

T.C.
YEDİTEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF PHYSIOTHERAPY AND REHABILITATION

**COMPARISON OF MUSCULOSKELETAL
SYSTEM COMPLAINTS IN PEOPLE WHO DO
YOGA AND PILATES**

MASTER'S PROGRAM IN SPORTS PHYSIOTHERAPHY

MEHMET ALİ KUŞ,PT

İSTANBUL 2020

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MEHMET ALİ KUŞ, PT.

ADVISER

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İSTANBUL 2020

APPROVAL

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Owner of the Thesis : Mehmet Ali Kuş
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This study have approved as a Master Thesis in regard to content and quality by the Jury.

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APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated 07/02072020 and numbered 2020/02-15.

Prof. Dr. Bayram YILMAZ
Director of Institute of Health Sciences

DECLARATION

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree except where due acknowledgement has been made in the text.

06.03.2020

Mehmet Ali Kuş



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ABSTRACT

Kuş M. A.(2020). Comparison of Musculoskeletal System Complaints in People Who Do Yoga and Pilates. Yeditepe University, Institute of Health Sciences, Department of Physiotherapy and Rehabilitation, Master Thesis. Istanbul.

This study aims to compare the musculoskeletal problems in people interested in yoga and pilates sports, to question whether trainer or physiotherapist creates a difference to regarding the musculoskeletal complaints in the sporters, and to compare musculoskeletal problems among groups of volunteers engaged in yoga, pilates and sedentary living. Randomly selected 162 volunteer participants, aged 18-50 years doing yoga, pilates and sedentary living were included in the study. 118 of the participants were female and 44 were male (mean age was 32.28 ± 7.06 year). 54 people who do yoga (mean age 34.52 ± 6.69), 54 people who do pilates (mean age 30.56 ± 5.46) and 54 people who live sedentary (mean age 32.28 ± 7.06) participated in the study. The sociodemographic features of the volunteer participants were asked, and Extended Nordic Musculoskeletal Questionnaire was applied. In the result of our study, no statistically significant difference ($p > 0.05$) was observed between the distribution of the complaints in the neck, shoulder, back, elbow, hand/wrist, waist, hip/thigh and foot/wrist area of the participants in all three groups. The complaints in the knee area of the yoga group were statistically higher ($p < 0.05$) than in the pilates and sedentary life groups. Furthermore, the area where the participants in the sedentary life and yoga groups experienced problems the most was the waist, while the area where the participants in the pilates group experienced problems the most was the neck. When the results of the survey are examined, it is seen that people who practice yoga or pilates have fewer complaints of musculoskeletal system than those who experience sedentary life. The problem in the neck and knee regions of the participants who do pilates with the physiotherapist was statistically lower ($p < 0.05$) than the participants who do pilates with the trainer. In addition, the problem in the neck area of the participants who do yoga with the physiotherapist was statistically lower ($p < 0.05$) than the participants who do yoga with the trainer.

Key words: Yoga, pilates, sedantery lifestyle, musculoskeletal system complaints, Extended Nordic Musculoskeletal Questionnaire (NMQ-E)

ÖZET

Kuş M. A.(2020).Yoga ve Pilates Yapan Kişilerde Kas İskelet Sistemi Şikayetlerinin Karşılaştırılması. Yeditepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Spor Fizyoterapisi Anabilim Dalı, Master Tezi, İstanbul.

Bu çalışmanın amacı yoga ve pilates sporlarıyla ilgilenen kişilerde oluşabilecek kas iskelet sistemi şikayetlerini karşılaştırmak, sporu yaptıran kişinin fizyoterapist ya da antrenör olmasının spor yapanlardaki kas iskelet sistemi şikayetleri konusunda bir fark yaratıp yaratmadığını sorgulamak ve yoga yapan, pilates yapan ve sedanter yaşayan gönüllü grupları arasında kas iskelet sistemi şikayetlerini karşılaştırmaktır. Çalışmaya rasgele seçilen, ancak 18-50 yaş aralığında yoga yapan, pilates yapan ve sedanter yaşayan 162 gönüllü katılımcı dahil edilmiştir. Katılımcıların 118'i kadın, 44'ü erkektir (yaş ortalaması $32,28 \pm 7,06$ yıl). Çalışmaya yoga yapan 54 ($34,52 \pm 6,69$ yıl), pilates yapan 54 ($30,56 \pm 5,46$ yıl) ve sedanter yaşayan 54 ($32,28 \pm 7,06$ yıl) kişi katılmıştır. Gönüllü katılımcılara sosyodemografik özellikleri sorulmuş ve Genişletilmiş Nordic Kas İskelet Anketi uygulanmıştır. Çalışmamızın sonucunda her üç gruptaki katılımcıların boyun, omuz, sırt, dirsek, el/el bileği, bel, kalça/uyluk ve ayak/bilek bölgelerindeki şikayetlerin dağılımları arasında istatistiksel açıdan ($p > 0.05$) fark görülmemiştir. Yoga grubundaki katılımcıların diz bölgesindeki şikayetler pilates ve sedanter yaşam gruplarındakilerden istatistiksel ($p < 0.05$) olarak daha yüksektir. Ayrıca sedanter yaşam ve yoga gruplarındaki katılımcıların en fazla sorun yaşadığı bölge bel iken pilates grubundaki katılımcıların en fazla sorun yaşadığı bölge boyundur. Anket sonuçları incelendiğinde yoga veya pilates yapan kişilerin sedanter yaşayan kişilere göre daha az kas iskelet sistemi şikayetine sahip olduğu görülmüştür. Fizyoterapist ile pilates yapan katılımcıların boyun ve diz bölgelerindeki sorun antrenör ile pilates yapan katılımcılardan istatistiksel ($p < 0.05$) olarak daha düşüktür. Ayrıca fizyoterapist ile yoga yapan katılımcıların boyun bölgesindeki sorun antrenör ile yoga yapan katılımcılardan istatistiksel ($p < 0.05$) olarak daha düşüktür.

.Anahtar Kelimeler: Yoga, pilates, sedanter yaşam, kas iskelet sistemi şikayetleri, Genişletilmiş Nordic Kas İskelet Anketi (NMQ-E)

1. INTRODUCTION AND PURPOSE

Nowadays, the number of people doing yoga and pilates is increasing. According to some sources, there were 9.05 million pilates and 27.35 million people doing yoga regularly in America in 2017 (1). In our country, yoga and pilates sports are performed by sports trainers and physiotherapists who receive training on this subject. These two popular sports branches have many benefits.

Pilates is a sport that increases flexibility, proprioception, balance and coordination (2). Pilates exercises, first offered by Joseph Pilates (1880-1967), are increasingly used in sick and healthy populations. Pilates training aims to combine movement originating from a central column with mind and body. The central column is formed by diaphragm, multifidus, transversus abdominis and pelvic floor muscles. Respiratory control activates the central column, and exercises involving arms and legs with the help of visual imagery thereby increase the patient's neuromuscular control and kinesthetic awareness of movement. Pilates training plays a role in restoring and maintaining muscular force, flexibility, endurance and operability of proprioceptive mechanisms(47). Yoga increases flexibility, balance, coordination and is beneficial in mental problems such as anxiety and depression (3). Yoga; consists of breathing exercises, posture positions and relaxation; improves mental health of the person by providing mind-body togetherness; reduces stress, anxiety and pain. It increases physical activity, strength and endurance, reduces functional impairment and improves quality of life. Spinal stabilization exercises aim to improve the inadequacy around the person's neutral spine by providing local stabilization muscle activation consisting of multifidus, diaphragm, transversus abdominus and pelvic floor novices. The person is encouraged to perceive the neutral spine position and adapt this position to daily life activities. Thus, by maintaining the stabilization function of the spine, inappropriate loads are minimized, thereby reducing pain and functional inadequacy(46). A sedentary lifestyle causes many serious health problems. The human model, which is created by dizzying technological progress in the 20th century, that is, not walking, not running, not physically fatigued during daily life, is described as sedentary human. Nowadays, scarcity of movement is characterized as a disease and is cited as the cause of many fatal diseases. Cardiovascular disease is the head of this group. Of course, with the development of technology, the fact that tools that facilitate work are an indispensable part of daily life has a great impact on

bodily inactivity. Many diseases such as obesity and cardiovascular diseases, which are described as the disease of the age, such as muscular weakness, postural disorder, and diabetes are more common in immobile and sedentary individuals. While the heartbeat of these people almost does not increase and their breathing becomes frequent, if they do not pay attention to their diet, they will most likely have to endure some complaints and ailments from the forties. Obesity (high body fat ratio), which is one of the most important of these ailments, is now accepted as a disease that needs to be treated on its own (48,49). The physical therapy community has had the opportunity to integrate pilates exercises into orthopedic rehabilitation since the early 1990s with traditional and alternative physical therapy methods and procedures. Physiotherapists can use pilates for spinal stabilization, muscle flexibility, balance, strength studies during the treatment of problems such as disc herniation, spondylolisthesis, low back pain, scoliosis, anterior cruciate ligament injuries, meniscus injuries (6). Yoga exercises, as well as pilates exercises, can be preferred by physiotherapists because of their therapeutic effects besides the purpose of doing sports. Yoga exercises can be used in addition to physical therapy protocols to increase flexibility, spinal stabilization, balance and strength in chronic pain, low back pain or balance problems (7).

The popularity of yoga has led researchers to explore the limitations of yoga and risk factors as a wellness method. Yoga is thought to have great potential, mental and physical health benefits. However, since yoga practices and training styles vary widely, care should be taken and yoga exercises should be prepared individually. Although rare, several yoga injuries have been reported in the literature, including pneumomediastinum, traumatic lymphocele, and various musculoskeletal lesions. For example, subcutaneous emphysema, retropharyngeal spaces, air and pneumomediastinum have been reported as a result of exercises that increase valsalva after a type of yoga called pranayama. Similarly, rectus sheath hematoma was observed after pranayama yoga session. Pranayama consists of breathing exercises in which breathing is manipulated by changing breathing and breathing movements, keeping the abdomen taut and loosening alternately. In addition, progressive glycomatous optic neuropathy, which caused loss of visual field, occurred due to the sirsacana (head posture) yoga posture performed for many years daily. Similarly, yoga-related musculoskeletal injuries have been reported as pseudoarthrosis of the first rib and rupture of the lateral collateral ligament (45). According to a study conducted in America, 29,590 people applied to the hospital emergency services between

2001-2014 due to yoga related injuries (4). In addition, it has been found that yoga is a risk factor for meniscus injuries (5).

As with any sport, there are some risks of injury in yoga and pilates. There is no study in the literature comparing yoga, pilates, and sedentary people in terms of pain and musculoskeletal system complaints caused by yoga and pilates exercises, which are becoming more and more popular in the world and increasing their use in the field of physiotherapy due to their therapeutic effects. For this reason, the aim of our study is to have an opinion about the pain or musculoskeletal system complaints that are mostly seen in people who do yoga or pilates, to see if there is a difference in terms of musculoskeletal system complaints between people who have been exercised by a physiotherapist and a coach, and to evaluate those who experience yoga or pilates and those who experience sedentary problems in terms of musculoskeletal system complaints. For this purpose, groups of volunteers participating in yoga, pilates and living sedentary will be evaluated.

Hypotheses of the study:

Hypothesis 1: Among the groups that practice yoga, pilates, and sedentary life, the physical areas where the majority have complaints of musculoskeletal system are different.

Hypothesis 2: Among the groups that practice yoga, pilates, and sedentary life, the physical areas where the majority have complaints of the musculoskeletal system are the same.

Hypothesis 3: There is a difference between the groups doing yoga and pilates in terms of having musculoskeletal system complaints in people who exercise with the physiotherapist and who exercise with the trainer.

Hypothesis 4: There is no difference between the groups doing yoga and pilates in terms of having musculoskeletal system complaints in those who exercise with the physiotherapist and exercise with the trainer.

2. GENERAL INFORMATION

2.1 Yoga

Yoga is an ancient discipline for a holistic health that aims to balance physically, mentally, emotionally and spiritually. Yoga is an Indian philosophy that aims to create balance mind and body harmony. Although yoga is often misunderstood as a simple “stretching” in the west, poses and postures (asanas) are just one of the eight components of a greater philosophy of complete health and balance. Today, yoga practiced in western cultures can often be described as Hatha Yoga. Hatha yoga involves practicing yoga postures with energetic breathing exercises (pranayama), one of the eight components of classical yoga. Generally, the coach shows a group of people performing a series of exercises with special postures, with breath control in a flow, often recommending that practitioners focus on postural fit, breathing, or bodily sensations produced by various postures (7,8).

Yoga evaluates the individual as a whole and strengthens the muscles, maintains the smoothness of the posture, provides flexibility, causes the breathing to regulate, calms the individual by relaxation and makes it more energetic. Yoga is a training program in which physical exercises that affect the mind are used together with concentration, relaxation, breathing exercises and maintaining a proper posture (9).

Yoga is done with comfortable clothes and bare feet. It consists of a series of postures called asana. These postures are done slowly and concentrated, with deep diaphragmatic breathing. Each posture is maintained in the range of 4 or 5 breaths. Yoga poses called Asana in Sanskrit are done gradually in turn, while each movement is accompanied by deep abdominal breathing (16).

2.1.1. Poses Used in Yoga Education (Asana)

Paschimothanasana	Bhujangasana
--------------------------	---------------------



Figure 2. 1: Forward Stretching Pose



Figure 2. 2: Cobra Pose

Vrikshasana





Figure 2. 3: Tree Pose



Tadasana







Figure 2. 4: Mountain Pose



<p>Trikonasana</p>	<p>Pada Hasthasana</p>
	
<p>Figure 2. 5: Triangle Pose</p>	<p>Figure 2. 6: Standing Forward Stretching Pose</p>

<p>Utthita Trikonasana</p>	<p>Parsvottanasana</p>
	
<p>Figure 2. 7: Triangular Pose For Circulation</p>	<p>Figure 2. 8: Intense Chest Stretch Pose</p>

Adhomukha Svanasana	Uttanasana
	
<p>Figure 2. 9: Downward Facing Dog Pose</p>	<p>Figure 2. 10: Intense Forward Stretching Pose</p>

Virabhadrasana 1	Virabhadrasana 2
	
<p>Figure 2. 11: Warrior 1</p>	<p>Figure 2. 12: Warrior 2</p>

Dandasana	Baddhakonasana
	
<p>Figure 2. 13: Wand Pose</p>	<p>Figure 2. 14: Fixed Angle Pose</p>

Janu Sirsasana	Savasana
	
<p>Figure 2. 15: Head on the Knee Pose</p>	<p>Figure 2. 16: Dead Pose</p>

Tadasana Paschima Namaskarasana	Tadasana Gomukhasana
 <p data-bbox="279 728 821 795">Figure 2. 17: Hands Ignited on The Back Mountain Pose</p>	 <p data-bbox="847 728 1390 795">Figure 2. 18: Hands Back in The Form of Cow Face Mountain Pose</p>

2.1.2. Sun Salutations (Surya Namaskar) Movement Series

Sun salute series (Surya Namaskar) consists of a combination of Yoga postures and breathing. Characteristically, Surya Namaskar is a versatile yoga practice, a special set of yoga asanas with both static stretching and dynamic muscle exercise components that include most of the joints, muscles and different internal organ systems of the body. It is an ideal form of aerobic exercise because it keeps the person on the verge of lactate or anaerobic and exerts moderate pressure on the cardiorespiratory system (47).

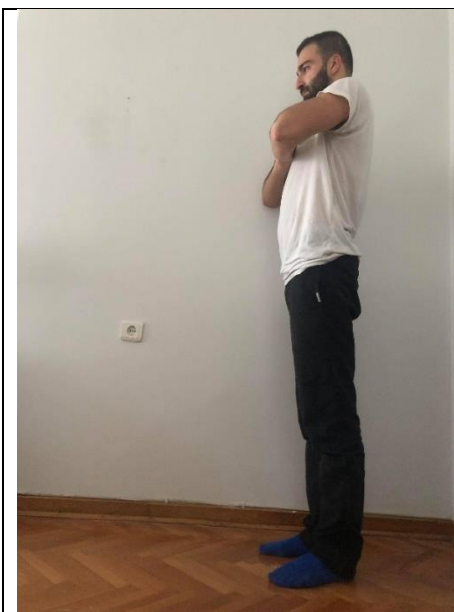


Figure 2. 19: Surya Namaskar Position 1

Hands are combined at chest level. Feet are adjacent and upright.



Figure 2. 20: Surya Namaskar Position 2

Breathe and arms are raised then arms are bent backwards.



Figure 2. 21: Surya Namaskar Position 3

Lean forward with exhalation and support from the hands. Initially, the knees can be bent, after a certain period of work, the knees should be straight.



Figure 2. 22: Surya Namaskar Position 4

Breathe and take a big step back with the right leg. Hands and feet are kept level on the ground. The head is raised slightly backwards.



