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DEPARTMENT OF PHYSIOTHERAPY AND REHABILITATION

**INVESTIGATION OF THE EFFICACY OF
TELEREHABILITATION IN WOMEN WITH STRESS
URINARY INCONTINENCE**

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DECLARATION

I confirm that this thesis is entirely my own creation and that, as far as I am aware and believe, it does not contain any previously published or written material by any other individual, nor does it include any material that has been acknowledged for the attainment of any other degree, unless explicitly referenced within the text.

Asena ZİNCAP



DEDICATION

I dedicate this thesis to my beloved parents, Demet ZİNCAP and Metin ZİNCAP, whose unwavering love, support, and encouragement have been instrumental in my academic journey. Their constant belief in me has been a driving force behind my accomplishments. I would also like to dedicate this thesis to my dear friend Ezgi Zehra TOPAL, whose friendship and companionship have brought joy, laughter, and inspiration to my life. Her unwavering support and understanding have been a source of strength throughout this endeavor.



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LIST OF SYMBOLS AND ABBREVIATIONS

ATLA	: Arcus Tendineus Levator Ani
ATFP	: Arcus Tendineus Fascia Pelvis
CIQ	: Coital Incontinence Questionnaire
DIAPPERS	: Delirium Infection, Atrophic Vaginitis, Pharmaceuticals, Psychological, Excess Fluids, Restricted Mobility And Stool Impaction.
EQ-5D-3L	: Euro Quality Of Life Scale
IIQ	: Incontinence Impact Questionnaire
IIQ-7	: Incontinence Impact Questionnaire-7
ICS	: International Continence Society
ISI	: Incontinence Severity Index
I-QOL	: Incontinence Quality of Life Questionnaire
KHQ	: King's Health Questionnaire
LA	: Levator Ani
MOS	: Modified Oxford Scale
MUI	: Mixed Urinary Incontinence
PERFECT	: Performance,Endurance ,Repetition,Fast,Elevation,Co-Contraction, Timing
PFM	: Pelvic Floor Muscle
PFMs	: Pelvic Floor Muscles
PFMT	: Pelvic Floor Muscle Training
POP	: Pelvic Organ Prolapse
SUI	: Stress Urinary Incontinence
TR	: Telerahabilitation
UDI-	: Urogenital Distress Inventory
UDI-6	: Urogenital Distress Inventory-6
UI	: Urinary Incontinence
UUI	: Urge Urinary Incontinence
UTIs	: Urinary Tract Infections

ABSTRACT

Zincap A. (2023). Investigation of the Efficacy of Telerehabilitation in Women with Stress Urinary Incontinence, Yeditepe University, Institute of Health Sciences, Department of Physiotherapy and Rehabilitation, Master Thesis. Istanbul.

Aim: This research aims to make an evaluation on the effectiveness of telerehabilitation and to compare incontinence severity, PFM strength, social activity level, quality of life, sexual function activities in women with stress urinary incontinence.

Material and method : According to the inclusion criteria, 57 participants diagnosed with Stress Urinary Incontinence (SUI) were separated into two main groups: the Online Tele-rehabilitation Group (OTG) and the Video Tele-rehabilitation Group (VTG), with 36 individuals in each group. The participants' demographic information was recorded. The incontinence severity was evaluated using the Incontinence Severity Index (ISI). Pelvic floor muscle strength was determined by using the Modified Oxford Scale (MOS) through digital palpation by an expert doctor. The incontinence impact on quality of life and social activity level was evaluated using the Incontinence Impact Questionnaire (IIQ-7), Urogenital Distress Inventory (UDI-6), and Incontinence Quality of Life (I-QOL) questionnaire. Overall quality of life was measured using the Euro Quality of Life scale (EQ-5D-3L). Sexual dysfunction was evaluated using the Coital Incontinence Questionnaire (CIQ). For a period of 6 weeks, both groups underwent a tele-rehabilitation (TR) program consisting of pelvic floor muscle strengthening exercises and bladder training twice a week. The OTG group followed this program via Zoom, while the VTG group received video instructions and performed the exercises under the guidance of a physiotherapist. After 6 weeks, all participants' evaluations of pelvic floor muscle strength, quality of life, social activity level, and sexual dysfunction were conducted again.

