(9):246-70.

118. Mehling WE, Wrubel J, Daubenmier JJ, Price CJ, Kerr CE, Silow T, et al. Body Awareness: a phenomenological inquiry into the common ground of mind-body therapies. Philos Ethics Humanit Med. 2011;5(1):66.

119. Riley PO, Mann RW, Hodge WA. Modelling of the biomechanics of posture and balance. J Biomech. 1990;23(5):503-6.

120. Shumway-Cook A, Horak FB. Assessing the influence of sensory interaction of balance. Suggestion from the field. Phys Ther. 1986;66(10):1548-50.

121. Huxham FE, Goldie PA, Patla AE. Theoretical considerations in balance assessment. Aust J Physiother. 2001;47(2):89-100.

122. Peköz MT, Sarıca Y. Diyabetes Mellitusta Postür, Denge ve Yürüme Bozuklukları. Arşiv Kaynak Tarama Dergisi. 2012;21(3):151-62.

123. Yim-Chiplis PK, Talbot LA. Defining and measuring balance in adults. Biol Res Nurs.2000;1(4):321-31.

124. Winter DA. Human balance and posture control during standing and walking. Gait &posture. 1995;3(4):193-214.

125. Del-Moral-García M, Obrero-Gaitán E, Rodríguez-Almagro D, Rodríguez-Huguet M, Osuna-Pérez MC, Lomas-Vega R. Effectiveness of Active Therapy-Based Training to Improve the Balance in Patients with Fibromyalgia. 2020;9(11):9-11.

126. Clauw DJ, Crofford LJ. Chronic widespread pain and fibromyalgia: what we know, and what we need to know. Best Practice & Research Clinical Rheumatology. 2003;17(4):685-701.

127. Giorgi V, Sirotti S, Romano ME, Marotto D, Ablin JN, Salaffi F, et al. Fibromyalgia:one year in review 2022. Clin Exp Rheumatol. 2022;40(6):1065-72.

128. Mantovani LM, Teixeira AL, Salgado JV. Functional capacity: a new framework for the assessment of everyday functioning in schizophrenia. Braz J Psychiatry. 2015;37(3):249-55.

129. García-Hermoso A, Saavedra JM, Escalante Y. Effects of exercise on functional aerobic capacity in adults with fibromyalgia syndrome: A systematic review of randomized controlled trials. J Back Musculoskelet Rehabil. 2015;28(4):609-19.

130. Ulus Y, Akyol Y, Tander B, Bilgici A, Kuru Ö. Knee Proprioception and Balance in Turkish Women With and Without Fibromyalgia Syndrome. Turkish Journal of Physical Medicine & Rehabilitation/Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi. 2013;59(2):12.

131. Staud R, Price DD, Robinson ME, Vierck CJ, Jr. Body pain area and pain-related negative affect predict clinical pain intensity in patients with fibromyalgia. J Pain. 2004;5(6):338-43.

132. Marques AP, Ferreira EA, Matsutani LA, Pereira CA, Assumpção A. Quantifying painthreshold and quality of life of fibromyalgia patients. Clin Rheumatol. 2005;24(3):266-71.

133. Laursen BS, Bajaj P, Olesen AS, Delmar C, Arendt-Nielsen L. Health related quality of life and quantitative pain measurement in females with chronic non-malignant pain. Eur J Pain. 2005;9(3):267-75.

134. Price DD, McGrath PA, Rafii A, Buckingham B. The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. Pain. 1983;17(1):45-56.

135. 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. Arthritis & Rheumatism: Official Journal of the American College of Rheumatology.1990;33(2):160-72.

136. Dilek K, Yıldız H. Dispne Semptomunun Değerlendirilmesinde Dispne Ölçeklerinin Etkinlikleri Ve Kullanım Sıklıkları. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi. 2013;2(1):137-49.

137. Kendrick KR, Baxi SC, Smith RM. Usefulness of the modified 0-10 Borg scale in assessing the degree of dyspnea in patients with COPD and asthma. J Emerg Nurs. 2000;26(3):216-22.

138. Borg GA. Psychophysical bases of perceived exertion. Med Sci Sports Exerc. 1982;14(5):377-81.

139. Soriano-Maldonado A, Ruiz JR, Álvarez-Gallardo IC, Segura-Jiménez V, Santalla A, Munguía-Izquierdo D. Validity and reliability of rating perceived exertion in women with fibromyalgia: exertion-pain discrimination. Journal of sports sciences. 2015;33(14):1515- 22.

140. A.P.D.V. Boas, F.A. de Lima Marson, M.A.G. de Oliveira Ribeiro, E. Sakano, P.B.M. Conti, A.D.C. Toro, J.D. Reibeiro. Walk test and school performance in mouth-breathing children. Brazilian Journal of Otorhinolaryngology 2013;79(2):212-218.

141. Eng JJ, Dawson AS, Chu KS. Submaximal exercise in persons with stroke: test-retest reliability and concurrent validity with maximal oxygen consumption. Archives of physicalmedicine and rehabilitation. 2004;85(1):113-8.

142. Flansbjer U-B, Holmbäck AM, Downham D, Patten C, Lexell J. Reliability of gait performance tests in men and women with hemiparesis after stroke. Journal of rehabilitation medicine. 2005;37(2):75-82.

143. Kennedy DM, Stratford PW, Wessel J, Gollish JD, Penney D. Assessing stability and change of four performance measures: a longitudinal study evaluating outcome following total hip and knee arthroplasty. BMC musculoskeletal disorders. 2005;6(1):1-12.

144. Scivoletto G, Tamburella F, Laurenza L, Foti C, Ditunno J, Molinari M. Validity and reliability of the 10-m walk test and the 6-min walk test in spinal cord injury patients. Spinalcord. 2011;49(6):736-40.

145. Harada ND, Chiu V, Stewart AL. Mobility-related function in older adults: assessment with a 6-minute walk test. Archives of physical medicine and rehabilitation. 1999;80(7):837-41.

146. Society AT. ATS statement: guidelines for the six-minute walk test. Am J Respir CritCare Med. 2002;166:111-7.

147. Pankoff BA, Overend TJ, Lucy SD, White KP. Reliability of the six-minute walk testin people with fibromyalgia. Arthritis Care & Research. 2000;13(5):291-5.

148. Heinicke G, Clay R, DeCato TW. Six-Minute-Walk Testing. Am J Respir Crit Care Med. 2021;204(3):5-6.

149. Khasnis A, Gokula RM. Romberg's test. J Postgrad Med. 2003;49(2):169-72.

150. Carbonell-Baeza A, Álvarez-Gallardo IC, Segura-Jiménez V, Castro-Piñero J, Ruiz JR, Delgado-Fernández M, et al. Reliability and feasibility of physical fitness tests in female fibromyalgia patients. Int J Sports Med. 2015;36(2):157-62.

151. Podsiadlo D, Richardson S. The timed "Up & Go": a test of basic functional mobility for frail elderly persons. J Am Geriatr Soc. 1991;39(2):142-8.

152. Collado-Mateo D, Domínguez-Muñoz FJ, Adsuar JC, Merellano-Navarro E, Olivares PR, Gusi N. Reliability of the Timed Up and Go Test in Fibromyalgia. Rehabil Nurs. 2018;43(1):35-9.