Figure 2. 23: Surya Namaskar Position 5

Breathe and hold for a short time. The left foot is placed next to the right foot. Stand straight up to the heel.



Figure 2. 24: Surya Namaskar Position 6

Exhale and bring the body closer to the ground. Hip above, curl the body and pass your head through your hands.



Figure 2. 25: Surya Namaskar Position 7

Breathe and bend back as much as possible and stretch the spine.



Figure 2. 26: Surya Namaskar Position 8

Exhale and lift the hips upwards while pressing the heels to the ground. Hands and feet should be flat on the floor.



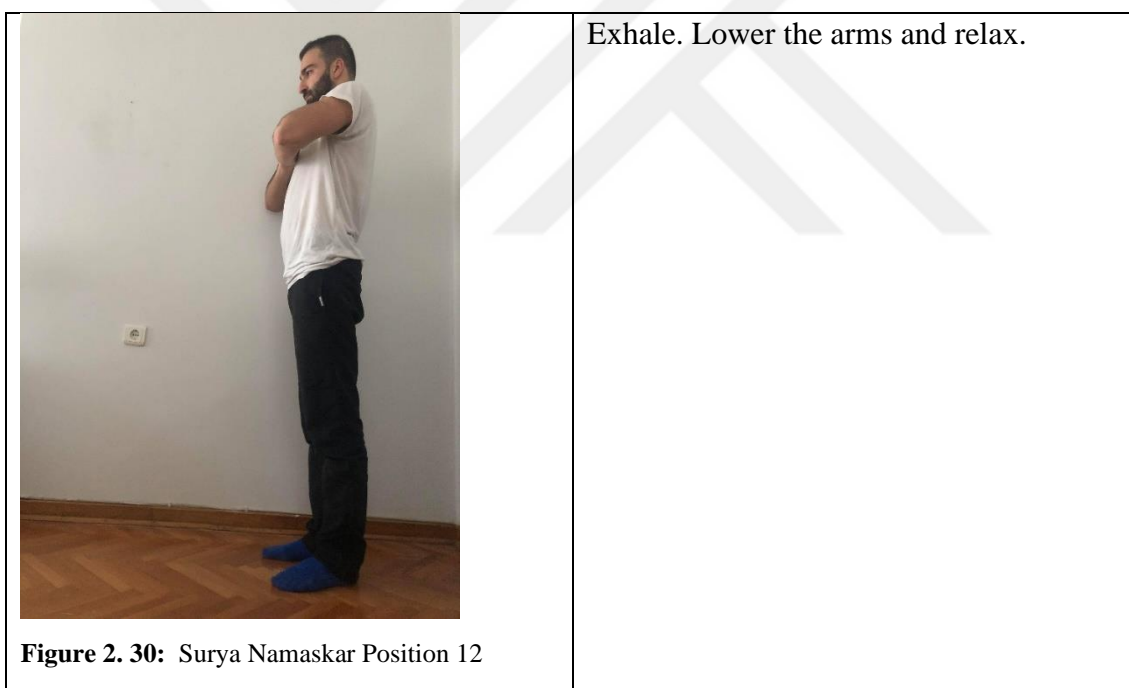
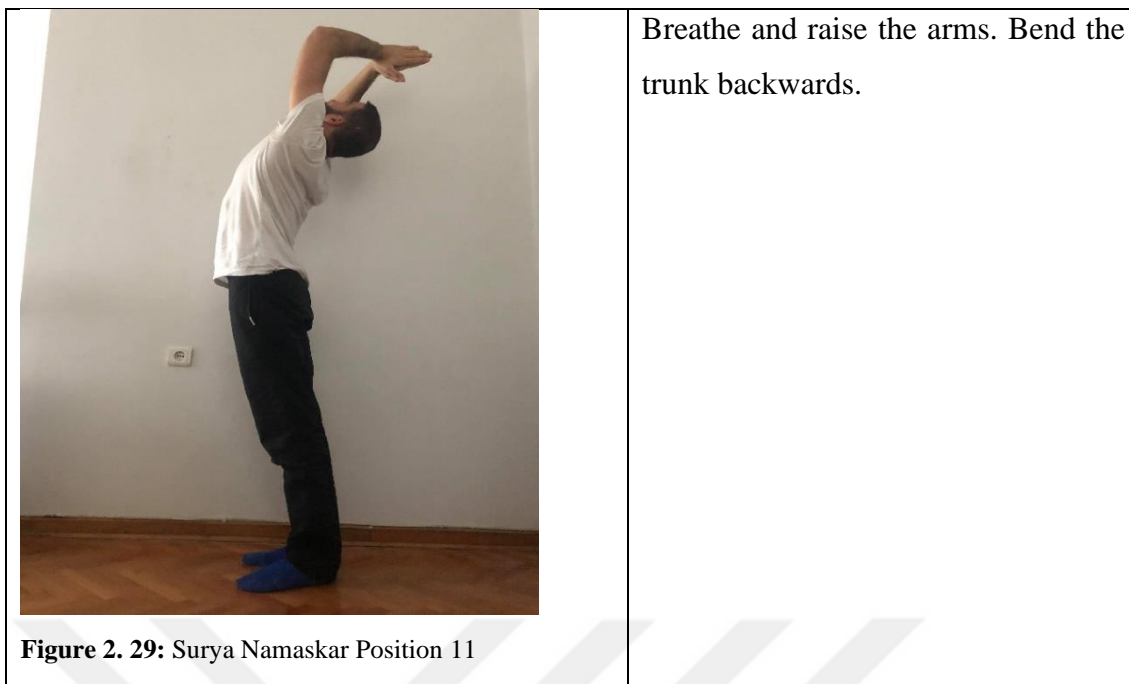
Figure 2. 27: Surya Namaskar Position 9

Breathe and align the right foot with the hands to the front.



Figure 2. 28: Surya Namaskar Position 10

Breathing out. Bend forward with support from the hands. In the beginning, the knees can be bent, after a certain period of work, the knees should be straight.



Although the health benefits of yoga have been investigated, the frequency of injuries among yoga participants has not been well documented. One study used data obtained through the National Electronic Injury Surveillance System (NEISS) between 2001 and 2014 to estimate the incidence and type of yoga-related injuries. The number of yoga participants and age distribution were estimated using data from National Health Statistics reports. In this study, national population estimates were applied to NEISS data

to determine injury rates in general and classified according to age categories. 29,590 yoga related injuries were observed in hospital emergency departments between 2001-2014. The trunk (46.6%) was the most frequently injured area and sprain / strain (45.0%) made up most of the diagnoses. It has been observed that participants over 65 years of age have more injuries in yoga practice than other age groups (4).

2.2. Pilates

Pilates is another popular mind-body exercise that focuses on controlled movement, posture and breathing. Joseph H. Pilates developed this comprehensive program known as the Pilates method in the 1920s. The dance group initially adopted Pilates as a method to get in shape for ballet and modern dancers. In recent years, the popularity of this exercise has increased and Pilates is now used both for sports and for a holistic health (10).

Pilates training is designed to improve body flexibility and health by using spinal stabilization, posture and exercise, and breath control. Pilates focuses on back extensors and strengthening the core muscles by focusing on the abdominal muscles, especially the transverse abdominus.

Exercise and breath control to prevent injuries to the peripheral joints while strengthening the core muscles; scapular, pelvic and rib cage stabilization when working the abdominal muscles; Head and neck positions are considered to avoid neck problems. In addition, pilates exercises include closed kinetic chain exercises that can provide compressive and decompressive forces that promote the nutrition of joints and cartilage to reduce degenerative effect (11,12).

In pilates, movement quality is more important than quantity, and repetitions are usually kept low between 6 and 10. Basic exercises provide stability, while more advanced exercises increase mobility, balance, coordination and muscle endurance. A variety of equipment can be added, including medicine balls, exercise bands, wooden blocks, small balls and balance boards, to provide movement variety. (12)

2.2.1. Aims of Pilates

- To provide neuromuscular retraining of correct abdominal movement patterns
- Accurate and balanced breathing

- To develop motion awareness
- Providing functional movement and balance training
- To improve muscle balance by increasing abdominal muscle strength and flexibility
- Providing lumbopelvic stability
- Restoring hip and shoulder girdle movements independently of the pelvis and spine
- To develop and coordinate isometric, concentric, eccentric muscle synergies and co-contraction for static and dynamic stabilization in all motion plans
- Improve joint range of motion and muscle strength throughout the entire movement
- To provide postural symmetry (12,13).

2.2.2 Fundamental Principles

1. Centering: Joseph Pilates defined the center (core) as the "house of power". Learning to use the power house correctly corrects the posture, stabilizes the spine, and improves the quality of movement. The core (core) consists of a lumbopelvic junction.

Muscles associated with the house of power (Muscolino and Cipriani 2004):

Anterior abdominals: Rectus abdominis, external oblique muscles, internal oblique muscles, Transversus abdominus.

Posterior abdominals: Erector spinae, transversospinalis muscles, quadratus lumborum

Hip extensors: Posterior head of gluteus maximus, hamstrings and adductor magnus

Hip flexors: Iliopsoas, rectus femoris, sartorius, tensor fascia lata, anterior hip adductors

Pelvic floor muscles: Levator ani, coccygeus, deep and superficial transverse perineal muscles and others

These muscles together with the fascia (thoracolumbar and abdominal fascia) provide spinal stability in the frontal, horizontal and sagittal planes.

2. **Concentration:** Pilates exercises require mental focus on the targeted body area. By directing attention to the working body segment, neuromuscular control improves the quality of movement. The more attention is paid, the better the quality of the movement produced. It may be helpful to give visual and tactile warnings to increase concentration.

3. **Control:** Pilates exercises teach the person to control their own body. Thus, the forces causing the injury are reduced and the body-mind connection is improved.

4. **Fluency:** Pilates exercises should be carried out without disruption and by ensuring continuity

5. **Accuracy:** In Pilates exercises, the quality of the exercise is important, not the number. It is important to apply an exercise until it is done correctly instead of a certain number of repetitions. Exercise can be done in a modified way until the person gets stronger. A complete body control is required for exercise regularity.

6. **Breathing:** Correct breathing is very important. Exercises are performed with a certain breathing rhythm. Thus, optimal oxygenated circulation is provided to all tissues. In addition, respiration is thought to increase core stability. Breathing is usually diaphragmatic. Abdomen is not inflated, and expansion is provided towards the posterior and lateral of the rib cage (11,13,18).

2.3. Physical Parameters Most Affected by Yoga and Pilates

2.3.1. Range of Motion

Joint range of motion differs from person to person depending on age, gender, body type, familial and professional factors. Studies have focused on the hereditary and acquired mobility of mobility. The conclusion from this is that hypermobility can occur by working as well as inherited (24).

Although there are many methods for measuring joint range of motion, universal goniometer is the most used method due to its practical use. Goniometer has 180 degree or 360 degree dial and two arms. It's arms can be of different sizes according to the size of the joint measured (25).

Joint range of motion determined by goniometric measurement methods are as follows (25);

Table 2. 2. Range of Motion

Shoulder Flexion	180°
Shoulder Extension	45°
Shoulder Abduction	180°
Shoulder Internal Rotation	70-90°
Shoulder External Rotation	90°
Elbow Flexion	145°
Forearm Supination	90°
Forearm Pronation	90°
Wrist Flexion	90°
Wrist Extension	70°
Wrist Radial Deviation	20°
Wrist Ulnar Deviation	35-45°
Hip Flexion	125°
Hip Extension	10°
Hip Abduction	45°
Hip Adduction	10°
Hip Internal Rotation	45°
Hip External Rotation	45°
Knee Flexion	140°
Knee Extension	0°
Ankle Dorsiflexion	20°
Ankle Plantarflexion	45°

2.3.2. Flexibility

Flexibility means the width of movement that occurs in the joint, and can be limited by muscles, ligaments, tendons and bone structures.

Increasing muscle strength from birth causes the flexibility to decrease gradually. At the same time, fluid loss in the tissues with advancing age decreases the connective tissue elasticity and is a factor in the decrease of flexibility. In general, women in the same age group are more flexible than men. The main reason for this difference is the hormone estrogen in women (26).

Flexibility is classified as static and dynamic.

Static flexibility: Mobility of the joint is based on motion, regardless of speed.

Dynamic flexibility: Complete joint mobility is required, including speed with dynamic flexibility. A person can have static flexibility without good dynamic flexibility.

Flexibility measurements involving a single joint are based on measuring the range of motion of the joint. Flexibility measurements can be made by evaluating single joint motion or by evaluating combined movements that create movement in more than one joint, such as trunk flexion, trunk extension, trunk rotations, and lateral flexions. Measuring with tape measure or ruler is preferred because it is simple to use (25).

2.3.3. Core Muscle Strength

The central region (core) is used to name the area consisting of 29 different muscles, including the waist-pelvis, hip and abdomen, including the center of gravity of the human body. Anatomically cor; It consists of muscles that are connected with the skeletal system of the trunk area (rib cage, spine, pelvis, shoulder belt) and soft tissues (cartilage and connective tissues) and that provide stability or active movements. In general, these muscles are composed of transverse abdominus, multifidus, internal oblique, transversospinalis and pelvic floor (puborectalis, pubococcygeus, iliococcygeus) muscles (48).

According to the Pilates concept, central core muscles are the central muscles of the body and all movements of the human body originate from these muscles, Joseph Pilates calls this area “powerhouse”. One of the basic principles of Pilates method is to strengthen the central region, which is also called core stabilization (49).

The core stability training targets the deep muscles in the abdomen that are attached to the spine, pelvis and shoulders, helps maintain good posture and provides the basis for all arm and leg movements. Yoga postures (asana) improves core stabilization as it works the respiratory muscles, the muscles of the extremities and the center area synchronously (50).

2.3.4. Balance

Maintaining balance and a stable posture is an integral part of most movement practices. Balance control is a complex motor capability that includes the integration and planning of flexible movement patterns as well as the integration of sensory inputs. The integration of information from sensor systems provides the person with information about his orientation to maintain posture control in space that allows regulatory reflexive movements. However, sensory inputs are not alone responsible for maintaining postural control. Postural stability depends on the integrity of muscle mass, the effectiveness of systems within the central nervous system and complete neural pathways for motor control. Environmental components on balance include somatosensory, visual and vestibular systems. The central nervous system combines environmental inputs from these systems, and selects many suitable muscular responses to control posture on body position and support base (51,61).

Yoga poses balance exercise examples:

- Eagle Posture (Garudasana): Bend the knees, raise the left foot up and balance on the right foot, wrap your left foot over your right foot. Left toes should be on the ground, balance on the right foot. Wrap the ankle, elbow over the elbow, with the right arm resting on the left arm. The back of your hands should be facing each other.

- Half Moon Pose (Ardha Grandasana):



Figure 2. 31: Half Moon Pose

- Tree Pose (Vrksasana)



Figure 2. 32: Tree Pose

- Warrior 3 Pose



Figure 2. 33: Warrior 3 Pose

Examples of Balance Exercise in Pilates:

Scissors Exercise:

Figure 2. 34: Scissors Exercise



- Bicycle Exercise



Figure 2. 35: Bicycle Exercise

- Leg Lying Rice



Figure 2. 36: Leg Lying Rice

2.4 Yoga and Pilates Exercise Reviews

2.4.1 Yoga Exercis Reviews

2.4.1.1.Utthita Trikonasana



Anterior leg: Iliacus, psoas major, piriformis, obturator internus, quadratus femoris, obturator externus, gemelli, gluteus medius and minimus, gluteus maximus, sartorius, hamstring.

Back leg: Gluteus medius and minimus, adductor magnus, gluteus maximus, pectineus, tensor fascia lata, semitendinosus, semimembranosus, biceps femoris.

Risk factors:

Pain or tenderness in the medial anterior knee may be caused by excessive stretching of gracilis and semitendinosus, which extend in this position and transfer the load to the joint capsule.

It is important that the hamstring muscles are active to avoid hyperextension in the anterior knee by overlapping body weight. Feelings from the knee or any joint are important signals to stop exercise or smooth the position.

Tension in the iliotibial band (tensor fascia lata, gluteus maximus, gluteus medius) can cause pain lateral to the posterior knee. If the gluteus maximus and medius muscles are stretched and the leg cannot move relative to the pelvis, the spine is bent laterally. Tension in the iliotibial band may cause tension behind the ankle (53).

2.4.1.2. Uttanasana

Working muscles: Vastus medialis-intermedius-lateralis, hamstrings, gluteus medius and minimus, gluteus maximus, piriformis, adductor magnus, soleus, gastrocnemius, spinal extensors.

Risk factors: People with back-waist problem or osteoporosis should be bent forward and gradually. Care should be taken if there is a feeling of tension in the hamstrings, gluteal muscles or spinal muscles.