Result: The baseline clinical characteristics of the groups were similar ($p > .05$). In the OTG group, there was a statistically significant change in the pre- and post-treatment scores of ISI ($p = .001$), IIQ-7 ($p = .001$), UDI-6 ($p = .001$), MOS ($p = .001$), I-QOL ($p = .001$), and the VAS ($p = .004$) value from the anxiety/depression subcategory of EQ-5D-3L. In the VTG group, there was a statistically significant change in the pre- and post-treatment scores of ISI ($p = .001$), IIQ-7 ($p = .001$), UDI-6 ($p = .001$), MOS ($p = .001$), and I-QOL ($p = .001$). The anxiety/depression subcategory of EQ-5D-3L ($p = .001$) showed a

higher score post-treatment compared to pre-treatment in both groups. There was no statistically significant difference in the CIQ ($p = .180$) scores between pre- and post-treatment in the OTG group. There was no statistically significant difference in the CIQ ($p = .124$) scores between pre- and post-treatment in the VTG group.

In the analysis of pre- to post-treatment changes between groups, no statistically significant difference was found in ISI ($p = .397$), UDI-6 ($p = .225$), MOS ($p = .110$), I-QOL ($p = .436$), CIQ ($p = .115$), and the subcategories of EQ-5D-3L including mobility ($p = .326$), self-care ($p = 1.000$), usual activities ($p = .971$), pain/discomfort ($p = .465$), and anxiety/depression ($p = .165$). However, a statistically significant difference in favor of the OTG group was observed in the IIQ-7 score ($p = .039$) in the analysis of pre- to post-treatment changes between groups.

Conclusion: In conclusion, our study found statistically significant differences in both groups after TR. But, there was no statistically significant difference between the OTG and VTG groups. We provide strong evidence regarding the short-term effects of TR-based pelvic floor muscle training (PFMT). We demonstrate the benefits of TR-based PFMT for women with SUI who cannot participate in rehabilitation outside the home due to weather conditions or health conditions.

Key words: Telerehabilitation, pelvic floor, stress urinary incontinence, exercise

ÖZET

Zincap A. (2023). Stres Üriner İnkontinanslı Kadınlarda Telerehabilitasyonun Etkinliğinin Araştırılması, Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü Fizyoterapi ve Rehabilitasyon Anabilim Dalı, Yüksek Lisans Tezi. İstanbul.

Materyal Method : Dahil edilme kriterlerine uygun olarak, toplamda 57 SUI (Stres Üriner İnkontinans) tanılı katılımcı, Online Telerehabilitasyon Grubu (OTG) ve Video Telerehabilitasyon Grubu (VTG) olmak üzere iki gruba ayrıldı. Her bir grupta 36 kişi bulunmaktadır. Katılımcıların demografik bilgileri kaydedildi. İnkontinans şiddeti, Incontinence Severity Index (ISI) kullanılarak değerlendirildi. Pelvik taban kas kuvveti, uzman doktor tarafından digital palpasyon ile Modifiye Oxford Skalası (MOS) kullanılarak ölçüldü. İnkontinansa bağlı yaşam kalitesi ve sosyal aktivite düzeyi, Incontinence Impact Questionnaire (IIQ-7) ve Urogenital Distress Inventory (UDI-6), Incontinence Quality of Life (I-QOL) questionnaire kullanılarak değerlendirildi. Genel yaşam kalitesi ise Euro Quality of Life scale (EQ-5D-3L) ile ölçüldü. Cinsel yaşam disfonksiyonu ise Coital Incontinence Questionnaire (CIQ) kullanılarak değerlendirildi. 6 hafta boyunca, her iki gruba da telerehabilitasyon (TR) yöntemiyle haftada 2 gün pelvik taban kas kuvvetlendirme programı ve mesane eğitimi uygulandı. OTG grubuna bu program zoom üzerinden takip edilirken, VTG grubuna ise video gönderilerek fizyoterapist eşliğinde uygulandı. 6 hafta sonunda, tüm katılımcıların pelvik taban kas kuvveti, yaşam kalitesi, sosyal aktivite düzeyi ve cinsel yaşam disfonksiyonu değerlendirmeleri tekrar yapıldı.

Bulgular: Grupların başlangıç klinik özellikleri benzerdi ($p > ,05$). OTG grubunda, TR öncesi ve sonrası ISI ($p = ,001$) skoru, IIQ-7 ($p = ,001$) skorları, UDI-6 ($p = ,001$), MOS ($p = ,001$) skoru, I-QOL ($p = ,001$) skoru, EQ-5D-3L alt kategorilerinden VAS ($p = ,004$) değerinin TR sonrası değişimi istatistiksel olarak anlamlıydı. VTG grubunda TR öncesi ve sonrası ISI ($p = ,001$) skorları, IIQ-7 ($p = ,001$) skorları, UDI-6 ($p = ,001$), MOS ($p = ,001$) skoru, I-QOL ($p = ,001$) skorunun TR sonrası değişimi istatistiksel olarak anlamlıydı. EQ-5D-3L'in anksiyete/depresyon alt kategorisi ($p = ,001$) her iki grup içinde TR öncesi skordan daha yüksek çıktı. OTG grubunda TR öncesi ve sonrası CIQ ($p = ,180$) skoruna bakıldığında istatistiksel olarak anlamlı bir fark bulunmadı. VTG grubunda TR öncesi ve sonrası CIQ ($p = 0,124$) skoruna bakıldığında istatistiksel olarak anlamlı bir fark bulunmadı.