153. Adsuar JC, Del Pozo-Cruz B, Parraca JA, Olivares PR, Gusi N. Whole body vibration improves the single-leg stance static balance in women with fibromyalgia: a randomized controlled trial. J Sports Med Phys Fitness. 2012;52(1):85-91.

154. Arnold BL, Schmitz RJ. Examination of balance measures produced by the biodex stability system. J Athl Train. 1998;33(4):323-7.

155. Bennett R. The Fibromyalgia Impact Questionnaire (FIQ): a review of its development, current version, operating characteristics and uses. Clin Exp Rheumatol. 2005;23:154-62.

156. Sarmer S, Ergin S, Yavuzer G. The validity and reliability of the Turkish version of the Fibromyalgia Impact Questionnaire. Rheumatol Int. 2000;20(1):9-12.

157. Burckhardt CS, Clark SR, Bennett RM. The fibromyalgia impact questionnaire: development and validation. J rheumatol. 1991;18(5):728-33.

158. Shields SA, Mallory ME, Simon A. The body awareness questionnaire: reliability andvalidity. Journal of personality Assessment. 1989;53(4):802-15.

159. Karaca S, Bayar B. Turkish version of body awareness questionnaire: validity and reliability study. Türk Fizyoterapi ve Rehabilitasyon Dergisi. 2021;32(1):44-50.

160. Ruiz-Montero PJ, Segura-Jimenez V, Alvarez-Gallardo IC, Nijs J, Mannerkorpi K, Delgado-Fernandez M, et al. Fibromyalgia Impact Score in Women with Fibromyalgia Across Southern, Central, and Northern Areas of Europe. Pain Physician. 2019;22(5):511-6.

161. Bannwarth B, Blotman F, Roué-Le Lay K, Caubère JP, André E, Taïeb C. Fibromyalgiasyndrome in the general population of France: a prevalence study. Joint Bone Spine. 2009;76(2):184-7.

162. Mäkelä M, Heliövaara M. Prevalence of primary fibromyalgia in the Finnish population. Bmj. 1991;303(6796):216-9.

163. White KP, Speechley M, Harth M, Ostbye T. The London Fibromyalgia Epidemiology Study: the prevalence of fibromyalgia syndrome in London, Ontario. J Rheumatol. 1999;26(7):1570-6.

164. Mas AJ, Carmona L, Valverde M, Ribas B. Prevalence and impact of fibromyalgia on function and quality of life in individuals from the general population: results from a nationwide study in Spain. Clin Exp Rheumatol. 2008;26(4):519-26.

165. Senna ER, De Barros AL, Silva EO, Costa IF, Pereira LV, Ciconelli RM, et al. Prevalence of rheumatic diseases in Brazil: a study using the COPCORD approach. J Rheumatol. 2004;31(3):594-7.

166. Cobankara V, Unal UO, Kaya A, Bozkurt AI, Ozturk MA. The prevalence of fibromyalgia among textile workers in the city of Denizli in Turkey. Int J Rheum Dis. 2011;14(4):390-4.

167. Kivimäki M, Leino-Arjas P, Kaila-Kangas L, Virtanen M, Elovainio M, Puttonen S, et al. Increased absence due to sickness among employees with fibromyalgia. Ann Rheum Dis.2007;66(1):65-9.

168. Al-Allaf AW. Work disability and health system utilization in patients with fibromyalgia syndrome. J Clin Rheumatol. 2007;13(4):199-201.

169. Vincent A, Lahr BD, Wolfe F, Clauw DJ, Whipple MO, Oh TH, et al. Prevalence of fibromyalgia: a population-based study in Olmsted County, Minnesota, utilizing the Rochester Epidemiology Project. Arthritis Care Res (Hoboken). 2013;65(5):786-92.

170. Villafaina S, Gusi N, Rodriguez-Generelo S, Martin-Gallego JD, Fuentes-García JP, Collado-Mateo D. Influence of a Cell-Phone Conversation on Balance Performance in Women with Fibromyalgia: A Cross-Sectional Descriptive Study. Biomed Res Int. 2019;51(32):80-2.

171. Sarihan K. Fibromiyalji sendromlu hastalarda denge, düşme riski ve ilişkili faktörlerindeğerlendirilmesi [Uzmanlık Tezi]. Erzurum: Atatürk Üniversitesi; 2020.

172. Jones KD, Horak FB, Winters-Stone K, Irvine JM, Bennett RM. Fibromyalgia is associated with impaired balance and falls. J Clin Rheumatol. 2009;15(1):16-21.

173. Peinado-Rubia A, Osuna-Pérez MC, Rodríguez-Almagro D, Zagalaz-Anula N, López- Ruiz MC, Lomas-Vega R. Impaired Balance in Patients with Fibromyalgia Syndrome: Predictors of the Impact of This Disorder and Balance Confidence. Int J Environ Res PublicHealth. 2020;17(9):17.

174. Pérez-de-Heredia-Torres M, Huertas-Hoyas E, Martínez-Piédrola R, Palacios-Ceña D, Alegre-Ayala J, Santamaría-Vázquez M, et al. Balance deficiencies in women with fibromyalgia assessed using computerised dynamic posturography: a cross-sectional study in Spain. BMJ Open. 2017;7(7):623-9.

175. Jones KD, King LA, Mist SD, Bennett RM, Horak FB. Postural control deficits in people with fibromyalgia: a pilot study. Arthritis Research & Therapy. 2011;13(4):127.

176. Kuchinad A, Schweinhardt P, Seminowicz DA, Wood PB, Chizh BA, Bushnell MC. Accelerated brain gray matter loss in fibromyalgia patients: premature aging of the brain? J Neurosci. 2007;27(15):4004-7.

177. Thorpe J, Shum B, Moore RA, Wiffen PJ, Gilron I. Combination pharmacotherapy forthe treatment of fibromyalgia in adults. Cochrane Database Syst Rev. 2018;2(2):105-85.

178. Costa ID, Gamundí A, Miranda JG, França LG, De Santana CN, Montoya P. Altered Functional Performance in Patients with Fibromyalgia. Front Hum Neurosci. 2017;11-14.

179. Tavares LF, Germano Maciel D, Pereira Barros da Silva TY, Brito Vieira WH. Comparison of functional and isokinetic performance between healthy women and women with fibromyalgia. J Bodyw Mov Ther. 2020;24(1):248-52.

180. Assumpção A, Sauer JF, Mango PC, Pascual Marques A. Physical function interfering with pain and symptoms in fibromyalgia patients. Clin Exp Rheumatol. 2010;(28):57-63.

181. Aparicio VA, Segura-Jiménez V, Álvarez-Gallardo IC, Soriano-Maldonado A, Castro-Piñero J, Delgado-Fernández M, et al. Fitness testing in the fibromyalgia diagnosis: the al- Ándalus project. Med Sci Sports Exerc. 2015;47(3):451-9.

182. Aparicio VA, Segura-Jiménez V, Álvarez-Gallardo IC, Estévez-López F, Camiletti-Moirón D, Latorre PA, et al. Are there differences in quality of life, symptomatology and functional capacity among different obesity classes in women with fibromyalgia? The al-Ándalus project. Rheumatology International. 2014;34(6):811-21.