Figure 2. 38: Uttanasana

People with hypertension should do the exercise gradually and continue if breath control is easily achieved. Those with hypotension should get up slowly while getting back from this posture, getting up fast can cause dizziness (53).

2.4.1.3. Virabhadrasana 2



Figure 2. 39: Virabhadrasana 2

Simultaneous abduction and extension in the posterior hip joint are challenging for the ligament and joint capsule of the posterior hip joint. As the posture is widened, the joints are loaded more heavily, and if the leg force is sufficient, stress occurs in the joint and connective tissues of the lower limbs (53).

Working muscles:

Posterior hip circumference: Gluteus medius and minimus, gluteus maximus, hamstrings, tensor fascia latae, pectineus, vastus lateralis.

Anterior hip circumference: Hamstrings, quadriceps, gluteus maximus, piriformis, obturator internus and externus, quadratus femoris, gemelli, gluteus medius and minimus.

Risk factors:

2.4.1.4. Virabhadrasana 3



Figure 2. 40: Virabhadrasana 3

Back extensors and abdominal muscles need to work harmoniously, if there is weakness in the abdominal muscles, the back extensors work excessively and the spine can bend irregularly.

Hamstring shortness may cause the pelvis to open and disproportionate load on the joints. In shortness, bending the knee is better than angling the pelvis (53).

Working muscles:

Spinal extensors, abdominal muscles and psoas minor, hamstrings, on the load-bearing leg; abductors, gluteus maximus, deep rotators, gastrocnemius.

Risk factors :

In this posture, the body should provide spinal stabilization against gravity in the axial plane.

2.4.2. Pilates Exercise Reviews

2.4.2.1. Pelvic Curl

Working muscles: Rectus abdominis, external oblique and internal oblique muscles, transversus abdominis, coccygeus, levator ani, gluteus maximus, hamstrings. Supporting muscles; erector spina, quadriceps femoris, latissimus dorsi, teres major, posterior deltoid.

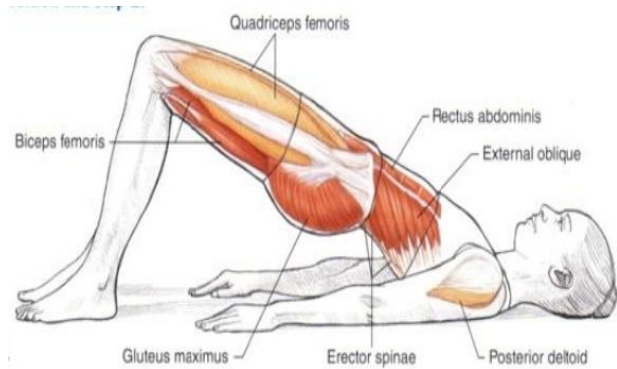


Figure 2. 41: Pelvic Curl

2.4.2.2. One Leg Circle

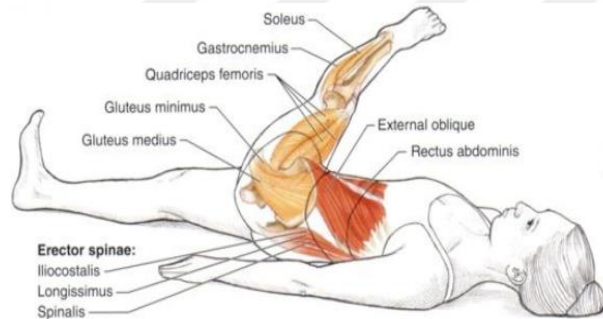
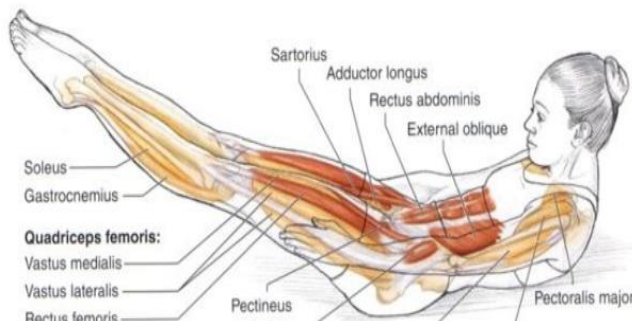


Figure 2. 42: One Leg Circle

Working muscles:

Rectus abdominis, external oblique and internal oblique muscles, erector spina, latissimus dorsi, gluteus maximus, gluteus medius and minimus, iliopsoas, quadriceps.

2.4.2.3. Double-Leg Stretch



Working muscles: Rectus abdominis, external oblique and internal oblique muscles, iliopsoas, rectus femoris, sartorius, tensor fascia lata, pectineus, quadriceps, sartorius.

Figure 2. 43: Double-Leg Stretch

2.4.2.4. Rocker with Open Legs

Working muscles: Rectus abdominis, external oblique and internal oblique muscles, iliopsoas, rectus femoris, gluteus medius, sartorius, quadriceps, tensor fascia lata, hamstrings.

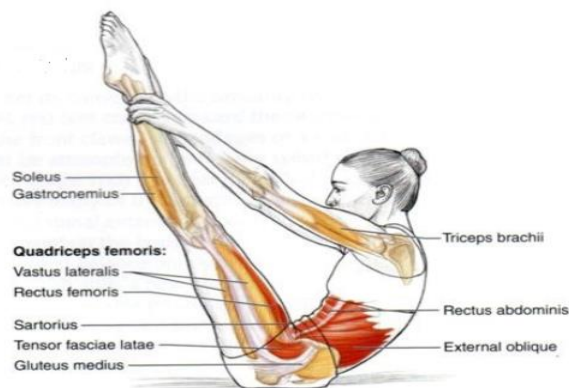


Figure 2. 44: Rocker with Open Leg

2.5. Musculoskeletal System Complaints that May Occur in People Who Do Yoga and Pilates

Studies to date include problems that may occur in people who practice yoga more. No studies on the ailments that may occur in people who do pilates have been found. There is a risk of injury in these two sports branches which are increasing in popularity day by day, as in every sport.

The most common musculoskeletal problems in people practicing yoga are; supraspinatus, achilles and peroneus brevis tendon tears, and fibrocartilagenous tears, including medial meniscus, acetabular labrum, glenoid labrum, and lumbal disc extrusion (27).

2.5.1. Supraspinatus Tendon Tear

Supraspinatus muscle initiates abduction of the shoulder (29). Supraspinatus tendon rupture may occur with recurrent anterior dislocation of the shoulder, massive rotator cuff tears, subacromial impingement, coracoid impingement. It shows up by constant shoulder pain, increased pain with motion and a feeling of weakness in the shoulder (28).

2.5.2. Achilles Tendon Tear

Achilles tendon is the largest tendon in the human body and is formed by the joining of the tendinose parts of the gastrocnemius and soleus muscles. The gastrocnemius tendon begins as a wide aponeurosis at the distal border of the muscle navel, while the soleus tendon originates proximally as a band from the posterior surface of the soleus muscle. Achilles tendon transmits the tension created by the gastrocnemius and soleus muscles to the calcaneus. The gastrocnemius and soleus muscles and tendons of these muscles in the triceps sura musculotendinosus complex are active during activities such as standing, postural control and walking, running and jumping (30).

Achilles tendon rupture usually occurs in middle-age men during sportive activities. Patients often describe a sudden, sharp pain in the affected leg, or a feeling of hitting the back of the leg. Others may say that they heard a bursting sound behind the leg. The most obvious clinical finding that occurs after Achilles tendon rupture is the pain that becomes evident upon loading on the leg. This is followed by difficulty in walking or walking disorder (30,31).

2.5.3. Peroneus Brevis Tendon Tear

Peroneus Brevis makes plantar flexion and eversion to the foot. Peroneus brevis tears are often ignored or misdiagnosed. The most evident finding of the peroneus brevis tendon rupture is swelling along the peroneal sheath. The treatment of injury depends on the type of the lesion, its chronicity, and the patient's age and level of activity. Generally, surgical procedures are applied and good results are obtained (32,33).

2.5.4. Medial Meniscus Injury

The meniscus are C-shaped fibrous cartilage located between the femoral condyles and the tibia. Meniscus that provide deepening of the tibia joint surface can also be accepted as functional extensions of the tibia (34). Menisci have very important roles in load transmission, shock absorption, protection of joint integrity, reduction of surface friction and especially stability (35,36).

Medial meniscus posterior root rupture is the most common lesion, covering 10 to 21% of meniscus surgeries. Due to decreased mobility and multi-load bearing, the posterior root of the medial meniscus tends to the lesions more than the posterior lateral root. In a region of the world where kneeling and squatting are daily activities, the frequency of these tears has increased. Medial meniscus injury can occur during acute injuries, especially multiligamentous acute injuries, but has been found to occur mainly due to meniscus extrusion, decreased shock absorption, joint degeneration, and chronic conditions associated with osteoarthritis (37).

2.5.5. Acetabular Labrum Damage

The acetabular Labrum is a cartilage structure surrounding the acetabulum. Its presence effectively deepens the acetabulum and can help stabilize the femoral head in the bone socket (38). Patients with acetabular labrum damage may feel pain and locking in the joint with a click. Often there is a feeling of dullness in the joint that does not pass over time, activity-related or positional pain. Patients often describe a deep feeling of pain in the groin, lateral to the trochanter, or hip (39).

2.5.6. Glenoid Labrum Damage

The function of the glenoid labrum is to assist joint movement, protect the humerus head and deepen the shoulder joint cavity (40). Labral tears may occur due to prolonged shoulder instability or injuries that will cause instability in the shoulder (41). A significant part of the cases present with pain especially in the upper head arm movements. Joint sounds, snagging, weakness and instability are other clinical findings. In physical examination, positive findings can be seen in shoulder laxity and provocative tests (42).

2.5.7. Lumbal Disc Extrusion

The lumbar intervertebral disc is a complex structure consisting of collagen, proteoglycans and sparse fibrochondric cells, used to distribute the forces exerted on the spine. As part of the normal aging process, disc fibrochondrocytes may lose some properties over time, and proteoglycan production decreases. This causes loss of hydration and collapse of the disc, which increases the load on the fibers of the annulus fibrosis surrounding the disc. Tears and cracks in the annulus fibrosis may occur if abrasive forces are placed on the disc, which facilitates the herniation of the disc material. Alternatively, a large biomechanical force that rides on a healthy normal disc can cause the disc material to be extruded if the annular fibers are damaged (43,62).

2.6. Sedentary Life

Sedentary behaviors; Less than 1.5 MET of energy, such as sitting and lying in times other than sleep. Examples of such behaviors include sitting for long hours, watching TV, playing video games and using a computer. Sedentary individuals are defined as individuals who walk less than 1 kilometer per day and work by sitting (14).

Some researchers state that a sedentary person refers to a person who is relatively inactive and has a lifestyle characterized by too much sitting, and individuals who spend less than 10% of their daily energy expenditure on medium to high intensity activities should be classified as sedentary (19).

The development of the accelerometer as an objective measure of physical activity has opened up new possibilities to study the effects of all intensity levels of physical activity on health. Researchers can now measure the entire spectrum of activities in free-living subjects, from completely immobile to very energetic and active. Although the accelerometer has some significant limitations and standardized procedures are still under development, it offers significant advantages over other methods for measuring physical activity. Firstly, raw data can be collected and stored for a long time at relatively short time intervals (eg 15, 30 or 60 s). Secondly, calibration curves can be used to estimate the intensity of physical activity that is always performed in the range. Thus, the accelerometer allows researchers to determine the cumulative time spent each day in the activity, including sedentary, light, medium and strong. Thus, the accelerometer allows

researchers to determine the cumulative time spent actively every day, including sedentary, mild, moderate and intense activity (20).

According to the 2015 report of the Turkish Public Health Agency, 71.9% of individuals in our country do not engage in regular physical activity (Turkish physical activity workshop, 2015). Sedentary life style brings serious health problems. Risk factors for high blood pressure, obesity, muscular weakness, postural disorder, diabetes and coronary artery increase, especially in middle age and above, and loss of chest cage and respiratory capacity, weakness of the abdominal muscles, and digestive and excretion difficulties occur. In all muscles, loss of function and easy injury occur in basic motoric features such as strength, flexibility and endurance. Losses in bone mineral density, joint calcification and loss of function occur. In addition to obesity and formlessness, physical and mental problems brought by obesity are the negative effects of long-term sedentary life in the organism, due to the increase in blood sugar and blood lipid levels, and the energy taken with foods cannot be spent (15).

2.7. Musculoskeletal System Complaints

Musculoskeletal system (WMD) provides movement by providing structural support to the body. The important tissues that make up this system are; muscles, tendons, ligaments, cartilage, bone, and synovia. The health of this system is extremely important for mobility. The musculoskeletal system provides the body with shape, support, balance and movement.

The primary functions of the musculoskeletal system include supporting the body, allowing movement and protecting vital organs. The skeletal part of the system acts as the main storage system for calcium and phosphorus and contains hematopoietic critical components. Musculoskeletal disorders include inflammatory and degenerative conditions that can affect muscles, tendons, ligaments, nerves, bones and joints. Although these problems are health problems that can be seen frequently, they can negatively affect the quality of life. It has been reported that one out of every four people in developing countries has chronic pain caused by the musculoskeletal system. (23)

Early signs of musculoskeletal injuries may appear suddenly, but may also occur gradually over a long period of time. Early warning symptoms; swelling, numbness, redness, tingling, weakness. (22)

Musculoskeletal disorder: sprains, strain, tendinitis, tenosynovitis, fibromyalgia, osteoarthritis, rheumatoid arthritis, gout, pseudogout polymyalgia rheumatica, bursitis, acute and chronic low back pain and osteoporosis. Injuries include sprain, strain and ligament, tendon, muscle and cartilage damage and tears. Pain is the most common symptom and is often caused by injury or inflammation. In addition to pain, other symptoms such as stiffness, tenderness, weakness, and swelling or deformity of the affected parts are symptoms of musculoskeletal disorders. Sports injuries are an important cause of musculoskeletal disorders resulting in pain, tension, sprains, stiffness and leg cramps (44).



3. MATERIALS AND METHODS

3.1. Material

162 volunteers who were doing yoga, doing pilates and living sedentary participated in the study. All cases were included in the study.

3.1.1. Inclusion Criteria

1. Accepting to be a case of work
2. Being over 18 years of age
3. Doing regular sports at a pilates or yoga studio for at least 3 months
4. No systemic disease
5. To have a level of mental and physical activity that can perform and complete the tests.

3.1.2 Exclusion Criteria

1. Not to accept the study
2. Serious visual and perception impairment
3. Having pain that does not allow testing
4. Having diseases with neurological dysfunction
5. Serious disability in the past 6 months

Before starting the study, Yeditepe University Non-Interventional Clinical Research Ethics Committee was applied and the research was started with the permission numbered 1127.

3.1.3. Flow Chart

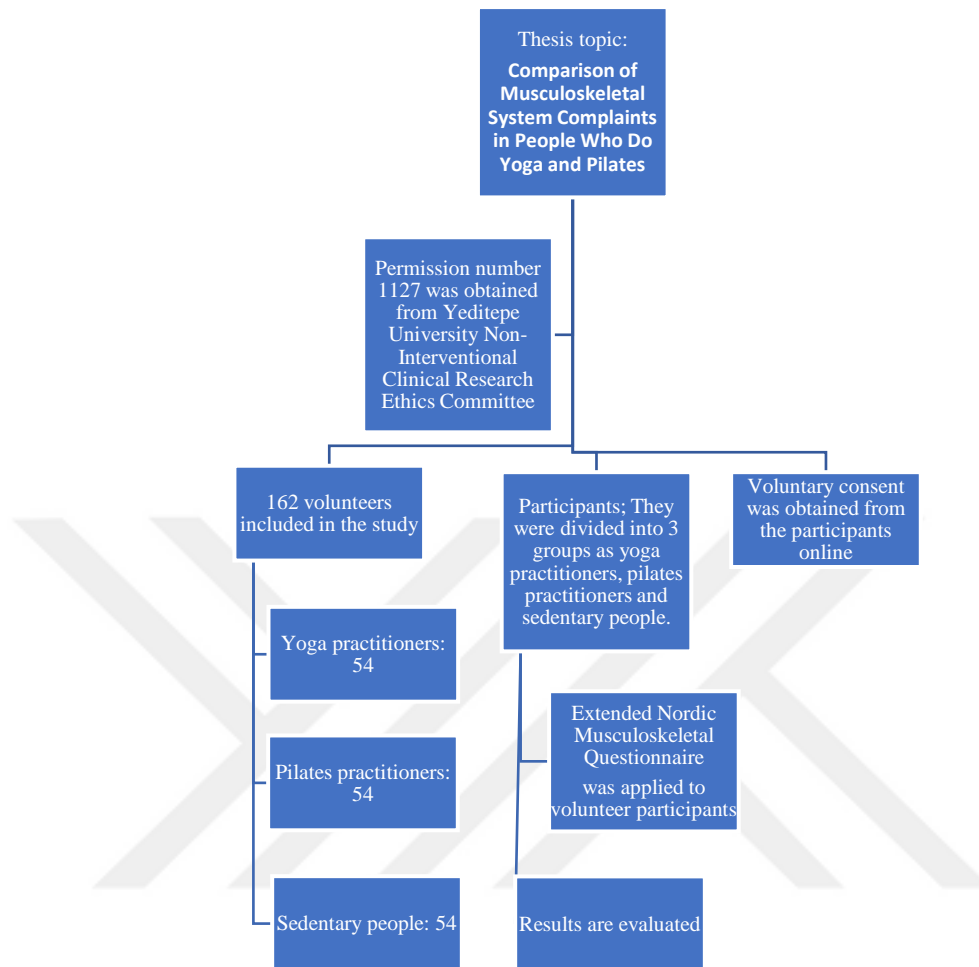


Figure 3. 1: Flow Chart

3.2. Method

The Extended Nordic Musculoskeletal Questionnaire (NMQ-E) was administered, prepared and presented online to volunteer participants. Participants also read and approved the Informed Voluntary Consent Form submitted online prior to participating in the survey.