Gruplar arası TR öncesi-sonrası değişim analizinde, ISI ($p = 0,397$), UDİ-6 ($p = 0,225$), MOS ($p = 0,110$), I-QOL ($p = 0,436$), CIQ ($p = 0,115$), EQ-5D-3L alt kategorilerinden hareket ($p = 0,326$), özbakım ($p = 1,000$), olağan aktiviteler ($p = 0,971$), ağrı/rahatsızlık ($p = 0,465$), anksiyete/depresyon ($p = 0,165$) değerlerinde gruplar arasında istatistiksel olarak anlamlı bir fark gözlemlenmedi. Gruplar arası TR öncesi-sonrası değişim analizinde IIQ-7 ($p = 0,039$) skorunda, OTG grubunun lehine istatistiksel olarak anlamlı bir fark tespit edildi.

Sonuç: Sonuç olarak, çalışmamızda her iki grupta da TR sonrası istatistiksel olarak anlamlı farklar bulunmuştur. Ancak, OTG ve VTG grupları arasında istatistiksel olarak anlamlı bir fark bulunmamıştır. TR tabanlı pelvik taban kas egzersizlerinin (PFMT) kısa vadeli etkileri konusunda zengin kanıtlar sunmaktayız. TR merkezli PFMT'nin, hava koşulları veya sağlık koşulları nedeniyle ev dışında rehabilitasyona katılamayan SUI tanılı kadınlar için faydalı olduğunu gösteriyoruz.

Anahtar kelimeler: Telerehabilitasyon, pelvik taban, stres üriner inkontinans, egzersiz

1.INTRODUCTION

1.1.Definition And Significance Of The Problem

Incontinence is a condition in which there is an involuntary loss of urine, causing hygienic or social problems, and can be objectively demonstrated [1]. Urinary incontinence is an uncomfortable issue that individuals often encounter but is not emphasized enough. It leads to embarrassment, boredom, avoidance behaviors, and negatively affects the individual's quality of life [2]. The urinary incontinence prevalence is higher in females than in males. In females, it varies between 20% and 50%, whereas in males, it is half of that due to anatomical and pathophysiological differences. Men experience urge type incontinence at a rate of 40%-80%, mixed type incontinence at a rate of 10%-30%, and stress type incontinence less than 10%. Conversely, stress type incontinence is more common in females [3].

The frequency of urinary incontinence varies between 25% and 51% in all age groups, and its frequency rises with age [4]. It is widely accepted that urinary incontinence is more common in females due to the effects of pregnancy and delivery. During pregnancy and vaginal delivery, muscles, nerves, and connective tissues can experience compression, tension, and tears. Compared to pre-pregnancy, females are more likely to experience incontinence during pregnancy, and those who suffer from incontinence during pregnancy face with bigger risk of experiencing these problems in the postpartum period [4]. Pelvic floor muscle weakness is one of the primary causes of incontinence and pelvic organ prolapse. The risk of urinary incontinence increases in cases of trauma that disrupt the functional integrity of the pelvic floor and in pelvic surgeries such as hysterectomy [4].

The incidence of incontinence is high in functional disorders that cause mobility limitation. The term "dependent continence" refers to the situation where the patient is dry (not experiencing incontinence) but requires regular reminders about the location of the toilet or relies on physical aids for toileting and mobility [5]. Smoking increases the risk of developing all types of urinary incontinence, particularly stress urinary incontinence (SUI). Generally, smokers tend to have a higher incidence of chronic cough compared to non-smokers [6]. Obesity is considered a responsible factor to the occurrence or increased severity of urinary incontinence. In cases of obesity, increased weight exerts pressure on the pelvic tissues, leading to chronic injuries, as well as tension and weakness in the muscles, nerves, and other structures of the pelvic floor [5]. Chronic diseases can

either directly cause incontinence or indirectly diminish a person's ability to address the issue. Examples of such diseases include multiple sclerosis, Parkinson, diabetes, and Alzheimer [4]. Other factors such as lower urinary tract infections, constipation, perineal suture, prolapse, radiation, impaired function of the levator ani muscle, dementia, paralysis, depression, and congestive heart failure can also be conducive to urinary incontinence [5].