183. Turk DC, Robinson JP, Burwinkle T. Prevalence of fear of pain and activity in patientswith fibromyalgia syndrome. J Pain. 2004;5(9):483-90.

184. Russek LN, Fulk GD. Pilot study assessing balance in women with fibromyalgia syndrome. Physiother Theory Pract. 2009;25(8):555-65.

185. Unal A, Altug F, Erden A, Cavlak U, Senol H. Validity and reliability of the Body Awareness Questionnaire in patients with non-specific chronic low back pain. Acta Neurol Belg. 2021;121(3):701-5.

186. Erden A, Altuğ F, Cavlak U. Investigation of the relationship between body awareness,pain, emotional status, and quality of life among healthy people. J Kartal Train Res Hosp. 2013;24(3):145-50.

187. Kendall SA, Brolin-Magnusson K, Sören B, Gerdle B, Henriksson KG. A pilot study of body awareness programs in the treatment of fibromyalgia syndrome. Arthritis Care Res.2000;13(5):304-11.

188. Bravo C, Skjaerven LH, Espart A, Guitard Sein-Echaluce L, Catalan-Matamoros D. Basic Body Awareness Therapy in patients suffering from fibromyalgia: A randomized clinical trial. Physiother Theory Pract. 2019;35(10):919-29.

189. Tangen SF, Helvik AS, Eide H, Fors EA. Pain acceptance and its impact on function and symptoms in fibromyalgia. Scand J Pain. 2020;20(4):727-36.

190. Perrot S, Winkelmann A, Dukes E, Xu X, Schaefer C, Ryan K, et al. Characteristics ofpatients with fibromyalgia in France and Germany. Int J Clin Pract. 2010;64(8):1100-8.

191. Kadimpati S, Zale EL, Hooten MW, Ditre JW, Warner DO. Associations between Neuroticism and Depression in Relation to Catastrophizing and Pain-Related Anxiety in Chronic Pain Patients. PLoS One. 2015;10(4):1263-51.

192. Clark LA, Watson D, Mineka S. Temperament, personality, and the mood and anxietydisorders. J Abnorm Psychol. 1994;103(1):103-16.

193. Seto A, Han X, Price LL, Harvey WF, Bannuru RR, Wang C. The role of personality in patients with fibromyalgia. Clin Rheumatol. 2019;38(1):149-57.

194. Wennemer HK, Borg-Stein J, Gomba L, Delaney B, Rothmund A, Barlow D, et al. Functionally Oriented Rehabilitation Program for Patients with Fibromyalgia: Preliminary Results. American Journal of Physical Medicine & Rehabilitation. 2006;85(8):659-66.

195. Rodríguez-Mansilla J, Mejías-Gil A, Garrido-Ardila EM, Jiménez-Palomares M, Montanero-Fernández J, González-López-Arza MV. Effects of Non-Pharmacological Treatment on Pain, Flexibility, Balance and Quality of Life in Women with Fibromyalgia: A Randomised Clinical Trial. J Clin Med. 2021;10(17):10.

196. Nielens H, Boisset V, Masquelier E. Fitness and Perceived Exertion in Patients With Fibromyalgia Syndrome. The Clinical Journal of Pain. 2000;16(3):209-13.

197. Van Santen M, Bolwijn P, Landewé R, Verstappen F, Bakker C, Hidding A, et al. Highor low intensity aerobic fitness training in fibromyalgia: does it matter? J Rheumatol. 2002;29(3):582-7.

198. Park HK, Song MK, Kim DJ, Choi IS, Han JY. Comparison of core muscle strengthening exercise and stretching exercise in middle-aged women with fibromyalgia: A randomized, single-blind, controlled study. Medicine (Baltimore). 2021;100(50):278-54.

199. Hernando-Garijo I, Ceballos-Laita L, Mingo-Gómez MT, Medrano-de-la-Fuente R, Estébanez-de-Miguel E, Martínez-Pérez MN, et al. Immediate Effects of a Telerehabilitation Program Based on Aerobic Exercise in Women with Fibromyalgia. Int J Environ Res Public Health. 2021;18(4):18-2.

200. Campbell SM, Clark S, Tindall EA, Forehand ME, Bennett RM. Clinical characteristicsof fibrositis. I. A "blinded," controlled study of symptoms and tender points. Arthritis Rheum. 1983;26(7):817-24.

201. Yunus M, Masi AT, Calabro JJ, Miller KA, Feigenbaum SL. Primary fibromyalgia (fibrositis): clinical study of 50 patients with matched normal controls. Semin Arthritis Rheum. 1981;11(1):151-71.

202. Sola AE. Treatment of myofascial pain syndromes. Advances in pain research and therapy. 1984;7:467-85.

203. Kraft GH, Johnson EW, LaBan MM. The fibrositis syndrome. Arch Phys Med Rehabil.1968;49(3):155-62.

204. Tunks E, Crook J, Norman G, Kalaher S. Tender points in fibromyalgia. Pain. 1988;34(1):11-9.

205. Scudds RA, Rollman GB, Harth M, McCain GA. Pain perception and personality measures as discriminators in the classification of fibrositis. J Rheumatol. 1987;14(3):563-9.

206. Maquet D, Croisier JL, Demoulin C, Crielaard JM. Pressure pain thresholds of tender point sites in patients with fibromyalgia and in healthy controls. Eur J Pain. 2004;8(2):111-7.

207. Santo A, De Sousa do Espirito M, Assumpção PC., Sauer A, Marques JF, Pascal A. Fibromyalgia: is there association between balance and pain? a pilot study. Fisioterapia e Pesquisa. 2014;21:27-33.

208. Yasemin U, Akyol Y, Tander B, Durmuş D, Bilgici A, Ömer K. Is there a balance problem in hypermobile patients with fibromyalgia? Archives of Rheumatology. 2013;28(1):10-5.

209. Jones KD, King LA, Mist SD, Bennett RM, Horak FB. Postural control deficits in people with fibromyalgia: a pilot study. Arthritis Res Ther. 2011;13(4):127.

210. Rodero B, Casanueva B, Luciano JV, Gili M, Serrano-Blanco A, García-Campayo J. Relationship between behavioural coping strategies and acceptance in patients with fibromyalgia syndrome: elucidating targets of interventions. BMC Musculoskelet Disord. 2011;12-143.

211. Yagci N, Cavlak U, Aslan UB, Akdag B. Relationship between balance performance and musculoskeletal pain in lower body comparison healthy middle aged and older adults. Archives of gerontology and geriatrics. 2007;45(1):109-19.

212. Przybelski RJ, Shea TA. Falls in the geriatric patient. Wmj. 2001;100(2):53-6.

213. Miles TP, Flegal K, Harris T. Musculoskeletal disorders: time trends, comorbid conditions, self-assessed health status, and associated activity limitations. Vital Health Stat 3. 1993(27):275-88.

214. Badley EH, Yoshida K, Webster G, Stephens M. Ontario health survey. 1990; (1):19-93.

215. Morris ME, Iansek R, Matyas TA, Summers JJ. Stride length regulation in Parkinson's disease. Normalization strategies and underlying mechanisms. Brain. 1996;(119):551-68.