In addition to the Extended Nordic Musculoskeletal Questionnaire (NMQ-E), the survey presented to the participants online contains questions about the socio-demographic characteristics of the participants, the habit of doing sports and whether the sport is performed with the physiotherapist or the trainer.

3.2.1. Socio-Demographic Data

The socio-demographic data of the individuals written below were recorded.

- Age
- Size
- Job
- Medication used
- Previous surgical history
- Medical history information

3.2.2 Extended Nordic Musculoskeletal Questionnaire (NMQ-E)

Extended Nordic Muscle Skeleton Questionnaire was used to evaluate whether there is a difference between the volunteer participant groups in terms of musculoskeletal problems, pain severity and frequency. This questionnaire is a general questionnaire that questions the musculoskeletal system problems and which parts of the body are having problems. It is supported with a body map to represent nine body regions, including the neck, shoulders, back, elbow, hand / wrist, waist, hip / thigh, knee, and ankle / ankles. Participants are asked questions about the musculoskeletal system problems felt in the past 12 months and musculoskeletal system problems that prevent normal daily activity in the last 7 days. Then, the effect of pain on daily life and work conditions, medication use due to pain and pain complaints are discussed with a healthcare professional and the duration of the pain is questioned (17) (Appendix 1).-

3.2.3. Statistical Evaluations

As a result of the survey conducted to compare the complaints of musculoskeletal system in people who practice yoga, pilates, and sedentary life, all statistical analyzes were performed with SPSS (Statistical Package for the Social Sciences version 25.0.0; SPSS Inc., Chicago, IL, USA). Descriptive statistics are specified as frequency (n), percentage (%), mean, standard deviation, minimum and maximum values. One-way ANOVA test was used for age comparison of groups. In addition, the relationship between the personal information of the participants and the Extended Nordic Muscle Skeleton Questionnaire was examined by chi-square test. Statistical significance was evaluated at $p < 0.05$ level.

Sufficient sample size was determined by using the G * power program (Foul, Erdfelder, Lang & Bunhner, 2007) in order to reach the intended working power of our study, which has been applied Extended Nordic Muscle Skeleton Questionnaire (NMQ-E). According to the power analysis results, it was determined that a minimum group of 159 people should be required to perform the one-way variance analysis (ANOVA) test at medium effect size ($\eta^2=0.25$), 80% power and 5% Type I error level, and that the number of people to be included in each group should be n:53.



4. RESULTS

The sample of the study consists of 162 volunteers randomly selected from the universe, but between the ages of 18-50, who practice yoga or pilates or live a sedentary life. Volunteer participants were asked for their socio-demographic characteristics in order to compare the complaints of the musculoskeletal system, and some results were obtained with the application of the Extended Nordic Muscle Skeleton Questionnaire and the analysis of the data was done in this section.

The personal information of the participants forming the working group is presented in Table 4.1. When the personal information of the participants is examined;

- It was determined that 33.3% of the participants were interested in pilates and 33.3% of them were interested in yoga sports. It was also observed that 33.3% of the participants lived a sedentary lifestyle.

- It was observed that 72.8% of the participants were women and 27.2% were men.

- It has been determined that 38.0% of the participants doing sports do more than 3 days a week, 28.7% do 3 days a week and 25.9% do 2 days a week. It was determined that 68.5% of the participants engaged in sports over 1 year and 66.7% were engaged in sports by a personal trainer.

- It has been determined that 71.0% of the participants have not undergone surgery before.

- It was determined that 87.0% of the participants had the right side of the dominant side.

- The average age of the participants is 32.28 ± 7.06 , the youngest is 20 and the oldest is 49 years old.

Table 4. 1. Personal Information Percentage of Participants

		N	%	Avg.(SS)
Which Sports Are You Doing	Pilates	54	33,3	
	Yoga	54	33,3	
	Sedentary Life	54	33,3	
?	1 Day	8	7,4	

How Many Days a Week Do You Do Sports ?	2 Days	28	25,9
	3 Days	31	28,7
	More Than 3 Days	41	38,0
Gender	Women	118	72,8
	Men	44	27,2
How Long Have You Been Doing This Sport ?	Between 1-3 Months	15	13,9
	Between 3-6 Months	8	7,4
	Between 6-9 Months	11	10,2
	More Than 1 year	74	68,5
Who conducts Yoga/Pilates ?	Physiotherapist	36	33,3
	Personel Trainer	72	66,7
Is There a Surgical Procedure You Have Previously ?	Yes	47	29,0
	No	115	71,0
Which Is Your Dominant Side ?	Right	141	87,0
	Left	21	13,0

The participants of the working group, "Which Sports Have You Done Before?" The answers given to the question are presented in Table 4.2. While 54.9% of the participants did not do sports before, 10.4% fitness, 4.9% volleyball, 4.9% swimming, 4.3% pilates, 1.9% running 1.2% are engaged in football and 1.2% are involved in walking sports.

Table 4. 2. The participants' "Which Sports Have You Performed Before?" Percentage Ratings of Answers to this Question

	Sport	N	%
Which Sports Have You Performed Before ?	I did not do sports	89	54,9
	Athletics	1	,6
	Basketball	1	,6
	Fitness, Pilates.	1	,6
	Fitness	17	10,4
	Fitness Swimming	1	,6
	Fitness, Pilates, Step, Aerobics	1	,6
	football	2	1,2
	Karate	1	,6
	Skiing, Basket, Tennis, Ice Skating, Pilates	1	,6
	Kickbox, Crossfit, Pilates	1	,6
	Running	3	1,9
	Pilates	7	4,3

Pilates, but I've left it for the last 2 years	1	,6
Pilates and Zumba	1	,6
Pilates, Dance	1	,6
Pilates, Swimming, Climbing	1	,6
Rugby	1	,6
Squash, Spinning, Walking,	1	,6
Tennis	1	,6
Tennis, Cardio, Golf	1	,6
Volleyball	8	4,9
Volleyball, Pilates	1	,6
Volleyball and Running	1	,6
Volleyball, Taekwondo, Fitness	1	,6
Yoga	1	,6
Yoga, Pilates, Cardio, Fitness	1	,6
Swimming, Athletics	1	,6
Walking	2	1,2
Swimming	8	4,9
Swimming, Skiing, Tennis	1	,6
Swimming, Zumba	1	,6
Zumba	1	,6
Zumba, Yoga, Pilates, Cycling	1	,6

The medication use status of the participants in the study group is presented in Table 4.3. 93.2% of the participants do not use any medications.

Table 4. 3. Table of Percentage of Participants' Medication Use Status

	Medications	N	%
Is There Any Medication You Have Used Before ?	Yes	11	6,8
	No	151	93,2
Which Medicine Are You Using?	Aknetrent	1	,6
	Anjelique	3	1,9
	Ferrum ford	1	,6
	Levmount	1	,6
	Proton inhibitor	1	,6
	Roakutan	1	,6
	Tamoksifen	1	,6
	Thyromazol	1	,6
	XM	1	,6
	Total	11	6,8

People who do not use drugs	151	93,2
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The occupational status of the participants forming the working group is presented in Table 4.4.

Table 4. 4. Profession Status Distribution of Participants Table of Percentage Rates

	Profession	N	%
	Academician	8	4,9
	Coach	4	2,5
	Lawyer	3	1,9
	Baglama Instructor	1	,6
	Banker	1	,6
	Physical Education and Sports Teacher	4	2,4
	Biologist	1	,6
	Dentist	1	,6
	nutritionist	1	,6
	Instructor	1	,6
	Industrial Engineering	1	,6
	Artisan	1	,6
	Housewife	17	10,5
	Physiotherapist	37	22,8
	Food Engineer	1	,6
What is Your Job ?	Graphic designer	2	1,2
	Nurse	4	2,5
	Communication Specialist	1	,6
	Operator	2	1,2
	Officer	5	3,1
	architect	4	2,5
	Engineer	13	8,0
	Kitchen chef	1	,6
	Customer manager	1	,6
	Student	9	5,6
	Teacher	6	3,7
	Pilates Instructor	3	1,8
	Secretary	5	3,1
	Social Worker	1	,6
	Chauffeur	2	1,2
	Designer	2	1,2

Cleaning staff	3	1,9
Interpreter	1	,6
Expert	1	,6
Programmer	2	1,2
Yoga Instructor	11	6,8
Administrative assistant	1	,6
Total	162	100

There was no statistical difference ($p > 0.05$) between the distributions of the problems in the neck, shoulder, back, elbow, hand / wrist, waist, hip / thigh and foot / ankle areas of the participants in all three groups. The problem in the knee region of the participants in the yoga group is statistically higher ($p < 0.05$) than in the pilates and sedentary life groups. In addition, while the area where the participants in the sedentary life and yoga groups have the most problems is waist, the area where the participants in the pilates group have the most problems is the neck. Finally, according to the data in Table 4.5, the musculoskeletal system complaint rates of all three groups are not equal. According to these results, when hypothesis evaluation is made;

“Among the groups that practice yoga, pilates, and sedentary life, the physical areas where the majority have complaints of musculoskeletal system are different.” hypothesis was rejected.

Table 4. 5. Problems in Groups' Body Areas (Pain, Discomfort, etc.)

Region		Pilates		Yoga		Sedentary Life		x ²	p
		n	%	n	%	n	%		
Neck	Yes	21	39,6	19	36,5	17	31,5	,787	,675
	No	33	60,4	35	63,5	37	68,5		
Shoulder	Yes	12	23,5	17	34,0	10	20,0	2,770	,250
	No	42	76,5	44	66,0	41	80,0		
Back	Yes	14	27,5	19	37,3	19	35,2	1,230	,541
	No	37	72,5	32	62,7	35	64,8		
Elbow	Yes	3	5,6	0	0,0	2	3,7	2,889	,236
	No	51	94,4	54	100,0	52	96,3		
Hand / Wrist	Yes	9	16,7	9	16,7	18	33,3	5,786	,055
	No	45	83,3	45	83,3	36	66,7		
Waist	Yes	17	31,5	26	48,1	21	38,9	3,151	,207
	No	37	68,5	28	51,9	33	61,1		

Hip / Thigh	Yes	6	11,1	9	16,7	8	14,8	,709	,701
	No	48	88,9	45	83,3	46	85,2		
Knee	Yes	5	9,3	17	31,5	12	22,2	8,115	,017
	No	49	90,7	37	68,5	42	77,8		
Foot / Ankle	Yes	2	3,7	5	9,3	6	11,1	2,174	,337
	No	52	96,3	49	90,7	48	88,9		

There was no statistically significant difference ($p > 0.05$) between the distribution of the problems in the neck, shoulder, back, elbow, hand / wrist, waist, hip / thigh and foot / ankle of the participants in both groups who did sports with the physiotherapist. The problem in the knee region of the participants in the pilates group who are doing sports with a physiotherapist is statistically lower ($p < 0.05$) than in the yoga group. In addition, the region where the participants in both groups doing sports with a physiotherapist experience the most problems is the waist.

There was no statistically significant difference ($p > 0.05$) between the distributions of the problems in the neck, shoulder, back, hand / wrist, waist, hip / thigh, knee and foot / ankle areas of the participants in both groups doing sports with the trainer. The problem in the elbow region of the participants in the yoga group who do sports with the trainer is statistically lower ($p < 0.05$) than in the pilates group. In addition, the region where the participants in the pilates group who are doing sports with the trainer experience the most problems is the neck, while the region in which the participants in the yoga group have the most problems is the waist. Finally, according to the data in Table 4.6, the musculoskeletal complaint rates of both groups who do sports with physiotherapist and trainer are not equal.

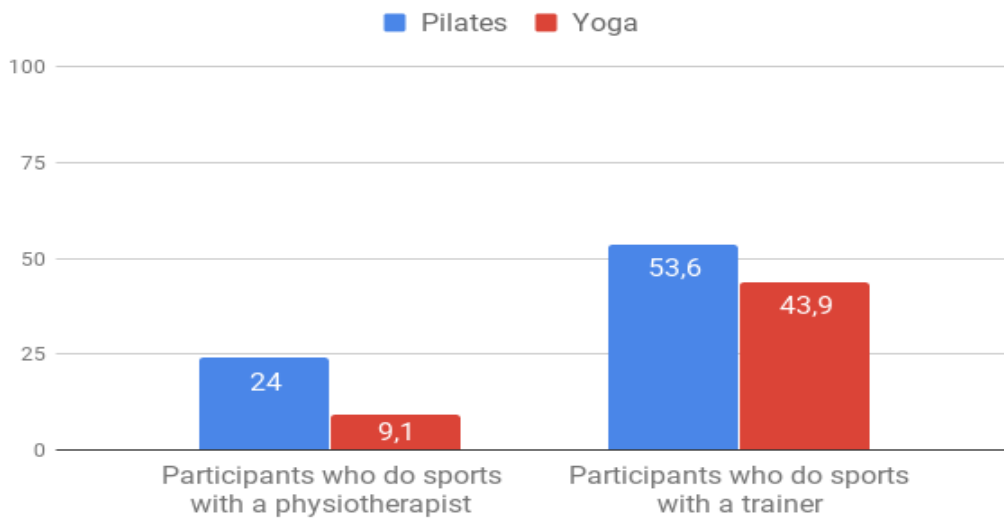


Figure 4. 8: Complaint Status of Participants in the Neck Region

While 24.0% of the participants who do pilates with a physiotherapist have a problem in the neck region, 53.6% of the participants who do pilates with a trainer have a problem in the neck region and 9.1% of the participants who do yoga with a physiotherapist have a problem in the neck region. It was determined that 43.9% of the participants had problems in the neck region.

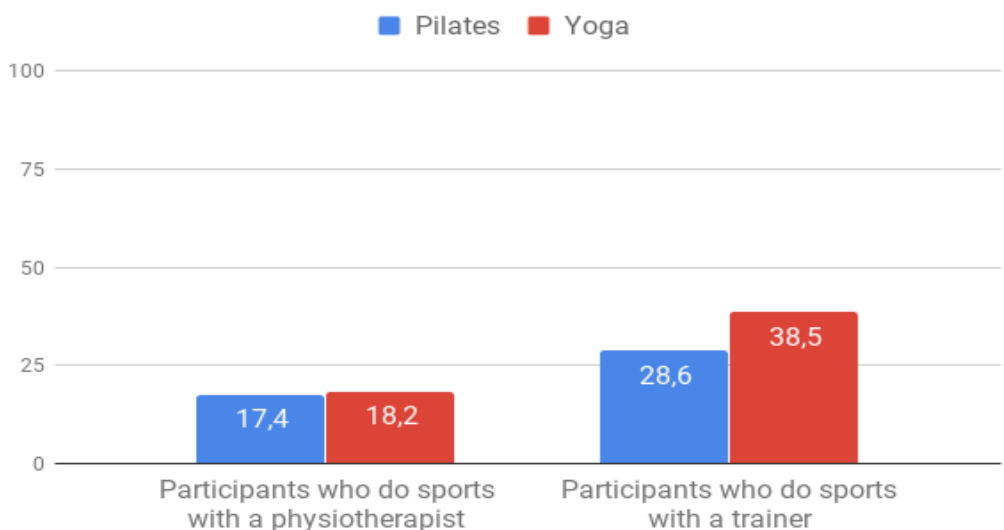


Figure 4. 9: Complaint Status of Participants in the Shoulder Region

While 17.4% of the participants who do pilates with the physiotherapist have problems in the shoulder region, 28.6% of the participants who do pilates with the trainer have problems in the shoulder region and 18.2% of the participants who do yoga with the physiotherapist have problems in the shoulder region, It was determined that 38.5% of the participants had problems in the shoulder region.