Stress urine incontinence is the most prevalent kind of incontinence. It refers to the involuntary loss of urine during physical activities that increase intra-abdominal pressure, including exercise, exertion, coughing, sneezing, laughing, and heavy lifting. This type of incontinence occurs when the pressure inside the bladder surpasses the pressure in the urethra, without detrusor muscle contraction [7]. Maintaining a proper balance between urethral closure and detrusor muscle activity is crucial for maintaining urinary continence. The pelvic floor muscles' inability to adequately support the proximal urethra is the main contributing factor to stress urine incontinence. As a result, when you exert yourself, your intraabdominal pressure increases since your intravesical pressure is higher than your urethral pressure cap. Essentially, the detrusor muscle activity is normal, but the mechanism of urethral closure is incompetent [8]. The urine lost amount during episodes of stress urinary incontinence (SUI) is typically small. This urine loss is realized suddenly in response to stress, without any specific stimulation [7].

In the SUI treatment, Pelvic Floor Muscle (PFM) exercises developed by Kegel in 1948 are commonly used as a first-line conservative approach. These exercises aim to enhance the strength of the PFMs, teach muscle functionality, support pelvic organs, and increase urethral pressure [9]. The PFMS consist of approximately 70% slow-twitch and 30% fast-twitch muscle fibers. Therefore, when designing a treatment program, both types of muscle fibers should be considered [10]. Studies have demonstrated that PFM training has a positive effect on SUI, with improvement rates ranging from 44% to 70% [11]. Patients who consistently engage in PFM exercises for three months or more often experience an improvement of 21% to 84% in their symptoms [7].

Telerehabilitation is defined as the provision of rehabilitation services over long distances through the use of electronic information and communication technology [11]. It involves the clinical use of therapeutic, diagnostic, preventive, and consultative services utilizing interactive telecommunication technology,. Telerehabilitation serves as an alternative to traditional outpatient rehabilitation services, as well as a substitute for in-home rehabilitation, which requires therapists or clinicians to visit to the residence of

patient. By overcoming barriers related to travel time and associated costs, telerehabilitation has the potential to enhance access to patients' rehabilitative care. With better access, inequities may be lessened for people and caregivers who are struggling financially or with transportation. The need for telerehabilitation services, the development of telerehabilitation interventions, and the support it offers to people with disabilities who may face barriers in accessing traditional rehabilitation services are all supported by growing evidence, despite the fact that there is still a dearth of research on telerehabilitation. With the development of video-based telerehabilitation, therapists may now give therapy to patients, including veterans, who have difficulty reaching healthcare professionals and institutions due to logistical, financial, and physical barriers. The field of telerehabilitation has witnessed significant expansion recently due to technological advancements, faster telecommunication speeds, and reductions in the costs of computer software and hardware. Direct therapeutic treatments, illness monitoring, care coordination, patient and caregiver education and training, patient networking, and multidisciplinary professional consultation are all included in the scope of telerehabilitation [12]. While there is growing enthusiasm and investment in telerehabilitation, there remains a limited understanding of its efficacy and patients' overall evaluation and acceptance of telerehabilitation services [12].

1.2.The Purpose Of The Study

This study aims to evaluate the effectiveness of telerehabilitation by comparing the severity of incontinence, pelvic floor muscle (PFM) strength, social activity level, quality of life, and sexual function activities in females with stress urinary incontinence (SUI).

1.3. The Hypotheses Of The Study

Hypothesis:

H0: There is no difference between Video Telerehabilitation Group (VTG) and Online Telerehabilitation Group (OTG) in terms of their effectiveness on SUI.

H1: VTG is more effective than OTG in improving SUI.

H2: OTG is more effective than VTG in improving SUI.

2.THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1. Pelvic Floor Anatomy

The pelvic floor is a complicated structure that includes muscles (active structure), fascia, nerves, bones, and ligaments (passive structure). It acts as a supportive sling for the bladder, reproductive organs, and rectum. Additionally, the pelvic floor plays a vital role in maintaining urinary and fecal continence, supporting the pelvic organs, facilitating micturition (urination), defecation (bowel movements), sexual functions, and labor [13].