216. Colledge NR, Cantley P, Peaston I, Brash H, Lewis S, Wilson JA. Ageing and balance: the measurement of spontaneous sway by posturography. Gerontology. 1994;40(5):273-8.

217. Daubney ME, Culham EG. Lower-extremity muscle force and balance performance inadults aged 65 years and older. Phys Ther. 1999;79(12):1177-85.

218. Trainor H, Baranoff J, Henke M, Winefield H. Functioning with fibromyalgia: The role of psychological flexibility and general psychological acceptance. Australian Psychologist. 2019;54(3):214-24.

219. Lami MJ, Martínez MP, Miró E, Sánchez AI, Guzmán MA. Catastrophizing, Acceptance, and Coping as Mediators Between Pain and Emotional Distress and Disability in Fibromyalgia. J Clin Psychol Med Settings. 2018;25(1):80-92.

220. Gunel M, Yağli N, Kerem Günel M, Vardar N, Akel B, Erdoğanoğlu Y, et al. Effect of body awareness therapy on fibromyalgia syndrome in women: a randomized controlled trial. J Exercise Ther Rehabil. 2014;2:43-8.

221. McCracken LM. Behavioral constituents of chronic pain acceptance: Results from factor analysis of the Chronic Pain Acceptance Questionnaire. Journal of Back and Musculoskeletal Rehabilitation. 1999;13(2-3):93-100.

222. Narula M, Jackson O, Kulig K. The effects of six-week Feldenkrais method on selected functional parameters in a subject with rheumatoid arthritis. Phys Ther. 1992;(7):86.

223. Kolt GS, McConville JC. The effects of a Feldenkrais® Awareness through movement program on state anxiety. Journal of Bodywork and Movement Therapies. 2000;4(3):216-20.

224. Mannion AF, Müntener M, Taimela S, Dvorak J. A randomized clinical trial of three active therapies for chronic low back pain. Spine (Phila Pa 1976). 1999;24(23):2435-48.

225. Erden A, Altuğ F, Cavlak U. Sağlıklı kişilerde vücut farkındalık durumu ile ağrı, emosyonel durum ve yaşam kalitesi arasındaki ilişkinin incelenmesi. Kartal Eğitim ve Araştırma Hastanesi Tıp Dergisi. 2013;24(3):145-150 .

226. Homann D, Stefanello JM, Góes SM, Leite N. Impaired functional capacity and exacerbation of pain and exertion during the 6-minute walk test in women with fibromyalgia. Rev Bras Fisioter. 2011;15(6):474-80.

227. Steffen TM, Hacker TA, Mollinger L. Age- and gender-related test performance in community-dwelling elderly people: Six-Minute Walk Test, Berg Balance Scale, Timed Up & Go Test, and gait speeds. Phys Ther. 2002;82(2):128-37.

228. Enright PL, Sherrill DL. Reference equations for the six-minute walk in healthy adults.Am J Respir Crit Care Med. 1998;(158):1384-7.

229. Carbonell-Baeza A, Aparicio VA, Sjöström M, Ruiz JR, Delgado-Fernández M. Painand functional capacity in female fibromyalgia patients. Pain Med. 2011;12(11):1667-75.

230. Notaro LST, Barros MMMB, Vasconcelos TS, de Menezes MCM, de Oliveira DA, Wanderley D. Assessment of balance and functional capacity in fibromyalgia patients with and without migraine. Headache Medicine. 2022;13(2):124-32.

231. Foley SJ, Lord SR, Srikanth V, Cooley H, Jones G. Falls risk is associated with pain and dysfunction but not radiographic osteoarthritis in older adults: Tasmanian Older Adult Cohort study. Osteoarthritis and Cartilage. 2006;14(6):533-9.

232. Özsoy G, Özsoy İ, İlçin N, Tekin N, Savcı S. Yaşlı bireylerde denge, fonksiyonel egzersiz kapasitesi ve periferal kas kuvveti arasındaki ilişki. Süleyman Demirel Üniversitesi Sağlık Bilimleri Dergisi. 2017;8(1):28-32.

233. Özalp H. Mahkûm ve mahkûm olmayan 60 yaş üzeri erkeklerde denge ve fiziksel performansın karşılaştırılması [Yüksek Lisans Tezi]. İzmir: Dokuz Eylül Üniversitesi; 2013.

234. Uyar N, Erdoğanoğlu Y, Editörler. Fazla kilolu ve obez yetişkinlerde fiziksel aktivite ve fiziksel performans düzeylerinin postural kontrol ile ilişkisi. SOCRATES 5TH International Conference on Engineering, Health and Applied Sciences. Tunus:National publication; 2022.

235. Leeuw M, Goossens ME, Linton SJ, Crombez G, Boersma K, Vlaeyen JW. The fear- avoidance model of musculoskeletal pain: current state of scientific evidence. J Behav Med.2007;30(1):77-94.

236. Vlaeyen JWS, Linton SJ. Fear-avoidance and its consequences in chronic musculoskeletal pain: a state of the art. Pain. 2000;85(3):317-32.

237. Gustafsson M, Ekholm J, Broman L. Effects of a multiprofessional rehabilitation programme for patients with fibromyalgia syndrome. J Rehabil Med. 2002;34(3):119-27.

238. Malmgren-Olsson EB, Bränholm IB. A comparison between three physiotherapy approaches with regard to health-related factors in patients with non-specific musculoskeletal disorders. Disabil Rehabil. 2002;24(6):308-17.

239. Malmgren-Olsson E-B, Armelius B-A, Armelius K. A comparative outcome study of body awareness therapy, feldenkrais, and conventional physiotherapy for patients with nonspecific musculoskeletal disorders: changes in psychological symptoms, pain, and self-image. Physiotherapy Theory and Practice. 2001;17(2):77-95.

240. Pirinççi, CŞ, Cihan E, Ünüvar BS, Gerçek H. Genç Yetişkinlerde Vücut Farkındalığı ile Fiziksel Aktivite, Depresyon ve Yaşam Kalitesi İlişkisi. CBÜ Beden Eğitimi ve Spor Bilimleri Dergisi.17(2):207-15.

241. El Ansari W, Stock C, Phillips C, Mabhala A, Stoate M, Adetunji H, et al. Does the association between depressive symptomatology and physical activity depend on body image perception? A survey of students from seven universities in the UK. Int J Environ Res Public Health. 2011;8(2):281-99.

242. Góes SM, Leite N, Shay BL, Homann D, Stefanello JM, Rodacki AL. Functional capacity, muscle strength and falls in women with fibromyalgia. Clin Biomech (Bristol, Avon). 2012;27(6):578-83.

243. Latorre Román P, Santos E, García-Pinillos F. Effects of functional training on pain, leg strength, and balance in women with fibromyalgia. Mod Rheumatol. 2015;25(6):943-7.

244. Cerón-Lorente L, Valenza MC, Pérez-Mármol JM, García-Ríos MDC, Castro-Sánchez AM, Aguilar-Ferrándiz ME. The influence of balance, physical disability, strength, mechanosensitivity and spinal mobility on physical activity at home, work and leisure timein women with fibromyalgia. Clin Biomech (Bristol, Avon). 2018;60:157-63.