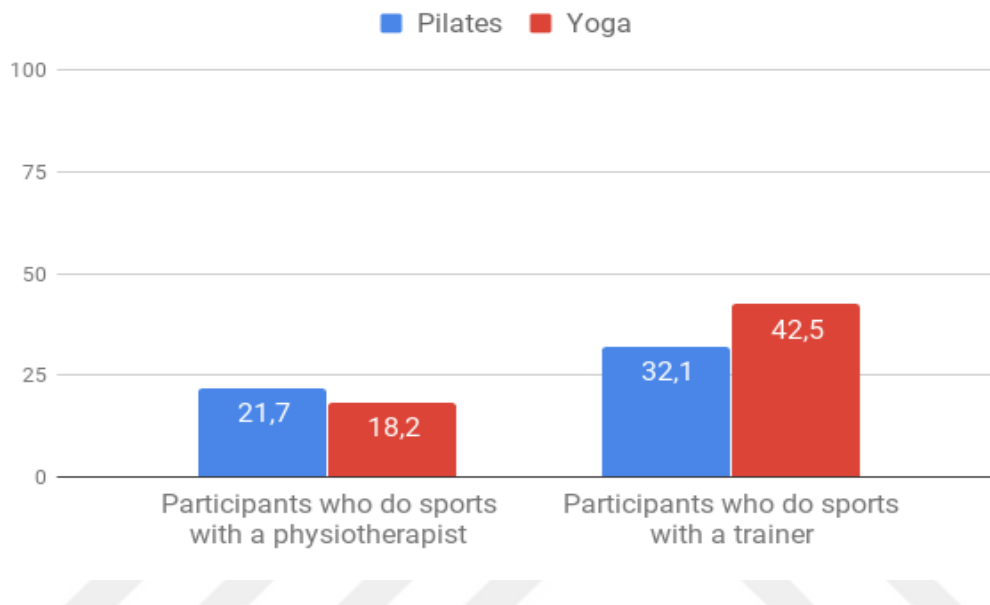


Figure 4. 10: Complaint Status of Participants in the Back Region

While 21.7% of the participants who do pilates with the physiotherapist have problems in the back region, 32.1% of the participants who do pilates with the trainer have problems in the back region, and 18.2% of the participants who do yoga with the physiotherapist have problems in the back region and 42.5% of the participants doing yoga with the trainer were determined to have problems in the back region.

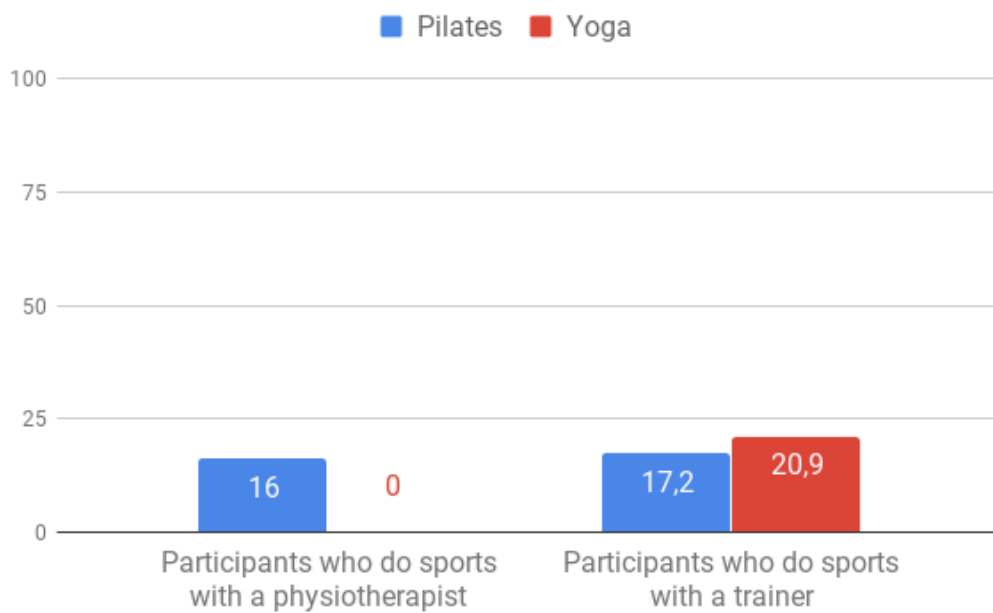


Figure 4. 11: Complaint Status of Participants in the Hand / Wrist Region

It was determined that 16.0% of the participants who do pilates with the physiotherapist have problems with the hand/wrist region while 17.2% of the participants who do pilates with the trainer have problems with the hand/wrist region and while there were no problems in the hand/wrist region of the participants who do yoga with the physiotherapist, 20.9% of the participants who do yoga with the trainer have problems in the hand/wrist region.

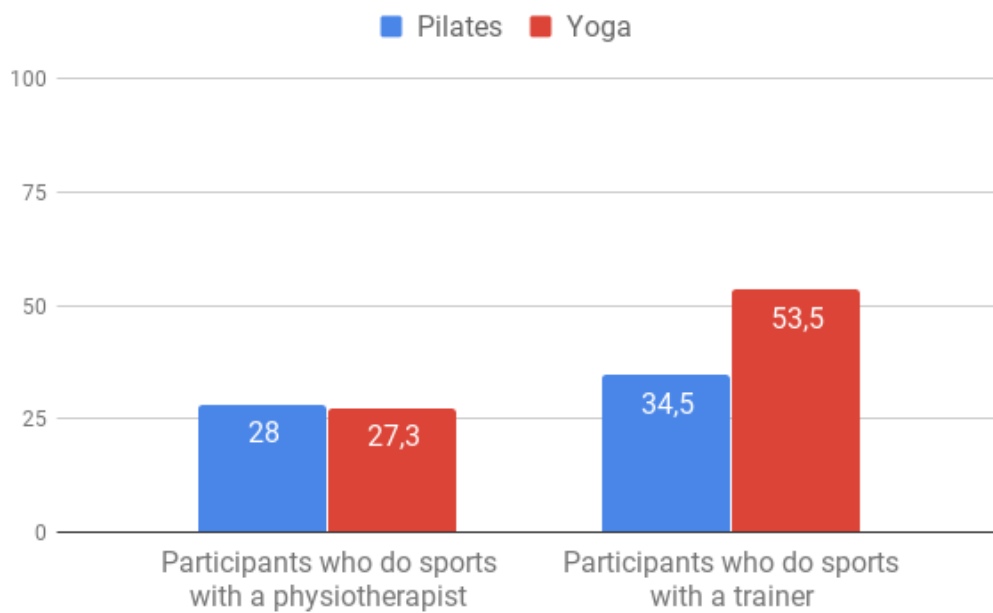


Figure 4. 12: Complaint Status of Participants in the Waist Region

While 28.0% of the participants who do pilates with the physiotherapist have problems in the waist region, 34.51% of the participants who do pilates with the trainer have problems in the waist region and 27.3% of the participants who do yoga with the physiotherapist have problems in the waist region. It was determined that 53.5% of the participants had problems in the waist region.

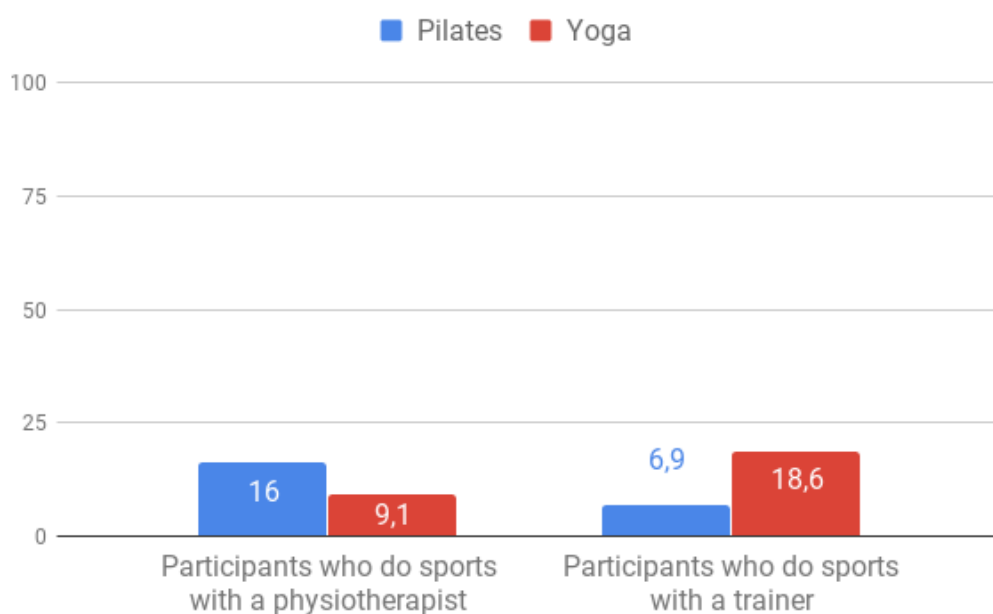


Figure 4. 13: Complaint Status of Participants in the Hip / Thigh Region

16.0% of the participants who do pilates with the physiotherapist have problems in the hip / thigh region while 6.9% of the participants who do pilates with the trainer have problems in the hip / thigh region and it was determined that 9.1% of the participants doing yoga with the physiotherapist had problems in the hip / thigh region, while 18.6% of the participants doing yoga with the trainer had problems in the hip / thigh region.

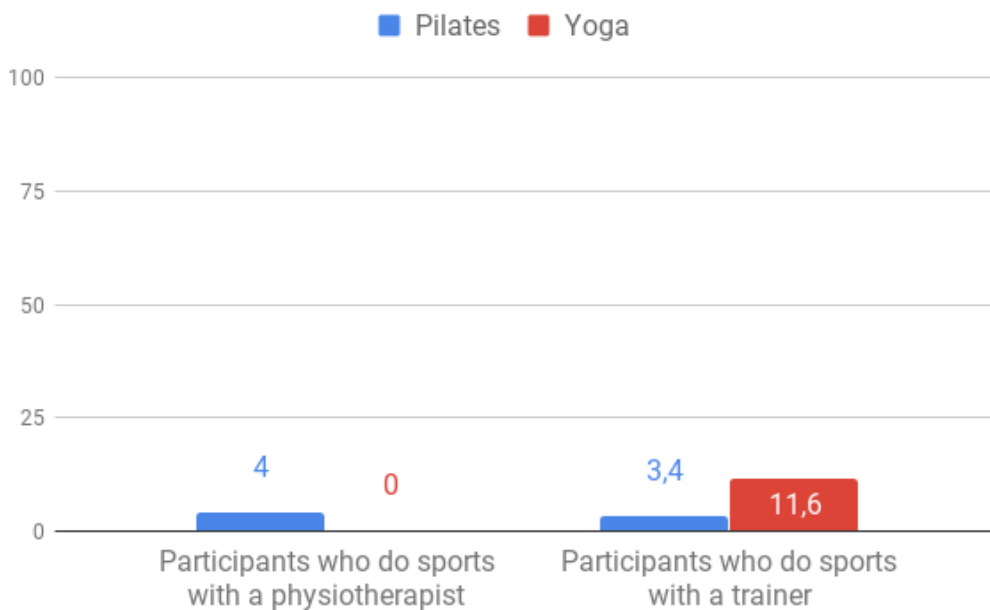


Figure 4. 14: Complaint Status of Participants in the Foot / Ankle Region

4.0% of the participants who do pilates with the physiotherapist have problems in the foot / ankle region, while 3.4% of the participants who do pilates with the trainer have problems in the foot / ankle region and it was determined that the participants doing yoga with the physiotherapist had no problems in the foot / ankle area and 11.6% of the participants doing yoga with the trainer had problems in the foot / ankle region.

In other words, the musculoskeletal system complaints rates of both groups who did sports with physiotherapist and coach were not equal. According to these results, when hypothesis evaluation has made;

“There is a difference between the groups doing yoga and pilates in terms of having musculoskeletal system complaints in people who exercise

with the physiotherapist and who exercise with the trainer.” hypothesis was accepted.

Table 4. 6. The Problems of Pain (Pain, Pain, Discomfort etc.) in Body Regions According to Sports instructors and Sports Groups

Region		People Doing Sports with a Physiotherapist						People Doing Sports with a Trainer					
		Pilates		Yoga		x ²	p	Pilates		Yoga		x ²	p
		n	%	n	%			n	%	n	%		
Neck	Yes	6	24,0	1	9,1	1,084	,298	15	53,6	18	43,9	,623	,430
	No	19	76,0	10	90,9			13	46,4	23	56,1		
Shoulder	Yes	4	17,4	2	18,2	,003	,955	8	28,6	15	38,5	,707	,400
	No	19	82,6	9	81,8			20	71,4	24	61,5		
Back	Yes	5	21,7	2	18,2	,058	,810	9	32,1	17	42,5	,748	,387
	No	18	78,3	9	81,8			19	67,9	23	57,5		
Elbow	Yes	-	-	-	-	-	-	3	10,3	0	0,0	4,642	,031
	No	25	100,0	11	100,0			26	89,3	43	100,0		
Hand / Wrist	Yes	4	16,0	0	0,0	1,980	,159	5	17,2	9	20,9	,150	,698
	No	21	84,0	11	100,0			24	82,6	34	79,1		
Waist	Yes	7	28,0	3	27,3	,002	,964	10	34,5	23	53,5	2,520	,112
	No	18	72,0	8	72,7			19	65,5	20	46,5		
Hip / Thigh	Yes	4	16,0	1	9,1	,305	,581	2	6,9	8	18,6	1,985	,159
	No	21	84,0	10	90,9			27	93,1	35	81,4		
Knee	Yes	0	0,0	2	18,2	4,813	,028	5	17,2	15	34,9	2,687	,101
	No	25	100,0	9	81,8			24	82,8	28	65,1		
Foot / Ankle	Yes	1	4,0	0	0,0	,453	,501	1	3,4	5	11,6	1,517	,218
	No	24	96,0	11	100,0			28	96,6	38	88,4		

Table 4. 7. Problems in Body Regions (Pain, Pain, Discomfort, etc.) According to Sports Instructors

Region		Pilates						Yoga					
		People Doing Sports with a Physiotherapist		People Doing Sports with a Trainer		x ²	p	People Doing Sports with a Physiotherapist		People Doing Sports with a Trainer		x ²	p
		n	%	n	%			n	%	n	%		
Neck	Yes	6	24,0	15	53,6	4,828	,028	1	9,1	18	43,9	4,333	,033
	No	19	76,0	13	46,4			10	90,9	23	56,1		
Shoulder	Yes	4	17,4	8	28,6	,877	,349	2	18,2	15	38,5	1,572	,210
	No	19	82,6	20	71,4			9	81,8	24	61,5		
Back	Yes	5	21,7	9	32,1	,686	,407	2	18,2	17	42,5	2,183	,140
	No	18	78,3	19	67,9			9	81,8	23	57,5		
Elbow	Yes	-	-	3	10,3	2,738	,098	-	-	0	0,0	-	-
	No	25	100,0	26	89,3			11	100,0	43	100,0		
Hand / Wrist	Yes	4	16,0	5	17,2	,015	,903	0	0,0	9	20,9	2,763	,096
	No	21	84,0	24	82,6			11	100,0	34	79,1		
Waist	Yes	7	28,0	10	34,5	,262	,609	3	27,3	23	53,5	2,411	,120
	No	18	72,0	19	65,5			8	72,7	20	46,5		
Hip / Thigh	Yes	4	16,0	2	6,9	1,127	,289	1	9,1	8	18,6	,571	,450
	No	21	84,0	27	93,1			10	90,9	35	81,4		
Knee	Yes	0	0,0	5	17,2	4,750	,029	2	18,2	15	34,9	1,133	,287
	No	25	100,0	24	82,8			9	81,8	28	65,1		
Foot / Ankle	Yes	1	4,0	1	3,4	,011	,915	0	0,0	5	11,6	1,410	,235
	No	24	96,0	28	96,6			11	100,0	38	88,4		

The problem in the neck and knee regions of the participants who pilates with the physiotherapist is statistically lower ($p < 0.05$) than the participants who pilates with the trainer. There was no statistically significant difference ($p > 0.05$) between the distributions of problems in the shoulder, back, elbow, hand / wrist, waist, hip / thigh and foot / ankle regions of the participants who performed pilates with a physiotherapist or trainer. Also, the region where the participants who do pilates with the physiotherapist have the most problems is the waist, and the area where the participants who do pilates with the trainer have the most problems is the neck.

The problem in the neck area of the participants doing yoga with the physiotherapist is statistically lower ($p < 0.05$) than the participants doing yoga with the trainer. There was no statistically significant difference ($p > 0.05$) between the distribution of problems in the shoulder, back, elbow, hand / wrist, waist, hip / thigh, knee and foot / ankle of the participants who practiced yoga with the physiotherapist or trainer. In addition, the region where the participants who practice yoga with the physiotherapist and trainer experience the most problems is the waist.