2.1.1. Pelvis Bone Structure

The bony pelvis includes two hip bones and the sacrum, which is formed by the fusion of the ilium, ischium, and pubis bones. The hip bones are connected at the front by the symphysis pubis joint and at the back by the sacroiliac joints, where they join with the sacrum. Below the sacrum is the coccyx bone, serving as attachment point for various muscles and ligaments. The support of the sacroiliac joints involves several ligaments, including the anterior sacroiliac ligament, posterior sacroiliac ligament, anterior longitudinal ligament, short and long dorsal sacroiliac ligaments, sacrospinous ligament, supraspinous ligament, sacrotuberous ligament, and iliolumbar ligament. During pregnancy, musculoskeletal changes can lead to stretching and increased stress on these ligaments, resulting in pain in the posterior sacroiliac joint. Pain may also occur as the symphysis pubis joint, which is supported by ligaments from the anterior, posterior, upper, and lower regions, expands due to laxity during pregnancy [13].

2.1.2. Pelvic Floor Structures

The pelvic floor structures, arranged from deep to superficial, include the endopelvic fascia, perineal membrane (also known as the urogenital diaphragm), pelvic diaphragm (consisting of the levator ani and coccygeus muscles), superficial layer, external genital organs, and skin [14].

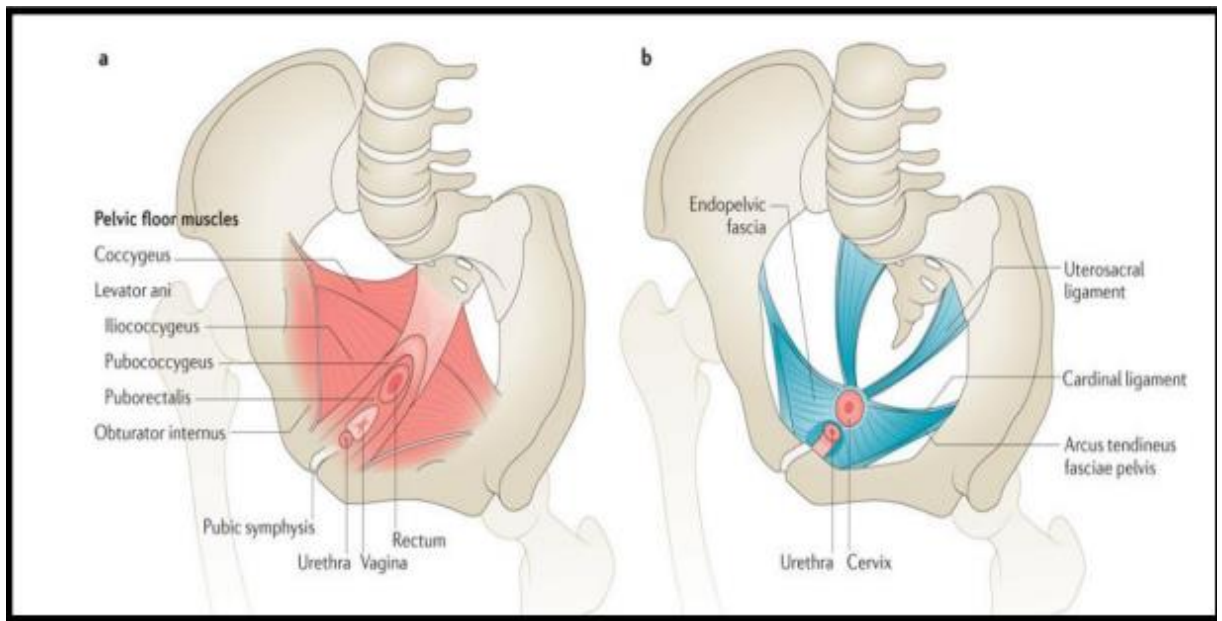


Figure 2.1. Anterior Vaginal Wall and Endopelvic Fascia [14]

2.1.2.1. Endopelvic Fascia

The endopelvic fascia serves as a covering for the pelvic organs and attaches them to the lateral walls of the pelvis. It is composed of collagen, elastin, mucopolysaccharides, adipose tissue, and neurovascular structures. The fascia that covers the levator ani muscle continues as the endopelvic fascia superiorly, the perineal fascia inferiorly, and the obturator fascia laterally. The levator ani muscles, along with their upper and lower fascia, form the pelvic diaphragm. The condensation of the fascia of the levator ani and the obturator fascia gives rise to the arcus tendineus levator ani (ATLA) and the arcus tendineus fasciae pelvis (ATFP). The ATLA extends from the pubis to the ischial spine, while the ATFP connects the cervix and upper vagina to the obturator and levator ani muscles. The front part of the ATFP is located below and inside the ATLA, and its posterior part joins with the ATLA and attaches to the ischial spine. The portion of the endopelvic fascia between the bladder and the vagina is known as the pubocervical fascia, while the portion between the vagina and the rectum is called the rectovaginal fascia [15].