245. Akkaya N, Akkaya S, Atalay NS, Acar M, Catalbas N, Sahin F. Assessment of the relationship between postural stability and sleep quality in patients with fibromyalgia. Clin Rheumatol. 2013;32(3):325-31.

246. Herman T, Giladi N, Hausdorff JM. Properties of the 'timed up and go' test: more thanmeets the eye. Gerontology. 2011;57(3):203-10.

247. Feldman R, Schreiber S, Pick CG, Been E. Gait, balance, mobility and muscle strength in people with anxiety compared to healthy individuals. Hum Mov Sci. 2019;67(10):251-3.

248. Lopes K, Costa D, Santos L, Castro D, Bastone A. Prevalence of fear of falling amonga population of older adults and its correlation with mobility, dynamic balance, risk and history of falls. Brazilian Journal of Physical Therapy. 2009;13:223-9.

249. Anderson B, Strand LI, Råheim M. The effect of long-term body awareness training succeeding a multimodal cognitive behavior program for patients with widespread pain. Journal of Musculoskeletal Pain. 2007;15(3):19-29.

250. Seferiadis A, Ohlin P, Billhult A, Gunnarsson R. Basic body awareness therapy or exercise therapy for the treatment of chronic whiplash associated disorders: a randomized comparative clinical trial. Disabil Rehabil. 2016;38(5):442-51.

251. Yilmaz K, Yazicioglu FG, Akkoyun Sert O, Ozturk B, Armutlu K, Yuce H. The effects of basic body awareness therapy on balance in patients with chronic neck pain: a randomisedcrossover trial. Somatosens Mot Res. 2023;12:1-9.

252. Courtois I, Cools F, Calsius J. Effectiveness of body awareness interventions in fibromyalgia and chronic fatigue syndrome: A systematic review and meta-analysis. Journal of Bodywork and Movement Therapies. 2015;19(1):35-56.

APPENDICES

Appx 1. Ethical Committee Approval

KLİNİK ARAŞTIRMALAR ETİK KURULU KARAR FORMU

ARAŞTIRMANIN AÇIK ADI		"Fibromiyaljili Kadın Hastalarda Denge ve Vücut Farkındalığı İle Ağrı ve Fonksiyonel Kapasite Arasındaki İlişkinin İncelenmesi"
VARSA ARAŞTIRMANIN PROTOKOL KODU		
ETİK KURUL BİLGİLERİ	ETİK KURULUN ADI	Kırşehir Ahi Evran Üniversitesi Tıp Fakültesi Klinik Araştırmalar Etik Kurulu
	AÇIK ADRESİ:	Kırşehir Ahi Evran Üniversitesi Tıp Fakültesi Bağbaşı Yerleşkesi Merkez/KIRŞEHİR
	TELEFON	
	FAKS	
	E-POSTA	

BAŞVURU BİLGİLERİ	KOORDİNATÖR/SORUMLU ARAŞTIRMACI UNVANI/ADI/SOYADI	Dr. Öğr. Üyesi Anıl ÖZÜDOĞRU			
	KOORDİNATÖR/SORUMLU ARAŞTIRMACININ UZMANLIK ALANI	Fizik Tedavi ve Rehabilitasyon			
	KOORDİNATÖR/SORUMLU ARAŞTIRMACININ BULUNDUĞU MERKEZ	Kırşehir			
	VARSA İDARİ SORUMLU UNVANI/ADI/SOYADI				
	DESTEKLEYİCİ				
	PROJE YÜRÜTÜCÜSÜ UNVANI/ADI/SOYADI (TÜBİTAK vb. gibi kaynaklardan destek alanlar için)				
	DESTEKLEYİCİNİN YASAL TEMSİLCİSİ				
	ARAŞTIRMANIN FAZI VE TÜRÜ	FAZ 1	☐		
		FAZ 2	☐		
		FAZ 3	☐		
		FAZ 4	☐		
		Gözlemsel ilaç çalışması	☐		
		Tıbbi cihaz klinik araştırması	☐		
		İn vitro tıbbi tanı cihazları ile yapılan performans değerlendirme çalışmaları	☐		
		İlaç dışı klinik araştırma	☐		
		Diğer ise belirtiniz: Girişimsel Olmayan Klinik Araştırma			
	ARAŞTIRMAYA KATILAN MERKEZLER	TEK MERKEZ ☒	ÇOK MERKEZLİ ☐	ULUSAL ☒	ULUSLARARASI ☐

Sayfa 1/3

Etik Kurul Başkan V.
Unvanı/Adı/Soyadı: Dr. Öğr. Üyesi Arif Hüdai KÖKEN
İmza:

Not: Etik kurul başkanı, imzasının yer almadığı her sayfaya imza atmalıdır.

KLİNİK ARAŞTIRMALAR ETİK KURULU KARAR FORMU

ARAŞTIRMANIN AÇIK ADI	"Fibromiyaljili Kadın Hastalarda Denge ve Vücut Farkındalığı İle Ağrı ve Fonksiyonel Kapasite Arasındaki İlişkinin İncelenmesi"
VARSA ARAŞTIRMANIN PROTOKOL KODU	

	Belge Adı	Tarihi	Versiyon Numarası	Dili
DEĞERLENDİRİLEN BELGELER	ARAŞTIRMA PROTOKOLÜ	26.09.2022	1	Türkçe ☒ İngilizce ☐ Diğer ☐
	BİLGİLENDİRİLMİŞ GÖNÜLLÜ OLUR FORMU	26.09.2022	1	Türkçe ☒ İngilizce ☐ Diğer ☐
	OLGU RAPOR FORMU	26.09.2022	1	Türkçe ☒ İngilizce ☐ Diğer ☐
	ARAŞTIRMA BROŞÜRÜ			Türkçe ☐ İngilizce ☐ Diğer ☐

	Belge Adı		Açıklama
DEĞERLENDİRİLEN DİĞER BELGELER	SİGORTA	☐	
	ARAŞTIRMA BÜTÇESİ	☐	
	BİYOLOJİK MATERYEL TRANSFER FORMU	☐	
	İLAN	☐	
	YILLIK BİLDİRİM	☐	
	SONUÇ RAPORU	☐	
	GÜVENLİLİK BİLDİRİMLERİ	☐	
	DİĞER:	☐	

KARAR BİLGİLERİ	**Karar No: 2022-18/164**	**Tarih: 11/10/2022**

Yukarıda bilgileri verilen başvuru dosyası ile ilgili belgeler araştırmanın/çalışmanın gerekçe, amaç, yaklaşım ve yöntemleri dikkate alınarak incelenmiş ve uygun bulunmuş olup araştırmanın/çalışmanın başvuru dosyasında belirtilen merkezlerde gerçekleştirilmesinde etik ve bilimsel sakınca bulunmadığına, toplantıya katılan Etik Kurul üye tamsayısının salt çoğunluğu ile karar verilmiştir.

Ancak Kırşehir İl Sağlık Müdürlüğünden çalışmanın onay yazısı alındıktan sonra çalışmaya başlanabilir.