There was no statistically significant difference ($p > 0.05$) between hospitalization status distributions due to problems in the neck, shoulder, back, elbow, hand / wrist, waist, hip / thigh, knee and foot / wrist areas of the participants in all three groups. In addition, it was observed that the participants in all three groups were very low in hospitalization due to problems in the body area.

Table 4. 8. Hospitalization Status of Groups Due to Problem in Body Regios

Region		Pilates		Yoga		Sedentary Life		χ^2	p
		n	%	n	%	n	%		
Neck	Yes	0	0,0	1	1,9	0	0,0	2,012	,366
	No	54	100,0	53	98,1	54	100,0		
Shoulder	Yes	-	-	-	-	-	-	-	-
	No	54	100,0	54	100,0	54	100,0		
Back	Yes	1	1,9	1	1,9	0	0,0	1,013	,603
	No	53	98,1	53	98,1	54	100,0		
Elbow	Yes	-	-	-	-	-	-	-	-
	No	54	100,0	54	100,0	54	100,0		
Hand/ Wrist	Yes	-	-	-	-	-	-	-	-
	No	54	100,0	54	100,0	54	100,0		

Waist	Yes	1	1,9	1	1,9	1	1,9	,000	1,000
	No	53	98,1	53	98,1	53	98,1		
Hip / Thigh	Yes	1	1,9	0	0,0	1	1,9	1,013	,603
	No	53	98,1	54	100,0	53	98,1		
Knee	Yes	1	1,9	0	0,0	2	3,8	1,975	,373
	No	52	98,1	51	100,0	51	96,2		
Foot / Ankle	Yes	0	0,0	1	2,0	1	1,9	1,034	,596
	No	53	100,0	50	98,0	52	98,1		

There was no statistically significant difference ($p > 0.05$) between the participants in all three groups, changing their job or duty due to problems in the neck, shoulder, back, elbow, hand / wrist, waist, hip / thigh, knee and foot / wrist regions. In addition, it was seen that the rate of changing the profession or duty of the participants in all three groups was very low due to the problems in the body regions.

Table 4. 9. Changing the Job or Task of the Participants Based on the Problem in the Body Region

Region		Pilates		Yoga		Sedentary Life		x ²	p
		n	%	n	%	n	%		
Neck	Yes	1	1,9	1	1,9	1	1,9	,001	1,000
	No	53	98,1	53	98,1	53	98,1		
Shoulder	Yes	0	0,0	0	0,0	1	1,9	1,994	,369
	No	54	100,0	54	100,0	53	98,1		
Back	Yes	1	1,9	0	0,0	1	1,9	,994	,608
	No	53	98,1	54	100,0	53	98,1		
Elbow	Yes	-	-	-	-	-	-	-	-
	No	54	100,0	54	100,0	54	100,0		
Hand/ Wrist	Yes	0	0,0	1	1,9	3	5,7	3,638	,162
	No	54	100,0	53	98,1	51	94,3		
Waist	Yes	1	1,9	2	3,8	2	3,8	,436	,804
	No	53	98,1	52	96,2	52	96,2		
Hip / Thigh	Yes	1	1,9	2	3,8	0	0,0	1,988	,370
	No	53	98,1	52	96,2	54	100,0		
Knee	Yes	0	0,0	1	1,9	2	3,8	2,058	,357
	No	54	100,0	53	98,1	52	96,2		
Foot / Ankle	Yes	0	0,0	0	0,0	1	1,9	1,994	,369
	No	54	100,0	54	100,0	53	98,1		

There was no statistically significant difference ($p > 0.05$) between the distributions of the problems in the neck, shoulder, back, elbow, hand / wrist, waist, hip / thigh, knee and foot / ankle regions of the participants in all three groups in the last 12 months. In addition, the region where the participants in all three groups had the most problems in the last 12 months is waist.

Table 4. 10. Problems (Pain, Discomfort, etc.) in Body Regions of the Groups in the Last 12 Months

Region		Pilates		Yoga		Sedentary Life		χ^2	p
		n	%	n	%	n	%		
Neck	Yes	15	27,8	14	26,4	16	29,6	,138	,933
	No	39	72,2	40	73,6	38	70,4		
Shoulder	Yes	11	20,8	9	18,0	10	18,9	,097	,952
	No	43	79,2	45	82,0	44	81,1		
Back	Yes	11	20,8	13	26,5	18	33,3	2,157	,340
	No	43	79,2	36	73,5	36	66,7		
Elbow	Yes	2	3,8	0	0,0	1	1,9	1,869	,393
	No	52	96,2	54	100,0	53	98,1		
Hand/ Wrist	Yes	8	15,1	4	8,2	13	24,5	5,104	,078
	No	45	84,9	45	91,8	40	75,5		
Waist	Yes	16	29,6	19	37,3	19	35,2	,735	,693
	No	38	70,4	32	62,7	35	64,8		
Hip / Thigh	Yes	5	9,4	5	10,2	2	3,8	1,872	,392
	No	48	90,6	44	89,8	52	96,2		
Knee	Yes	3	5,6	8	15,4	7	13,2	2,831	,243
	No	51	94,4	44	84,6	46	86,8		
Foot / Ankle	Yes	3	5,6	3	6,1	2	3,8	,293	,864
	No	51	94,4	46	93,9	52	96,2		

There was no statistically significant difference ($p > 0.05$) between the distributions of the problems in the neck, shoulder, back, elbow, hand / wrist, waist, hip / thigh, knee and foot / ankle regions of the participants in all three groups in the last month. In addition, while the region where the participants in the sedentary life and yoga groups had the most problems in the last 1 month is waist, the region where the participants in the pilates group have the most problems is the neck.

Table 4. 11. Problems (Pain, Discomfort, etc.) in Body Regions in the Last 1 Month of the Groups

Region		Pilates		Yoga		Sedentary Life		x ²	p
		n	%	n	%	n	%		
Neck	Yes	12	22,2	7	13,5	12	22,2	1,725	,422
	No	42	77,8	45	86,5	42	77,8		
Shoulder	Yes	8	14,8	7	13,5	8	15,1	,065	,968
	No	46	85,2	45	86,5	45	84,9		
Back	Yes	11	20,4	8	15,7	16	29,6	3,099	,212
	No	43	79,6	43	84,3	38	70,4		
Elbow	Yes	2	3,8	0	0,0	1	1,9	1,932	,381
	No	52	96,2	54	100,0	53	98,1		
Hand/ Wrist	Yes	5	9,3	4	7,7	11	20,8	4,892	,087
	No	49	90,7	50	92,3	43	79,2		
Waist	Yes	10	18,9	11	21,2	19	35,2	4,440	,109
	No	44	81,1	43	78,8	35	64,8		
Hip / Thigh	Yes	2	3,8	3	5,7	2	3,8	,391	,823
	No	52	96,2	51	94,3	52	96,2		
Knee	Yes	2	3,8	3	5,7	6	11,3	2,568	,277
	No	52	96,2	51	94,3	48	88,7		
Foot / Ankle	Yes	2	3,8	2	3,8	2	3,8	,004	,998
	No	52	96,2	52	96,2	52	96,2		

There was no statistical difference ($p > 0.05$) between the distribution of the problems in the neck, shoulder, elbow, waist, hip / thigh, knee and foot / ankle regions of the participants in all three groups on the day of the survey. The problem in the back and hand / wrist regions of the participants in the sedentary life group is statistically higher ($p < 0.05$) than in the pilates and yoga groups. In addition, while the region where the participants in the sedentary life and yoga groups experienced the most problems on the day of the survey was waist, the region where the participants in the pilates group had the most problems was the neck.

Table 4. 12. Problems of Groups (Pain, Pain, Discomfort etc.) in Body Regions During the Day of the Survey

Region		Pilates		Yoga		Sedentary Life		x ²	p
		n	%	n	%	n	%		
Neck	Yes	9	16,7	6	11,3	4	7,5	2,149	,341

	No	45	83,3	48	88,7	50	92,5		
Shoulder	Yes	5	9,3	3	5,7	6	11,3	1,028	,598
	No	49	90,7	51	94,3	48	88,7		
Back	Yes	5	9,3	2	3,8	11	20,4	7,415	,025
	No	49	90,7	52	96,2	43	79,6		
Elbow	Yes	0	0,0	0	0,0	1	1,9	1,994	,369
	No	54	100,0	54	100,0	53	98,1		
Hand/ Wrist	Yes	3	5,7	0	0,0	10	18,9	13,194	,001
	No	51	94,3	54	100,0	44	81,1		
Waist	Yes	4	7,5	6	12,0	12	22,2	5,027	,081
	No	50	92,5	44	88,0	42	77,8		
Hip / Thigh	Yes	2	3,8	2	3,8	0	0,0	2,094	,351
	No	52	96,2	52	96,2	54	100,0		
Knee	Yes	1	1,9	2	3,8	3	5,7	1,070	,586
	No	53	98,1	52	96,2	51	94,3		
Foot / Ankle	Yes	2	3,8	1	1,9	1	1,9	,444	,801
	No	52	96,2	53	98,1	53	98,1		

There was no statistically significant difference ($p > 0.05$) between the disruption of work at home or outside the home due to the problem in the neck, shoulder, elbow, waist, hip / thigh, knee and foot / ankle regions of the participants in the three groups over the past 12 months. However, depending on the problem in the back and hand / wrist areas of the participants in the sedentary life group in the last 12 months, the disruption of work at home or outside the home is statistically higher ($p < 0.05$) than in the yoga and pilates groups.

Table 4. 13. Disruption of Work at Home or Outside The Home , Due to Problems in Body Regions in The Last 12 Months of Groups

Region		Pilates		Yoga		Sedentary Life		χ^2	p
		n	%	n	%	n	%		
Neck	Yes	4	7,4	5	9,3	4	7,4	,170	,918
	No	50	92,6	49	90,7	50	92,6		
Shoulder	Yes	4	7,4	5	9,3	5	9,3	,184	,912
	No	50	92,6	49	90,7	49	90,7		
Back	Yes	5	9,3	1	1,9	13	24,1	13,034	,001
	No	49	90,7	53	98,1	41	75,9		
Elbow	Yes	0	0,0	0	0,0	1	1,9	1,994	,369
	No	54	100,0	54	100,0	53	98,1		
Hand/ Wrist	Yes	1	1,9	2	3,8	9	17,0	10,019	,007

	No	53	98,1	52	96,2	45	83,0		
Waist	Yes	5	9,4	4	7,5	8	14,8	1,606	,448
	No	48	90,6	49	92,5	46	85,2		
Hip / Thigh	Yes	3	5,7	3	5,7	0	0,0	3,120	,210
	No	51	94,3	51	94,3	54	100,0		
Knee	Yes	0	0,0	2	3,8	4	7,6	4,186	,123
	No	54	100,0	52	96,2	50	92,4		
Foot / Ankle	Yes	1	1,9	0	0,0	1	1,9	1,043	,594
	No	53	98,1	54	100,0	53	98,1		

There was no statistically significant difference ($p > 0.05$) between the distributions of the situation of applying to health services due to the problem in the shoulder, back, elbow, hand / wrist, waist, hip / thigh, knee and foot / ankle areas of the participants in all three groups in the last 12 months. Participants in the yoga group applied to health services due to the problem in the neck area in the last 12 months were statistically ($p < 0.05$) higher than those in the pilates and sedentary life groups. In addition, the participants in the sedentary life and yoga groups have applied to health services in the last 12 months mostly because of the problem in the waist region and the pilates group mostly have applied because of the problem in the neck region.

Table 4. 14. The Status of Groups to Apply to Health Services in the Last 12 Months Due to a Problem in the Body Regions

Region		Pilates		Yoga		Sedentary Life		χ^2	p
		n	%	n	%	n	%		
Neck	Yes	12	22,2	13	24,1	3	5,8	7,407	,025
	No	42	77,8	41	75,9	49	94,2		
Shoulder	Yes	3	5,6	6	11,3	4	8,3	1,157	,561
	No	51	94,4	47	88,7	44	91,7		
Back	Yes	4	7,5	7	13,2	4	7,8	1,238	,538
	No	49	92,5	46	86,8	47	92,2		
Elbow	Yes	0	0,0	0	0,0	1	1,9	2,223	,329
	No	54	100,0	54	100,0	53	98,1		
Hand/ Wrist	Yes	3	5,7	5	9,4	4	7,7	,539	,764
	No	51	94,3	49	90,6	50	92,3		
Waist	Yes	8	15,1	13	25,0	6	12,0	3,297	,192
	No	45	84,9	39	75,0	44	88,0		
Hip / Thigh	Yes	1	1,9	3	5,9	0	0,0	3,430	,180

	No	51	98,1	48	94,1	54	100,0		
Knee	Yes	3	5,7	6	11,3	3	6,0	1,493	,474
	No	50	94,3	47	88,7	47	94,0		
Foot / Ankle	Yes	1	1,9	3	5,7	0	0,0	3,466	,177
	No	53	98,1	51	94,3	54	100,0		

There was no statistically significant difference ($p > 0.05$) between drug use status distributions due to the problem in the neck, shoulder, back, elbow, waist, hip / thigh, knee and foot / wrist areas of the participants in all three groups in the last 12 months. The drug use status of the participants in the sedentary life group was statistically higher ($p < 0.05$) than in the pilates and yoga groups due to the problem in the hand / wrist area in the last 12 months. In addition, participants in the pilates and yoga groups have used medication mostly because of the problem in the neck area, while the participants in the sedentary lifestyle group have used the drug mostly due to the problem in the lumbar region in the last 12 months.

Table 4. 15. Medication Status of the Groups in the Last 12 Months Due to Problem in the Body Regions

Region		Pilates		Yoga		Sedentary Life		χ^2	p
		n	%	n	%	n	%		
Neck	Yes	9	16,7	11	20,8	3	6,1	4,580	,101
	No	45	83,3	42	79,2	46	93,9		
Shoulder	Yes	4	7,4	5	9,4	4	7,4	,197	,906
	No	50	92,6	49	90,6	50	92,6		
Back	Yes	7	13,0	3	5,7	6	11,1	1,719	,423
	No	47	87,0	51	94,3	48	88,9		
Elbow	Yes	0	0,0	0	0,0	1	1,9	1,994	,369
	No	54	100,0	54	100,0	53	98,1		
Hand/ Wrist	Yes	0	0,0	0	0,0	3	5,7	6,057	,048
	No	54	100,0	54	100,0	51	94,3		
Waist	Yes	8	15,1	11	20,4	5	9,3	2,630	,268
	No	45	84,9	43	79,6	49	90,7		
Hip / Thigh	Yes	2	3,8	4	7,4	0	0,0	4,154	,125
	No	52	96,2	50	92,6	54	100,0		
Knee	Yes	3	5,6	5	9,3	2	3,7	1,492	,474
	No	51	94,4	49	90,7	52	96,3		

Foot / Ankle	Yes	1	1,9	1	1,9	1	1,9	,000	1,000
	No	53	98,1	53	98,1	53	98,1		

There was no statistically significant difference ($p > 0.05$) between the distribution of sick leave status of the participants in all three groups due to the problem in the neck, shoulder, back, elbow, hand / wrist, waist, hip / thigh, knee and foot / ankle areas in the last 12 months. . In addition, it was observed that the participants in all three groups had a low rate of sick leave due to problems in the body area.

Table 4. 16. Sick Leave Status of the Groups in the Last 12 Months Due to Problem in the Body Regions

Region		Pilates		Yoga		Sedentary Life		χ^2	p
		n	%	n	%	n	%		
Neck	Yes	3	5,6	3	5,6	0	0,0	3,001	,223
	No	51	94,4	51	94,4	54	100,0		
Shoulder	Yes	1	1,9	0	0,0	0	0,0	1,975	,372
	No	53	98,1	54	100,0	54	100,0		
Back	Yes	2	3,8	3	5,6	1	1,9	1,033	,597
	No	52	96,2	51	94,4	53	98,1		
Elbow	Yes	-	-	-	-	-	-	-	-
	No	54	100,0	54	100,0	54	100,0		
Hand/ Wrist	Yes	0	0,0	0	0,0	2	3,7	4,013	,134
	No	54	100,0	54	100,0	52	96,3		
Waist	Yes	4	7,5	5	9,3	2	3,7	1,373	,503
	No	49	92,5	49	90,7	52	96,3		
Hip / Thigh	Yes	1	1,9	2	3,7	0	0,0	2,026	,363
	No	53	98,1	52	96,3	54	100,0		
Knee	Yes	3	5,6	2	3,7	0	0,0	2,889	,236
	No	51	94,4	52	96,3	54	100,0		
Foot / Ankle	Yes	1	1,9	1	1,9	1	1,9	,000	1,000
	No	53	98,1	53	98,1	53	98,1		

There was no statistically significant difference ($p > 0.05$) between the severity of pain and the change of pain on holidays on the participants in all three groups. The frequency of pain of participants in the sedentary life group is statistically higher ($p < 0.05$) than in the pilates and yoga groups.