The endopelvic fascia also condenses in certain areas to form ligaments. The uterosacral ligaments connect upper vagina and the cervix to the sacrum, providing support. The cardinal ligaments connect the cervix to the lateral pelvic walls and offer passive support to the uterus and vagina. The pubourethral ligament supports the urethra and bladder neck by connecting the inner surface of the pubis to the middle part of the

urethra. Damage to the endopelvic fascia can result in vaginal wall prolapses such as cystocele and rectocele [15].

2.1.2.2. Pelvic Diaphragm

The musculature of the pelvic floor consists of two main layers: the superficial layer and the deep layer. The deep layer, which forms the pelvic diaphragm, is composed of the levator ani and coccygeus muscles, along with the fascia that surrounds these muscles. Together, they provide support and strength to the pelvic floor [16].

2.1.2.2.1. Levator Ani (LA)

The levator Ani (LA) is a crucial structure involved in providing support to the pelvic organs. It is a complex muscle unit composed of multiple components that serve different functions based on their origins and insertions. The LA muscle consists of three main parts: the pubococcygeus (pubovisceralis), puborectalis, and iliococcygeus muscles. The sacral nerve roots S3-S5 innervate these muscle components [16].

- a) M.Iliococcygeus:** The first part of the LA muscle, known as the iliococcygeus muscle, is situated at the posterior region of the pelvic floor. It is a relatively flat and horizontal layer that spans from one side wall of the pelvis to the other. The iliococcygeus muscle is predominantly composed of aponeurotic tissue. It plays a role in the voluntary control of urine [16].
- b) M.Pubococcygeus:** The pubococcygeus muscle, the most anterior component of the LA, has a role in maintaining the tone of the pelvic floor and providing support to the pelvic viscera [16]. It originates from the pubic bone on both sides and extends to the walls of the pelvic organs and the perineal body, forming a U shape around the urogenital hiatus. Contraction of the pubococcygeus muscle brings the rectum, vagina, and urethra closer to the pubic bone, resulting in a narrowing of the lumens of these pelvic organs. This contractile property of the muscle contributes to urinary and fecal continence, in addition to support for the pelvic organs [17].

The pubococcygeus muscle is further separated into three parts: the pubovaginalis, puboanalis, and puboperineal muscles, based on their fiber attachments. While the levator ani muscles in women do not have a direct connection to the urethra, the fibers of the pubovaginalis muscle, which attach to the vagina, are responsible for elevating the urethra during contraction of the

pelvic muscles, thereby potentially contributing to urinary continence. The puboperineal fibers attach to the perineal body and pull it toward the pubic symphysis. The puboanalis fibers attach to the sphincteric groove between the internal and external anal sphincters and elevate the anus. Together with the rest of the fibers of the pubococcygeus and puborectalis muscles, they help keep the urogenital hiatus closed [17].

- c) **M.Puborektalis:** The puborectalis muscle is composed of the middle and lower fibers of the levator ani muscle. It originates from both sides of the pubic bone. The main function of the puborectalis muscle is to support fecal continence by pulling the anorectal junction towards the pubis, contributing to the closure of the anorectal angle [7].

2.1.2.2.2. Coccygeus (iscococcygeus)

The triangular coccygeal muscle originates from the ischial spines and attaches to the lower half of the sacrum and the lateral walls of the coccyx. Its main functions are to stabilize the sacroiliac joint and provide support to the pelvic organs [13].

The levator ani muscles are mostly composed of type 1 (slow twitch) and, less frequently, type 2 (fast twitch) striated muscle fibers. Type 1 muscle fibers are resistant to fatigue and can contract for a long time without tiring. They maintain the tone of the urethra during rest and provide closure of the urogenital opening during standing activities. On the other hand, type 2 muscle fibers are not resistant to fatigue but possess high contraction strength. During activities involving increased intra-abdominal pressure (such as coughing, sneezing, etc.), they contract rapidly, keeping the urogenital opening closed and ensuring continence [18].

Thanks to the basic normal activity of the LA muscles, the urethra, vagina, and rectum are pulled towards the pubic bone, keeping the urogenital opening closed. The continuous tonic activity of these muscles provides active support against the force of the pelvic organs and abdominal pressure on the pelvic floor [19]. When intra-abdominal pressure increases, the pelvic floor is engaged to maintain continence. The muscles contract reflexively and close the urogenital opening. Relaxation of the pelvic floor muscle (PFM) occurs only briefly and intermittently during micturition and defecation [13].