KLİNİK ARAŞTIRMALAR ETİK KURULU	
ETİK KURULUN ÇALIŞMA ESASI	İlaç ve Biyolojik Ürünlerin Klinik Araştırmaları Hakkında Yönetmelik, İyi Klinik Uygulamaları Kılavuzu
BAŞKAN V. UNVANI / ADI / SOYADI:	Dr. Öğr. Üyesi Arif Hüdai KÖKEN

11/10/2022 tarihinde aşağıdaki kişiler toplantıya katılmışlardır.

Unvanı/Adı/Soyadı	Uzmanlık Alanı	Kurumu	Cinsiyet		Araştırma ile ilişki		Katılım *		İmza
Doç. Dr. Recai DAĞLI	Anesteziyoloji ve Reanimasyon	Ahi Evran Üniversitesi Tıp Fakültesi	E ☒	K ☐	E ☐	H ☐	E ☐	H ☐	
Dr. Öğr. Üyesi Arif Hüdai KÖKEN	Tıp Tarihi ve Etik	Ahi Evran Üniversitesi Tıp Fakültesi	E ☒	K ☐	E ☐	H ☐	E ☐	H ☐	
Dr. Öğr. Üyesi Dilek KUZAY AKSOY	Fizyoloji	Ahi Evran Üniversitesi Tıp Fakültesi	E ☐	K ☒	E ☐	H ☐	E ☐	H ☐	

Etik Kurul Başkan V.
Unvanı/Adı/Soyadı: Dr. Öğr. Üyesi Arif Hüdai KÖKEN
İmza:

Not: Etik kurul başkanı, imzasının yer almadığı her sayfaya imza atmalıdır.

KLİNİK ARAŞTIRMALAR ETİK KURULU KARAR FORMU

ARAŞTIRMANIN AÇIK ADI	"Fibromiyaljili Kadın Hastalarda Denge ve Vücut Farkındalığı İle Ağrı ve Fonksiyonel Kapasite Arasındaki İlişkinin İncelenmesi"
VARSA ARAŞTIRMANIN PROTOKOL KODU	

Prof. Dr. Ayla ÜNSAL	Hemşirelik	Ahi Evran Üniversitesi Sağlık Bilimleri Fakültesi	E ☐	K ☒	E ☐	H ☐	E ☐	H ☐
Dr. Öğr. Üyesi Gülhan ÜNLÜ	Tıbbi Farmakoloji	Ahi Evran Üniversitesi Tıp Fakültesi	E ☐	K ☒	E ☐	H ☐	E ☐	H ☐
Uzm. Dr. Fatma Nur ARSLAN	Anesteziyoloji ve Reanimasyon	Kırşehir Eğitim ve Araş. Hastanesi	E ☐	K ☒	E ☐	H ☐	E ☐	H ☐
Dr. Öğr. Üyesi Naime Meriç KONAR	Biyoistatistik ve Tıp Bilişimi	Ahi Evran Üniversitesi Tıp Fakültesi	E ☐	K ☒	E ☐	H ☐	E ☐	H ☐
Dr. Öğr. Üyesi Ramazan DULKADİR	Çocuk Sağlığı ve Hastalıkları	Ahi Evran Üniversitesi Tıp Fakültesi	E ☒	K ☐	E ☐	H ☐	E ☐	H ☐
Uzm. Dr. Mustafa AVCU	Kulak Burun Boğaz Hastalıkları	Özel Musa Gül Hastanesi	E ☒	K ☐	E ☐	H ☐	E ☐	H ☐
Dr. Öğr. Üyesi Murat DOĞAN	Aile Hekimliği	Ahi Evran Üniversitesi Tıp Fakültesi	E ☒	K ☐	E ☐	H ☐	E ☐	H ☐
Av. Ali DEMİR	Hukuk	Serbest Avukat	E ☒	K ☐	E ☐	H ☐	E ☐	H ☐
Doç. Dr. Mümtaz DADALI	Üroloji	Ahi Evran Üniversitesi Tıp Fakültesi	E ☒	K ☐	E ☐	H ☐	E ☐	H ☐
V.H.K.İ Yasin KILIÇ	Memur	Ahi Evran Ün. TÖMER Merkezi	E ☒	K ☐	E ☐	H ☐	E ☐	H ☐

*:Toplantıda Bulunma

Etik Kurul Başkan V.
Unvanı/Adı/Soyadı: Dr. Öğr. Üyesi Arif Hüdai KÖKEN
İmza:

Not: Etik kurul başkanı, imzasının yer almadığı her sayfaya imza atmalıdır.

Appx 2. Socio-Demographic Questionnaire Form

Katılımcı No: **Tarih:**

Araştırmanın Adı: Fibromiyaljili Kadın Hastalarda Denge ve Vücut Farkındalığı ile Ağrı ve Fonksiyonel Kapasite Arasındaki İlişkinin İncelenmesi

Hasta Grubu ( ) Kontrol Grubu ( )

Yaşı :

Cinsiyeti :

Boy :

Kilo :

Eğitim Düzeyi : İlkokul ( ) Ortaokul ( ) Lise ( ) Üniversite ( )
Yüksek Lisans ( ) Doktora ( )

Mesleği :

Çalışma Durumu : Çalışıyorum ( ) Çalışmıyorum ( ) Emekli

( )Şikâyetleri :

Kullandığı ilaçlar :

Ek Mevcut Sistemik Hastalık: Yok ( ) Var ( )*

*Diğer Hastalıklar :

Hassas noktaları :

Doktor notu :

VAS (Görsel Analog Skala)

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Fibromiyalji Etki Anketi.....skor

Vücut Farkındalık Anketi .....skor

Zamanlı Kalk ve Yürü Testi .....sn

6 Dakika Yürüme Testi.....sn

Biodex Denge Sistemi:

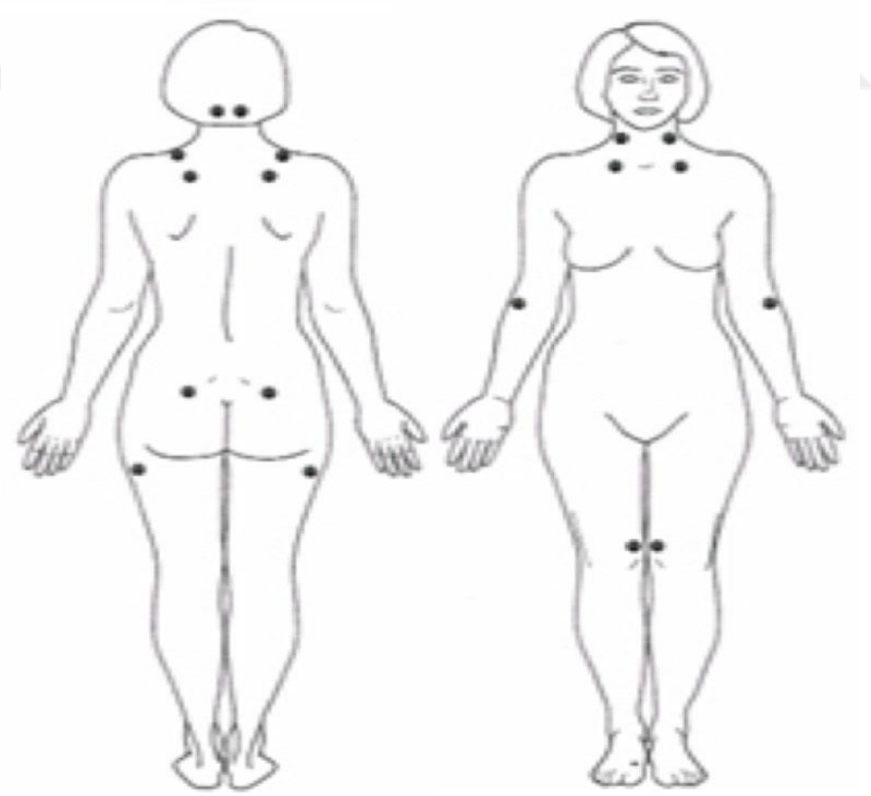
Dinamik A-P		Statik A-P	
Dinamik M-L		Statik M-L	
Dinamik Genel		Statik Genel	