Table 4. 17. Pain Status of Participants

		Pilates		Yoga		Sedentary Life		x ²	p
		n	%	n	%	n	%		
Frequency of Pain	Continuous	3	9,1	2	4,9	7	15,9	16,414	,003
	Often	11	33,3	15	36,6	28	63,6		
	Rarely	19	57,6	24	58,5	9	20,5		
Pain in Holidays	Decreasing	18	54,5	21	51,2	20	46,5	,498	,780
	Does not Change	15	45,5	20	48,8	23	53,5		
Severity of Pain	0	0	0,0	2	4,8	0	0,0	16,963	,655
	1	0	0,0	1	2,4	1	2,3		
	2	3	9,1	4	9,5	3	6,8		
	3	5	15,2	7	16,7	6	13,6		
	4	8	24,2	11	26,2	6	13,6		
	5	8	24,2	5	11,9	13	29,5		
	6	5	15,2	7	16,7	10	22,7		
	7	2	6,1	1	2,4	2	4,5		
	8	1	3,0	4	9,5	2	4,5		
	9	1	3,0	0	0,0	0	0,0		
	10	0	0,0	0	0,0	1	2,3		

There was no statistically significant difference ($p > 0.05$) between the distribution of the participants in the Pilates and yoga group for how long they were doing sports. The rate of doing sports for more than 3 days in the yoga group is statistically higher ($p < 0.05$) than in the pilates group. The rate of doing sports with the trainer of the participants in the yoga group is statistically higher ($p < 0.05$) than in the pilates group. There was no statistically significant difference ($p > 0.05$) between the genders, the state of surgical operation, regular drug use, and the dominant side of the participants in all three groups.

Table 4. 18. Comparison of Groups' Personal Information

		Pilates		Yoga		S Yaşam		x ²	p
		n	%	n	%	n	%		
How Many Days a Week Do You Exercise?	1 Day	5	9,3	3	5,6	0	0,0	169,244	,000
	2 Day	16	29,6	12	22,2	0	0,0		
	3 Day	18	33,3	13	24,1	0	0,0		
	More Than 3 Days	15	27,8	26	48,1	0	0,0		
Gender	Female	35	64,8	45	83,3	38	70,4	4,930	,085

	Male	19	35,2	9	16,7	16	29,6		
How Long Have You Been Doing This Sport ?	1-3 Months	9	16,7	6	11,1	0	0,0	2,783	,426
	3-6 Months	5	9,3	3	5,6	0	0,0		
	6-9 Months	7	13,0	4	7,4	0	0,0		
	More Than 1Year	33	61,1	41	75,9	0	0,0		
Who conducts Yoga / Pilates?	Physiotherapist	25	46,3	11	20,4	0	0,0	8,167	,004
	Personal Trainer	29	53,7	43	79,6	0	0,0		
Surgical Procedure Status	Yes	12	22,2	20	37,0	15	27,8	2,937	,230
	No	42	77,8	34	63,0	39	72,2		
Regular Medication	Yes	3	5,6	5	9,3	3	5,6	,780	,677
	No	51	94,4	49	90,7	51	94,4		
Dominant Side	Right	46	85,2	47	87,0	48	88,9	,328	,849
	Left	8	14,8	7	13,0	6	11,1		

The results of one-way analysis of variance are shown in Table 18. The ages of the participants were statistically significant ($F = 4.665$, $p = 0.011$). In other words, the groups of the participants affect the age of the participants.

Table 4. 19. One-Way Variance Analysis Results for the Relationship Between the Group of the Participants' Ages

	Group	n	Avg.	SS	F	p
Age	Pilates	54	30,56	5,46	4,665	,011
	Yoga	54	34,52	6,69		
	Sedentary Life	54	32,28	7,06		

In order to compare the musculoskeletal complaints of the groups practicing yoga, pilates and sedentary life groups, the results of the questionnaire were examined and compared. When the personal information of the participants is examined;

- Pilates, yoga and sedentary life groups are composed of equal numbers of participants and the average age of the participants in the yoga group is 34.52 ± 6.69 , while the average age of the participants in the sedentary life group is 32.28 ± 7.06 and the average age of the participants in the pilates group is 30.56 ± 5.46 ,

When the body regions of the groups that have musculoskeletal complaints are compared;

- While the area where the participants in the sedentary life and yoga groups have the most problems is waist, the area where the participants in the pilates group have the most problems is the neck,
- The region where the participants in both groups doing sports with a physiotherapist experience the most problems is the waist,
- While the area where the participants in the pilates group who are doing sports with the trainer experience the most problems is the neck, the region where the participants in the yoga group have the most problems is the waist,
- The hospitalization rate of the participants in all three groups is very low due to musculoskeletal problems,
- The rate of changing the job or duty of the participants in all three groups is very low due to problems in the body regions,
- The region where the participants in all three groups had the most problems in the last 12 months is the waist,
- While the region where the participants in the sedentary life and yoga groups had the most problems in the last 1 month was the waist, the region where the participants in the pilates group had the most problems was the neck,
- While the region where the participants in the sedentary life and yoga groups experienced the most problems on the day of the survey was waist, the region where the participants in the pilates group had the most problems was the neck,
- Participants in the sedentary life and yoga groups have disrupted their work at home or outside the home in the last 12 months mostly due to the problem in the waist region, and the participants in the pilates group due to the problem in the neck area.
- Participants in the pilates and yoga groups have been taking medication in the last 12 months, mainly because of the problem in the neck region, and participants in the sedentary life group, because of the problem in the waist,
- Participants in all three groups had a low rate of sick leave due to musculoskeletal problems,

- There was no difference between the pain severity of the participants in all three groups and the change of pain on holidays,
- There is a difference between the frequency of pain of the participants in all three groups,
- There is no difference between the distribution of participants in the pilates and yoga group for how long they have been doing pilates / yoga,
- There is a difference between how many days a week the participants in the pilates and yoga group do exercise and about who conducts pilates / yoga,
- There was no significant difference between the genders of the participants, the state of surgical operation, regular medication use and the dominant side in all three groups,
- Participants 'groups were found to affect the participants' ages.

5. DISCUSSION AND CONCLUSION

In order to compare the complaints of musculoskeletal system among people who practice yoga and pilates, and to compare the complaints of musculoskeletal system between people who exercise with the trainer and physiotherapist; according to the results of our study comparing the three groups who practice yoga, who practise pilates and who has sedentary life, the body regions where the majority of the groups have complaints of musculoskeletal system are the same when questioned for the last 12 months but different when questioned for the last 1 month. In addition, there is a difference between the groups doing yoga and pilates in terms of having a musculoskeletal system complaints according to the condition of doing sports with the physiotherapist and doing sports with the trainer.

Yoga is an exercise philosophy that aims to balance physically, mentally, emotionally and spiritually, strengthens the muscles, maintains the smoothness of the posture, provides flexibility, keeps the breath in order, calms the individual with relaxation and helps to be more energetic (8,9). Pilates focuses on controlled movement, posture and breathing; It is a sport designed to improve body flexibility and health by using spinal stabilization and exercise and breath control (10,11). Sedentary individuals are defined as individuals who walk less than 1 kilometer per day and work by sitting (14).

Pilates has been used in many studies as a therapeutic agent for mechanical problems such as impaired body composition, chronic low back pain and back pain (6,10,11,12,18). However, there are no studies in the literature regarding complaints of musculoskeletal system that may occur in pilates.

It is supported by many studies that yoga improves posture, improves mechanical pain in the body, improves mental health, and increases flexibility and balance (3,7,8,9,10,16). However, in a study by Swain et al; In the USA, 29,590 people applied to the emergency services of the hospitals due to injuries related to yoga between 2001-2014 (4).

M. Kim and his friends analyzed 2007 National Health Interview Survey (NHIS) data to investigate the frequency of serious injuries that would stop practicing yoga in people doing yoga in the USA and to investigate the most injured body area in those who practice yoga (n = 23,293). In their study, they stated that less than 1% of those who

practice yoga experience a sufficiently large injury to quit yoga and the most injured area is the waist in accordance with our study (54).

As a result of Dacci et al. Review of a case report on a 67-year-old woman who experienced bilateral sciatic nerve injury during yoga exercises; They concluded that those using sedative medications, people with hypermobility and elderly people are at risk of sciatic nerve damage when doing yoga (55).

Derek et al. Stated that yoga exercises may result in negative side effects when yoga exercises push the body to physiological excesses as a result of a case report review about the yoga breathing exercises (Kapalabhati Pranayama) caused pneumothorax in a 29-year-old young healthy woman (56).

Ferreira et al. Stated that head stand may cause degenerative cervical spine changes and compression myelomalacia in the long term as a result of a case report about a woman who is 52 years old, doing yoga and suffering from compressive myelopathy and myelomalacia (57).

Fishman et al included yoga instructors, yoga therapists, and other clinicians in a 22-question survey to obtain an opinion on the scope, nature and causes of yoga-related injuries. The survey was conducted in cooperation with the International Association of Yoga Therapists (IAYT), Yoga Alliance and Yoga Spirit. Between May and October 2007, 1,336 responses were received from 34 countries.

Most of the respondents said that the most common and serious injuries occur in the neck, waist, shoulders, wrists and knee. They reported that the most common causes of yoga injuries were poor technical or poor positioning, previous injuries, overtraining and incorrect or inadequate training (58).

Penman et al. Conducted a national questionnaire on yoga practitioners using a comprehensive web-based questionnaire to investigate yoga practice in Australia. A total of 3892 people participated in the questionnaire, and for what purpose, how often they do yoga and the yoga-related injuries experienced by the participants were questioned. According to the results of this study, the proportion of people who have been practicing yoga under supervision for 12 months is below 2.4% (59).

As a result of the studies conducted by Mikkonen and his friends with Ashtanga Vinyasa Yoga practitioners in two yoga studios in Finland in order to examine the effects

of Ashtanga Vinyasa Yoga on musculoskeletal injuries (n = 300); stated that 68 (62%) of 110 applicants who participated in the survey had at least one injury lasting more than a month, and some practitioners reported more than one injury and a total of 107 musculoskeletal injuries were reported. In this study, it was stated that the three most common injuries were hamstring, knee and waist, and none of the practitioners experienced permanent damage due to their injuries (60).

Yoga strengthens the muscles around the knee joint and can be used in the treatment of osteoarthritis problems in the knee according to many studies (3, 52,53). According to a study conducted by Zhu et al. On Chinese women, yoga exercises were found to be a higher risk factor for meniscus when compared with badminton, running and hill climbing sports (5). 15.4% of the people who participated in our study and practiced yoga stated that they had knee problems in the last year, this rate is 3% in the pilates group and 13.2% in the sedentary group. According to the results in the last month, 5.7% of the yoga group, 3.8% of the pilates group and 11.3% of the sedentary group stated that they had knee problems. According to our evaluation, the problem in the knee region of the participants in the yoga group is statistically higher ($p < 0.05$) than in the pilates and sedentary life groups and it can be said that yoga is a greater risk factor for knee problems than pilates.

Corroller et al. reported that the most common musculoskeletal problems in people practicing yoga were supraspinatus, achilles and peroneus brevis tendon tears, and fibrocartilogenous tears, including medial meniscus, acetabular labrum, glenoid labrum, and lumbal disc extrusion (27).

In our study, those who have been practicing yoga or pilates for at least 3 months and those who are sedentary are included. When the musculoskeletal system complaints of the volunteer participants in the past month were asked, the region where the yoga group complained most was the waist region with a rate of 21.2%, while this ratio is 22.2% in the pilates group and 35.2% in the sedentary living group.

Limitations of our study are that the participants of the study were not questioned about whether they had any health problems before starting sports, the changes in their complaints after starting to do yoga or pilates and that the improvement about musculoskeletal problems between those who do sports with physiotherapists and those who do sports with trainers did not compare.

Less pain and complaints in the neck and knee regions of people who do pilates with a physiotherapist and less pain in the neck on those who practice yoga with a physiotherapist may indicate the importance of education in sports injuries prevention.

Although there are many studies in the literature about the therapeutic effects of yoga and pilates sports, there is a need for more studies on injuries that may occur in people who are dealing with these sports branches. Our study is capable of shedding light on the studies to be carried out on this subject.



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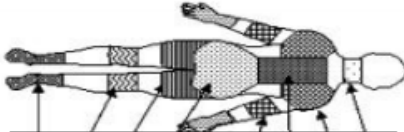
7. APPENDICES

Appendix 1: Extended Nordic Musculoskeletal Questionnaire (NMQ-E)

Anket Formu-

Genişletilmiş Nordic Kas İskelet Sistemi Anketi

Anketin Yanıtlanması: Lütfen uygun kutuya x işareti koyarak cevaplandırınız. Her soru için bir x işareti. Vücudunuzun herhangi bir yerinde asla bir sorunu yaşamamış olsanız bile bütün soruları cevaplayınız. Lütfen bir aşğıdaki vücut bölgesine geçmeden önce soruların soldan sağa doğru cevaplayınız. Bu resim vücudun nasıl bölümlendiğini göstermektedir. Simitler çok net olarak belirtilmemişdir ve bazı bölgeler üst üste gelmektedir. Hangi bölgenin (eğer varsa) etkilendiği ya da etkilendiği olduğuna kendiniz karar vermişsinizdir.



Bu vücut bölgesinde sorunuz (ağrı, acı, rahatsızlık hissi vb) oldu mu?	Cevabınız "Hayır" ise diğer vücut bölgesine geçiniz "evet" ise lütfen devam ediniz.	Bu sorunu kaç yarıyızda başladı?	Bu sorunu ne zaman başladı?	Bu sorunu ne zaman başladı?	Son 12 ay içerisinde herhangi bir vücut bölgesinde sorunuz (ağrı, acı, rahatsızlık hissi vb) oldu mu?	Cevabınız "Hayır" ise diğer vücut bölgesine geçiniz "evet" ise lütfen devam ediniz.	Son bir ay (4 hafta) içerisinde herhangi bir vücut bölgesinde sorunuz (ağrı, acı, rahatsızlık hissi vb) oldu mu?	Bugün sorunuz (ağrı, acı, rahatsızlık hissi vb) oldu mu?	Son 12 ay içerisinde herhangi bir vücut bölgesinde sorunuz (ağrı, acı, rahatsızlık hissi vb) oldu mu?	Bu sorunu ne zaman başladı?	Bu sorunu ne zaman başladı?	Bu sorunu ne zaman başladı?	Bu sorunu ne zaman başladı?
BOYUN	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır
OMUZ	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır
SIRT	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır
DIRSEK	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır
EL/EL BİLEĞİ	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır
BEL	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır
KALÇAĞ/UYLUK	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır
DİZ	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır
AYAK/BİLEK	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır	<input type="checkbox"/> Evet <input type="checkbox"/> Hayır

Yukarıdaki tabloda ilk soruya evet yanıtı verdiyse lütfen uygun gözleri doldurunuz.

Ağrı ne sıklıkla oluyor	2-Sık sık (haftada birkaç gün)	BOYUN	OMUZ	SIRT	DIRSEK	EL/EL BİLEĞİ	BEL	KALÇAĞ/UYLUK	DİZ	AYAK/BİLEK
1-Sırekli (hemem her gün)										
3-Nadiren (haftada bir gün ya da daha seyrek)										
Ağrınız nasıl günleri	1-Azaltıyor 2-Fark etmiyor									
Ağrı şiddeti nedir? 1-10 arası bir değer veriniz (1 çok hafif..... 10 dayanılmaz)										

Appendix 2: Online Survey Applied to Volunteer Participants

ANKET ARAŞTIRMALARI İÇİN AYDINLATILMIŞ ONAM FORMU

Sevgili Katılımcı,

“Yoga ve Pilates Yapan Kişilerde Kas İskelet Sistemi Şikayetlerinin Karşılaştırılması” başlıklı bu araştırma

, Yeditepe Üniversitesi Sağlık Bilimleri Fakültesi, Fizyoterapi ve Rehabilitasyon Bölümü tarafından yapılmaktadır. Araştırma yoga veya pilates yapan insanlarda ya da sedanter yaşayan kişilerde kas iskelet sistemi şikayetlerini ve bazı parametreleri karşılaştırma amacıyla planlanmıştır. Sizin yanıtlarınızdan elde edilecek sonuçlarla bu konuya ışık tutulacaktır. Bu nedenle soruların tümüne içtenlikle cevap vermeniz büyük önem taşımaktadır.

Araştırmaya katılmanız gönüllülük esasına dayalıdır. Bu form ile elde edilecek bilgiler gizli kalacaktır ve sadece araştırma amacıyla (veya “bilimsel amaçlar için”) kullanılacaktır. Çalışmaya katılmamayı tercih edebilirsiniz veya anketi doldururken istemezseniz son verebilirsiniz.

Anket formuna adınızı ve soyadınızı yazmayınız.