During micturition, the parasympathetic system activity under the control of the autonomic nervous system leads to the contraction of the bladder detrusor, while the urethral sphincter and LA muscles (especially the pubococcygeal muscles) relax voluntarily. The coordinated contraction and relaxation movements of the PFMs are essential for maintaining urinary continence and facilitating voiding at the appropriate time and place. Similarly, during defecation, the parasympathetic activity under the control of the autonomic nervous system results in the simultaneous relaxation of the anal sphincter and puborectal muscles, leading to the widening of the rectoanal angle and allowing the passage of stool. Additionally, the abdominal muscles contract during valsalva to increase intra-abdominal pressure. Just like in micturition, the PFMs relax to facilitate defecation at the appropriate time and place [19].

The PFMs play a crucial role in safeguarding the connective tissue from excessive strain. With the continuous tonic activity of the PFMs, minimal tension is exerted on the ligaments and fascia as long as the urogenital opening remains closed and the pelvic organs are adequately supported [19]. However, when the PFMs weaken or sustain damage, the responsibility of holding the pelvic organs in place falls onto the ligaments and fascia. While the ligaments and fascia can temporarily compensate for this load, sustained tension on the connective tissue leads to pelvic organ prolapse. The support mechanism of the uterus can be likened to a ship floating in water and connected to a dock by ropes. In this analogy, the uterus represents the ship, the ligaments correspond to the ropes tethered to the dock, and the PFMs represent the water. When the water level drops, the ropes must bear the weight of the ship without the support of water, leading to eventual damage. Similarly, when the PFMs are impaired, the fascia and ligaments must assume the task of maintaining the position of the uterus and vagina. However, over time, the stretching of connective tissue makes it increasingly challenging to keep the pelvic organs in their proper place (Figure 2) [18].

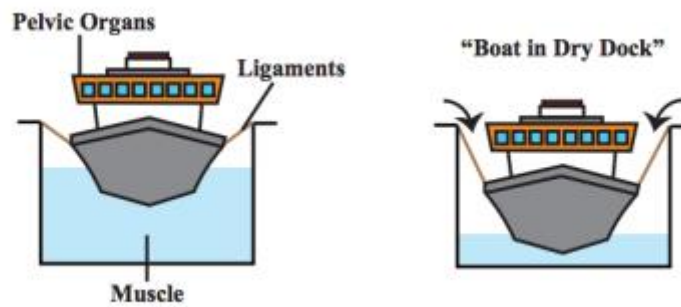


Figure 2. 2. Boat In Dry Dock[20]

2.1.2.3. Urogenital Diaphragm (Perineal Membrane)

It forms the inferior portion of the anterior pelvic floor. It consists of the deep transverse perineal muscle and the underlying fascia. It is a dense triangular mass of fibromuscular tissue extending from the anterior half of the pelvic outlet. It lies just caudal to the striated urogenital sphincter. The medial connections of the perineal membrane are the urethra, vaginal walls, and the perineal body. The primary function of the perineal membrane is related to its connections to the vagina and perineal body. By connecting those elements to the bony pelvis outlet, it supports the pelvic floor against gravity and intra-abdominal pressure increases. The amount of descent of the perineal membrane can be determined by inserting a finger into the rectum and pulling down the anterior perineal body. The perineal body is the connective tissue mass in the region bounded by the lower vagina, perineal skin, and anus. It is a hub where several muscles converge. The superficial transverse perineal muscle and perineal membrane connect it to the inferior pubic rami and ischial tuberosities. It includes the entrance of the bulbocavernosus muscles anterolaterally [21].

At the lateral borders, the upper limits of the pelvic body are connected with some fibers of the pelvic diaphragm. Posteriorly, the perineal body is indirectly attached to the coccyx, while the external anal sphincter is embedded in the perineal body; it is connected to the coccyx at the other end. These connections suspend the perineal body and surrounding structures in the bony pelvis and help hold it in place [21].

2.1.3. Superficial Perineal Muscles and Perineal Body

The most superficial layer of the pelvic floor is formed by the bulbospongiosus (bulbocavernosus) and ischiocavernosus muscles, the internal and external urethral and

anal sphincters, and the superficial and deep transverse perineal muscles. These muscles play a crucial role in controlling bladder, bowel, and sexual function, and they are often susceptible to injury during childbirth. The anterior part of this layer is formed by the superficial transverse perineal, bulbospongiosus, and ischiocavernosus muscles, while the posterior part is formed by the external anal sphincter. The superficial transverse perineal muscle is responsible for regulating intra-abdominal pressure and supporting the pelvic viscera, while the other muscles contribute to sexual function [16].