Araştırmacı/ İmza:

Borg skalası:

0	Hiç nefes darlığı yok	**5**	Şiddetli
0,5	Çok çok hafif nefes darlığı var	**6**	-
1	Çok hafif	**7**	Çok şiddetli
2	Hafif	**8**	-
3	Orta	**9**	Çok çok şiddetli
4	Biraz şiddetli	**10**	Maksimal

Algometre ölçümü:



Appx 3. The Fibromyalgia Impact Questionnaire (FIQ)

Fibromiyalji Etki Anketi

The Fibromyalgia Impact Questionnaire (FIQ)

Hastanın Adı Soyadı: _____ Tarih: ____/____/_____

1 Aşağıdaki aktiviteleri yapabiliyor musunuz?

		Daima	Çoğunlukla	Ara sıra	Hiçbir zaman
a	Alışveriş yapmak	❑0	❑1	❑2	❑3
b	Çamaşır yıkamak	❑0	❑1	❑2	❑3
c	Yemek hazırlamak	❑0	❑1	❑2	❑3
d	Bulaşıkları (tabak, kazan vs.) elde yıkamak	❑0	❑1	❑2	❑3
e	Elektrik süpürgesi ile halı süpürmek	❑0	❑1	❑2	❑3
f	Yatakları düzenlemek	❑0	❑1	❑2	❑3
g	Birkaç yüz metre yürümek	❑0	❑1	❑2	❑3
h	Arkadaş/akraba ziyareti yapmak	❑0	❑1	❑2	❑3
i	Bahçe işleri yapmak	❑0	❑1	❑2	❑3
j	Araba kullanmak	❑0	❑1	❑2	❑3
k	Merdiven çıkmak	❑0	❑1	❑2	❑3
		Toplam Skor:		[(a+b+….+k) / 10 x 3.33]	

2 Son bir hafta içinde kendinizi kaç gün iyi hissettiniz?

0 1 2 3 4 5 6 7 _____

3 Geçen hafta boyunca kaç gün fibromiyaljiden dolayı iş yapamaz duruma geldiniz?

0 1 2 3 4 5 6 7 _____

4 İşe gittiğiniz zaman, ev işlerinizi yaparken ağrı ve diğer yakınmalar iş yapmanızı ne kadar engelledi?

Engellemedi 0 1 2 3 4 5 6 7 8 9 10 Çok Engelledi _____

5 Ağrınızın düzeyi ne kadardı?

Yoktu 0 1 2 3 4 5 6 7 8 9 10 Çok Fazlaydı _____

6 Ne kadar yorgunsunuz?

Yorgun değilim 0 1 2 3 4 5 6 7 8 9 10 Çok Yorgunum _____

7 Sabahları kalktığınızda kendinizi nasıl hissediyorsunuz?

Dinlenmiş 0 1 2 3 4 5 6 7 8 9 10 Çok Yorgun _____

8 Sabah tutukluğunuz ne kadar?

Hiç yok 0 1 2 3 4 5 6 7 8 9 10 Çok Tutuk _____

9 Kendinizi ne kadar sinirli ve gergin hissediyorsunuz?

Sakin 0 1 2 3 4 5 6 7 8 9 10 Çok Sinirli _____

10 Kendinizi ne kadar hüzünlü, çökkün, morali bozuk veya depresif hissediyorsunuz?

Hiç 0 1 2 3 4 5 6 7 8 9 10 Çok _____

Burckhardt, C.S., Clark S.R., Bennett, R.M. (1991) Journal of Rheumatology. 1991 18, 728-734

ftronline

www.ftronline.com

Tasarım ve düzenleme: Dr. Ender Salbaş 2016

Appx 4. The Body Awareness Questionnaire (BAQ)

VÜCUT FARKINDALIĞI ANKETİ

Aşağıdaki ifadelerde insanların kendileriyle ilgili hissettikleri bazı durumlar listelenmiştir. Her ifadeyi okuduktan sonra ifadenin solundaki boşluğa ifadenin sizin için hangi derecede doğru olduğunu 1'den 7'ye kadar değerlendirerek numarayı yazınız. Doğru veya yanlış cevaplar yoktur. En doğru cevap ifadenin sizin tecrübenize uygunluğunu dürüstçe yansıtandır.

Benim için hiç doğru değil Benim için tamamen doğru

1 2 3 4 5 6 7

1. Vücudumun çeşitli yiyeceklere verdiği tepkilerdeki farklılığı anlarım.
2. Bir yerimi çarptığımda berelenme olup olmayacağını her zaman söyleyebilirim.
3. Kendimi ertesi gün ıstırap duyacak kadar fiziksel olarak zorlayıp zorlamadığımı her zaman bilirim.
4. Bazı yiyecekleri yediğim zaman enerji düzeyimdeki değişimleri her zaman fark ederim.
5. Grip olacağımı önceden anlarım.
6. Dereceyle ölçmeden ateşimin olduğunu bilirim.
7. Açlıktan kaynaklanan yorgunluk ile uykusuzluktan kaynaklanan yorgunluk arasındaki farkı ayırt edebilirim.
8. Uykusuzluğun beni günün hangi saatinde etkileyeceğini doğru tahmin edebilirim.
9. Gün boyunca aktivite düzeyimdeki değişikliklerin farkındayım.

*10. Vücut fonksiyonlarımdaki mevsimsel ritim ve döngüleri fark etmiyorum.

11. Sabah uyanır uyanmaz gün boyunca ne kadar enerjim olacağını bilirim.
12. Yatağa gittiğimde o gece ne kadar iyi uyuyacağımı söyleyebilirim.
13. Yorgun olduğumda vücudumdaki belirgin tepkileri fark ederim.
14. Hava değişikliklerine karşı vücudumun verdiği tepkileri fark ederim.
15. Dinlenmiş bir şekilde uyanmak için gece ne kadar uyumam gerektiğini tahmin edebilirim.
16. Egzersiz alışkanlıklarım değiştiğinde enerji düzeyimin nasıl etkileneceğini tahmin edebilirim.
17. Benim için gece uyumaya gitmenin belli bir uygun zamanı vardır.