Çalışmamızda kullandığımız anket; spor yaptığımız süre içerisinde farklı zaman dilimlerinde yaşadığınız fiziksel problemler ile ilgili soruları içermektedir. 5-10 dk zamanınızı alacak bu çalışmada yanıtlarınızı, soruların karşısında yer alan kutucukları işaretleyerek ve istenen bölümlerde uygun sayıları yazarak belirtiniz.

Anketi yanıtladığınız için teşekkür ederiz.

Çalışma ile ilgili bir sorunuz olduğunda aşağıdaki kişi(ler) ile iletişim kurabilirsiniz: Sorumlu Öğretim Üyesi: Yrd.Doç.Dr. Feyza Şule Badıllı Demirbaş

Yeditepe Üniversitesi Fizyoterapi ve Rehabilitasyon Bölümü

Arařtırma Ekibi: Yrd.Doç.Dr. Feyza Őule Badıllı Demirbař,
Fzt.Mehmet Ali Kuř

1.Yukarıdaki formu okuyup alıřmaya katılmayı kabul ediyorsanız lütfen ařağıdaki kutucuęu iřaretleyiniz ve devam ediniz.

Uygun olanların tümünü iřaretleyin.

- Kabul ediyorum
 Dięer: _____

2. Bölüm Demografik Veriler

1. Hangi sporu yapıyorsunuz ?

Yalnızca bir řıkkı iřaretleyin.

- Pilates
 Yoga
 Spor yapmıyorum
 Dięer: _____

2. Haftada kaç gün spor yapıyorsunuz ?

Yalnızca bir řıkkı iřaretleyin.

- 1
 2
 3
 3 ten fazla
 Yapmıyorum
 Dięer: _____

3. Cinsiyetiniz nedir ?

Yalnızca bir řıkkı iřaretleyin.

- Kadın

Erkek

4. Kaç yaşındasınız ?

5. Ne zamandır bu sporu yapıyorsunuz ?

Yalnızca bir şıkkı işaretleyin.

- 1-3 ay
 3-6 ay
 6-9 ay
 1 yıldan fazla

6. Haftada kaç gün spor yapıyorsunuz ?

Yalnızca bir şıkkı işaretleyin.

- 1
 2
 3
 3 ten fazla
 Yapmıyorum
 Diğer: _____

7. Cinsiyetiniz nedir ?

Yalnızca bir şıkkı işaretleyin.

- Kadın
 Erkek

8. Kaç yaşındasınız ?

9. Ne zamandır bu sporu yapıyorsunuz ?

Yalnızca bir şıkkı işaretleyin.

- 1-3 ay
 3-6 ay
 6-9 ay
 2 yıldan fazla

10. Haftada kaç gün spor yapıyorsunuz ?

Yalnızca bir şıkkı işaretleyin.

- 1
 2
 3
 3 ten fazla
 Yapmıyorum
 Diğer _____

11. Cinsiyetiniz nedir ?

Yalnızca bir şıkkı işaretleyin.

- Kadın
 Erkek

12. Kaç yaşındasınız ?

13. Ne zamandır bu sporu yapıyorsunuz ?

Yalnızca bir şıkkı işaretleyin

- 1-3 ay

- 3-6 ay
 6-9 ay
 1 yıldan fazla

14. Daha önce hangi sporu yaptınız ?

Yalnızca bir şıkkı işaretleyin.

- Fizyoterapist
 Personal Trainer(Kişisel Antrenör)

15. Daha önce geçirdiğiniz bir cerrahi işlem var mı?

Yalnızca bir şıkkı işaretleyin.

- Evet
 Hayır

16. Düzenli kullandığınız bir ilaç var mı ?

Yalnızca bir şıkkı işaretleyin.

- Evet
 Hayır

17. Daha önce geçirdiğiniz bir cerrahi işlem var mı?

Yalnızca bir şıkkı işaretleyin.

- Evet
 Hayır

18. Düzenli kullandığınız bir ilaç var mı ?

Yalnızca bir şıkkı işaretleyin.

- Evet
 Hayır

19. Kullanıyorsanız hangi ilacı kullanıyorsunuz ?

20. Dominant tarafınız hangisi?

Yalnızca bir şıkkı işaretleyin.

Sağ

Sol

21. Mesleğiniz nedir ?

GENİŞLETİLMİŞ NORDİC KAS İSKELET ANKETİ (NMQ-E)

Vücudunuzun herhangi bir yerinde asla bir sorun yaşamamış olsanız bile bütün soruları cevaplayınız.

1. Bu vücut bölgesinde sorunuz (ağrı, acı, rahatsızlık hissi vb) oldu mu ?

Uygun olanların tümünü işaretleyin.

	Evet	Hayır
Boyun	<input type="checkbox"/>	<input type="checkbox"/>
Omuz	<input type="checkbox"/>	<input type="checkbox"/>
Sırt	<input type="checkbox"/>	<input type="checkbox"/>
Dirsek	<input type="checkbox"/>	<input type="checkbox"/>
El/El bileği	<input type="checkbox"/>	<input type="checkbox"/>
Bel	<input type="checkbox"/>	<input type="checkbox"/>
Kalça/uyluk	<input type="checkbox"/>	<input type="checkbox"/>
Diz	<input type="checkbox"/>	<input type="checkbox"/>
Ayak/Bilek	<input type="checkbox"/>	<input type="checkbox"/>

2. Bu sorun kaç yaşında başladı ? (boyun:25 şeklinde yazınız.)

3. Bu sorun nedeniyle hiç hastanede yattınız mı ?

Uygun olanların tümünü işaretleyin.

	Evet	Hayır
Boyun	<input type="checkbox"/>	<input type="checkbox"/>
Omuz	<input type="checkbox"/>	<input type="checkbox"/>
Sırt	<input type="checkbox"/>	<input type="checkbox"/>
Dirsek	<input type="checkbox"/>	<input type="checkbox"/>
El/El bileği	<input type="checkbox"/>	<input type="checkbox"/>
Bel	<input type="checkbox"/>	<input type="checkbox"/>
Kalça/uyluk	<input type="checkbox"/>	<input type="checkbox"/>
Diz	<input type="checkbox"/>	<input type="checkbox"/>
Ayak/Bilek	<input type="checkbox"/>	<input type="checkbox"/>

4. Bu sorun nedeniyle işinizi ya da görevinizi(geçici de olsa) değiştirmek zorunda kaldınız mı ?

Uygun olanların tümünü işaretleyin.

	Evet	Hayır
Boyun	<input type="checkbox"/>	<input type="checkbox"/>
Omuz	<input type="checkbox"/>	<input type="checkbox"/>
Sırt	<input type="checkbox"/>	<input type="checkbox"/>
Dirsek	<input type="checkbox"/>	<input type="checkbox"/>
El/El bileği	<input type="checkbox"/>	<input type="checkbox"/>
Bel	<input type="checkbox"/>	<input type="checkbox"/>
Kalça/uyluk	<input type="checkbox"/>	<input type="checkbox"/>
Diz	<input type="checkbox"/>	<input type="checkbox"/>
Ayak/Bilek	<input type="checkbox"/>	<input type="checkbox"/>

5.Son 12 ay içerisinde herhangi bir zamanda bu vücut bölgesinde sorununuz(ağrı,acı,rahatsızlık hissi vb) oldu mu ?

Uygun olanların tümünü işaretleyin.

	Evet	Hayır
Boyun	<input type="checkbox"/>	<input type="checkbox"/>
Omuz	<input type="checkbox"/>	<input type="checkbox"/>
Sırt	<input type="checkbox"/>	<input type="checkbox"/>
Dirsek	<input type="checkbox"/>	<input type="checkbox"/>
El/El bileği	<input type="checkbox"/>	<input type="checkbox"/>
Bel	<input type="checkbox"/>	<input type="checkbox"/>

Kalça/uyluk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ayak/Bilek	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6.Son 1 ay(4 hafta) içerisinde herhangi bir zamanda bu vücut bölgesinde sorununuz(ağrı,acı,rahatsızlık hissi vb) oldu mu ?

Uygun olanların tümünü işaretleyin.

	Evet	Hayır	
Boyun	<input type="checkbox"/>	<input type="checkbox"/>	
Omuz	<input type="checkbox"/>	<input type="checkbox"/>	
Sırt	<input type="checkbox"/>	<input type="checkbox"/>	
Dirsek	<input type="checkbox"/>	<input type="checkbox"/>	
El/El bileği	<input type="checkbox"/>	<input type="checkbox"/>	
Bel	<input type="checkbox"/>	<input type="checkbox"/>	
Kalça/uyluk	<input type="checkbox"/>	<input type="checkbox"/>	
Diz	<input type="checkbox"/>	<input type="checkbox"/>	
Ayak/Bilek	<input type="checkbox"/>	<input type="checkbox"/>	

7.Bugün sorununuz(ağrı,acı,rahatsızlık hissi vb) oldu mu ?

Uygun olanların tümünü işaretleyin.

	Evet	Hayır	
Boyun	<input type="checkbox"/>	<input type="checkbox"/>	
Omuz	<input type="checkbox"/>	<input type="checkbox"/>	
Sırt	<input type="checkbox"/>	<input type="checkbox"/>	
Dirsek	<input type="checkbox"/>	<input type="checkbox"/>	
El/El bileği	<input type="checkbox"/>	<input type="checkbox"/>	
Bel	<input type="checkbox"/>	<input type="checkbox"/>	
Kalça/uyluk	<input type="checkbox"/>	<input type="checkbox"/>	
Diz	<input type="checkbox"/>	<input type="checkbox"/>	
Ayak/Bilek	<input type="checkbox"/>	<input type="checkbox"/>	

Son 12 ay içerisinde herhangi bir zamanda:

8. Bu sorun nedeniyle evde ya da ev dışında işleriniz aksadı mı?

Uygun olanların tümünü işaretleyin.

	Evet	Hayır
Boyun	<input type="checkbox"/>	<input type="checkbox"/>
Omuz	<input type="checkbox"/>	<input type="checkbox"/>
Sırt	<input type="checkbox"/>	<input type="checkbox"/>
Dirsek	<input type="checkbox"/>	<input type="checkbox"/>
El/El bileği	<input type="checkbox"/>	<input type="checkbox"/>
Bel	<input type="checkbox"/>	<input type="checkbox"/>
Kalça/uyluk	<input type="checkbox"/>	<input type="checkbox"/>
Diz	<input type="checkbox"/>	<input type="checkbox"/>
Ayak/Bilek	<input type="checkbox"/>	<input type="checkbox"/>

9. Bu sorun nedeniyle sağlık hizmetlerine(doktor,fizyoterapist vb) başvurduunuz mu?

Uygun olanların tümünü işaretleyin.

	Evet	Hayır
Boyun	<input type="checkbox"/>	<input type="checkbox"/>
Omuz	<input type="checkbox"/>	<input type="checkbox"/>
Sırt	<input type="checkbox"/>	<input type="checkbox"/>
Dirsek	<input type="checkbox"/>	<input type="checkbox"/>
El/El bileği	<input type="checkbox"/>	<input type="checkbox"/>
Bel	<input type="checkbox"/>	<input type="checkbox"/>
Kalça/uyluk	<input type="checkbox"/>	<input type="checkbox"/>
Diz	<input type="checkbox"/>	<input type="checkbox"/>
Ayak/Bilek	<input type="checkbox"/>	<input type="checkbox"/>

10.Bu sorun nedeniyle ilaç aldınız mı?

Uygun olanların tümünü işaretleyin.

	Evet	Hayır
Boyun	<input type="checkbox"/>	<input type="checkbox"/>
Omuz	<input type="checkbox"/>	<input type="checkbox"/>
Sırt	<input type="checkbox"/>	<input type="checkbox"/>
Dirsek	<input type="checkbox"/>	<input type="checkbox"/>
El/El bileği	<input type="checkbox"/>	<input type="checkbox"/>
Bel	<input type="checkbox"/>	<input type="checkbox"/>
Kalça/uyluk	<input type="checkbox"/>	<input type="checkbox"/>
Diz	<input type="checkbox"/>	<input type="checkbox"/>

Ayak/Bilek

<input type="checkbox"/>	<input type="checkbox"/>
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11.Bu sorun nedeniyle hastalık izni(rapor ya da izin) aldınız mı?

Uygun olanların tümünü işaretleyin.

	Evet	Hayır
Boyun	<input type="checkbox"/>	<input type="checkbox"/>
Omuz	<input type="checkbox"/>	<input type="checkbox"/>
Sırt	<input type="checkbox"/>	<input type="checkbox"/>
Dirsek	<input type="checkbox"/>	<input type="checkbox"/>
El/El bileği	<input type="checkbox"/>	<input type="checkbox"/>
Bel	<input type="checkbox"/>	<input type="checkbox"/>
Kalça/uyluk	<input type="checkbox"/>	<input type="checkbox"/>
Diz	<input type="checkbox"/>	<input type="checkbox"/>
Ayak/Bilek	<input type="checkbox"/>	<input type="checkbox"/>

Lütfen bu bölümdeki ilk soruya Evet cevabını verdiyseniz devam ediniz.

12.Ağrı ne sıklıkta oluyor ?

Yalnızca bir şıkkı işaretleyin.

- Sürekli(hemen her gün)
- Sık sık(haftada birkaç gün)
- Nadiren(haftada bir gün ya da daha seyrek)

13.Ağrınız tatil günleri

Yalnızca bir şıkkı işaretleyin.

- Azalıyor
- Fark etmiyor

14.Ađrı Őiddeti nedir ? 1-10 arası bir deęer veriniz.

Yalnızca bir Őikkı Őaretleyin.

0	1	2	3	4	5	6	7	8	9	10
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Appendix 3 : Ethical Committee Approval



Sayı : 37068608-6100-15- 1783
Konu: Klinik Araştırmalar
Etik kurul Başvurusu hk.

05/12/2019

İlgili Makama (Mehmet Ali Kuş)

Yeditepe Üniversitesi Sağlık Bilimleri Fakültesi Fizik Tedavi ve Rehabilitasyon Bölümü Dr. Öğr. Üyesi Feyza Şule Badıllı'nın sorumlu araştırmacı olduğu "**Yoga ve Pilates Yapan Kişilerde Kas İskelet Sistemi Şikayetlerinin Karşılaştırılması**" isimli araştırma projesine ait Klinik Araştırmalar Etik Kurulu (KAEK) Başvuru Dosyası (1766) kayıt Numaralı KAEK Başvuru Dosyası, Yeditepe Üniversitesi Klinik Araştırmalar Etik Kurulu tarafından **04.12.2019** tarihli toplantıda incelenmiştir.

Kurul tarafından yapılan inceleme sonucu, yukarıdaki isimi belirtilen çalışmanın yapılmasının etik ve bilimsel açıdan uygun olduğuna karar verilmiştir (**KAEK Karar No: 1127**).

Prof. Dr. Turgay ÇELİK
Yeditepe Üniversitesi
Klinik Araştırmalar Etik Kurulu Başkanı

Appendix 4: CV

Kişisel Bilgiler

Adı	Mehmet Ali	Soyadı	Kuş
Doğum Yeri	Antakya / Hatay	Doğum Tarihi	20.02.1993
Uyruğu	Türk	TC Kimlik No	46108174472
E-mail	Mehmetalikus93@gmail.com	Tel	05076310510

Öğrenim Durumu

Derece	Alan	Mezun Olduğu Kurumun Adı	Mezuniyet Yılı
Doktora			
Yüksek Lisans	Spor Fizyoterapisi	Yeditepe Üniversitesi	2020
Lisans	Fizyoterapi ve Rehabilitasyon	Muğla Sıtkı Koçman Üniversitesi	2015
Lise	-	Tosçelik Fen Lisesi	2011

Başarılmış birden fazla sınav varsa (KPDS, ÜDS, TOEFL; EELTS vs), tüm sonuçlar yazılmalıdır

Bildiği Yabancı Dilleri	Yabancı Dil Sınav Notu (#)
İngilizce	YÖKDİL: 69

İş Deneyimi (Sondan geçmişe doğru sıralayın)

Görevi	Kurum	Süre (Yıl - Yıl)
Fizyoterapist	Du-Çe Fizik Tedavi Merkezi	2016-Halen
Fizyoterapist	Banvit Basketbol Kulübü	2015-2016

Bilgisayar Bilgisi

Program	Kullanma becerisi

*Çok iyi, iyi, orta, zayıf olarak değerlendirin

Bilimsel Çalışmaları

SCI, SSCI, AHCI indekslerine giren dergilerde yayınlanan makaleler

Diğer dergilerde yayınlanan makaleler

Uluslararası bilimsel toplantılarda sunulan ve bildiri kitabında (*Proceedings*) basılan bildiriler

Hakemli konferans/sempozyumların bildiri kitaplarında yer alan yayınlar

Diğer (Görev Aldığı Projeler/Sertifikaları/Ödülleri)