18. Aşırı açlık durumundaki özel vücut tepkilerimi fark ederim

*=ters skorlanan madde

Appx 5. Informed Consent Form

Çalışmanın Adı: Fibromiyaljili Kadın Hastalarda Denge Ve Vücut Farkındalığı İle Ağrı Ve Fonksiyonel Kapasite Arasındaki İlişkinin İncelenmesi'

Aşağıda bilgileri yer almakta olan bir araştırma çalışmasına katılmanız istenmektedir. Çalışmaya katılıp katılmama kararı tamamen size aittir. Katılmak isteyip istemediğinize karar vermeden önce araştırmanın neden yapıldığını, bilgilerinizin nasıl kullanılacağını, çalışmanın neleri içerdiğini, olası yararları ve risklerini ya da rahatsızlık verebilecek yönlerini anlamanız önemlidir. Lütfen aşağıdaki bilgileri dikkatlice okumak için zaman ayırınız. Eğer çalışmaya katılma kararı verirseniz, **Çalışmaya Katılma Onayı** Formu'nu imzalayınız. Çalışmadan herhangi bir zamanda ayrılmakta özgürsünüz. Çalışmaya katıldığınız için size herhangi bir ödeme yapılmayacak ya da sizden herhangi bir maddi katkı/malzeme katkısı istenmeyecektir.

Çalışmanın Konusu ve Amacı: Çalışma sizin gibi fibromiyalji sendromu olan hastalarda yapılacaktır. Sizin denge düzeyinizi, hastalığınızın gidişatını, ağrı şiddetinizi, vücut farkındalığınızı, fonksiyonel durumunuzu, aerobik kapasitenizi ve düşme riskinizi değerlendirecek olan testler ve anketler yapılacaktır. Bu kapsamda fibromiyalji tanısı alan kadın hastalarda denge ve vücut farkındalığı ile ağrı ve fonksiyonel kapasitenin arasında ilişkinin olup olmadığı ortaya konularak literatüre katkıda bulunmak hedeflenmektedir.

Çalışma İşlemleri: Bu çalışmaya katıldığınız takdirde size doldurmanız gereken üç adet form verilecektir. Çalışmaya başlamadan önce sizin yaş, boy, kilo, sistemik hastalıklarınızın varlığı gibi sosyodemografik verileriniz kayıt altına alınacaktır. Diğer iki form ise standardize ölçeklerdir. Bu ölçekler sizin fonksiyonel durumunuzu ve vücut kompozisyonunuzun normal veya normal olmayan duyarlılık düzeyinizi sorgulamaktadır. Tüm formları eksiksiz doldurmanız beklenmektedir. Formları doldurduktan sonra size üç farklı test uygulanacaktır. İlk test düşme riskinizi ve mobilitenizi değerlendirir. İkinci test ise hastalığınızın gidişatını veya ağırlığı hakkında bilgi veren bir testtir. Son testimiz ise denge probleminizin olup olmadığını belirlemektedir. Değerlendirme testleri yaklaşık 60 dk sürecektir.

Çalışmaya Katılmanın Olası Yararları Nelerdir? Çalışmaya katılarak hastalığınızın genel sağlık durumunuzu nasıl etkilediği ortaya çıkacaktır

Kişisel Bilgilerim Nasıl Kullanılacak? Birey ile ilgili tüm tıbbi ve kişisel bilgiler gizli tutulacak, ancak çalışmanın kalitesini denetleyen görevliler, etik kurullar ya da resmi makamlarca gereği halinde incelenebilecek ve bilimsel amaçlı kullanılabilecektir.

Günün 24 saatinde soru ve problemler için başvurulacak kişiler/GSM:

Dr.Öğr. Üyesi Anıl

ÖZÜDOĞRUGSM No:

05**********

E-posta: **********@hotmail.com

Gönüllünün Çalışmaya Katılma Onayı:

Yukarıdaki bilgileri ilgili araştırmacı ile ayrıntılı olarak tartıştım ve kendisi bütün sorularımı cevapladı. Bu bilgilendirilmiş olur belgesini okudum ve anladım. Bu araştırmaya katılmayı kabul ediyor ve bu onay belgesini kendi hür irademle imzalıyorum. Bu onay, ilgili hiçbir kanun ve yönetmeliği geçersiz kılmaz. Araştırmacı, saklamam için bu belgenin bir kopyasını çalışma sırasında dikkat edeceğim noktaları da içerecek şekilde bana teslim etmiştir.

Gönüllü Adı Soyadı:		*Tarih ve İmza:*
Telefon:		

Veli ya da Vasi (var ise) Adı Soyadı:		*Tarih ve İmza:*
Telefon:		

Araştırmacı[2] Adı Soyadı:	Dr. Öğr.Üyesi Anıl ÖZÜDOĞRU	*Tarih ve İmza:*
Adres ve Telefon:	Kırşehir Ahi Evran Üniversitesi Fizik Tedavi ve Rehabilitasyon Yüksekokulu GSM No: 05**********	

1: Gönüllünün bilgilendirilme işlemine başından sonuna dek tanıklık eden kişi

2: Gönüllüyü araştırma hakkında bilgilendiren kişi

CURRICULUM VITAE

PERSONAL DETAILS	
Surname / Name	Mensure ASLAN
Date of birth	**********
Place of birth	**********
Nationality	**********
Phone	**********
E-mail address	**********

EDUCATION	
BACHELOR DEGREE	
University	Kırşehir Ahi Evran University
Faculty	School of Physical Therapy and Rehabilitation
Department	Physical Therapist
Graduation year	2021

CONFERENCE ATTENDANCE & PAPERS
International conference and symposium
2018 Kırşehir Ahi Evran University, School of Physical Therapy and Rehabilitation, ‘ 4th Annual Spring Symposium on Stroke Rehabilitation’

ARTICLES AND PAPERS	
2022	ASLAN Mensure, KANDEMİR Hatice, ÖZÜDOĞRU Anıl (2022). Effect of Scapular Kinesio Tape Application on Upper Extremity Function in Healthy Individuals. XVIII. Congress on Developments in Physiotherapy (Poster), ANKARA.
2022	KANDEMİR Hatice, ASLAN Mensure, ÖZÜDOĞRU Anıl (2022). Evaluation of Physical Activity Level and Exercise Benefit/Disability Perceptions of Patients Applying to Spinal Health Unit. XVIII. Congress on Developments in Physiotherapy (Poster), ANKARA.
2023	ASLAN Mensure, ÖZÜDOĞRU Anıl (2023). Investigation of the Relationship between Balance and Body Awareness with Pain and Functional Capacity in Women with Fibromyalgia. 6th International Health Science and Life Congress (IHSLC 2023).
2023	Anıl Özüdoğru, Mehmet Canlı, Şafak Kuzu, Mensure Aslan, İsmail Ceylan and Halil Alkan (2023). Muscle strength, balance and upper extremity function are not predictors of cervical proprioception in healthy young subjects. *Taylor&Francis Online.*
2023	Mehmet Yetiş, İsmail Ceylan, Mehmet Canlı, Ömer Alperen Gürses, Mensure Aslan, Levent Horoz, Abdulhamit Tayfur (2023). Validity and Reliability of Turkish Version of the Munich Wrist Questionnaire in Patients With Wrist Problems. *Evaluation & the Health Professions.*