The perineal body is a pyramid-shaped fibromuscular structure situated between the vagina and anus. It serves as a meeting point for the PFMs and sphincters, offering support to the pelvic floor. The perineal body has an essential role in maintaining the integrity of the distal vagina and ensuring normal anorectal function. Injury to this area during childbirth can lead to weakening of the PFMs and pelvic organ prolapse [13].

2.2. Functional Anatomy of The Lower Urinary System

The urinary system is examined in two separate parts: the upper and lower urinary systems. The upper urinary system comprises two kidneys that facilitate urine formation and two ureters that participate in the transmission of urine to the bladder. The lower urinary tract consists of the bladder, which stores urine, and the urethra, which is responsible for the excretion of urine [15].

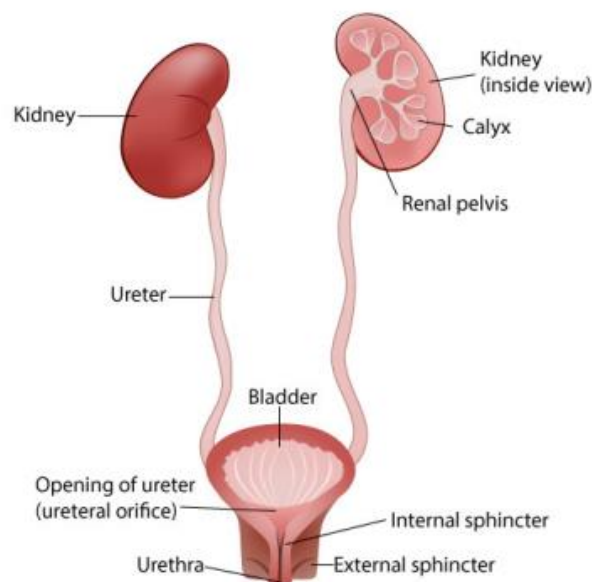


Figure 2.3. Urinary System [22]

2.2.1. Bladder

The bladder is a relatively simple yet complex organ. Its primary function is to store and empty urine effortlessly, painlessly, and without leakage. To fulfill these requirements, the bladder must have normal neurophysiological function and anatomical support [22].

The bladder is covered with three layers of smooth muscle known as the detrusor. The detrusor muscle fibers consist of collagen and elastic fibers that intersect freely. These fibers are longitudinal inside and outside the bladder, while circular in the middle, enabling the bladder to contract uniformly in all directions during detrusor contraction. The region between the entrance holes of the ureters to the bladder and the bladder neck is called the trigone. Although it does not have contractile properties, it possesses rich innervation. During micturition, it takes the shape of a funnel and facilitates urine flow. The urethra is connected to the bladder via the bladder neck. During bladder emptying, the detrusor muscle contracts and the bladder neck opens. Conversely, during bladder filling, the detrusor muscle relaxes, and the bladder neck closes [15].

2.2.2. Urethra

The urethra extends from the external urethral opening or external urethral meatus to the bladder neck. It serves as a conduit for the urinary and genital systems. In females, the urethra has an average length of 4 cm and a diameter of 6 mm. When not involved in micturition, its lumen remains closed and has a star-like shape. Women with a short urethra or with close proximity between the anus, vagina, and external structures are more susceptible to urinary tract infections resulting from tampons and sexual activity. Apart from the muscular mechanisms that contribute to continence in the female urethra, the urethrovesical angle, mucosal folds, and rich vascular submucosal structure play significant roles. Alterations or reversal of the normal angle of 90-110 degrees can lead to urinary incontinence. In both males and females, a circular skeletal muscle group passes through the pelvic floor and encircles the urethra. This structure is known as the external urethral sphincter, which can be voluntarily controlled to maintain continence and relaxed to allow urine drainage [22].

The urethra is surrounded by two muscles: the internal urethral sphincter and the external urethral sphincter, which contribute to urinary continence. The internal urethral sphincter forms a circular structure at the bladder neck when the longitudinal fibers of the

bladder muscle reach it. It is under the control of the sympathetic nervous system. The external urethral sphincter, composed of striated muscle, is located in the middle third of the urethra and is under the control of the somatic nervous system. Both sphincters contract during bladder filling and relax during bladder emptying [18].

2.3. Innervation of the Lower Urinary System and Pelvic Floor

To comprehend the intricate organization of the autonomic nervous system in the pelvic floor, it is crucial to understand the origin of sympathetic and parasympathetic motor fibers. Sympathetic nerves supplying the pelvic organs and pelvic floor arise from spinal segments T10-L2. These nerves communicate via rami communications to reach the sympathetic chain and its ganglia [23]. β -adrenergic receptors in the bladder body inhibit and relax the detrusor muscle, while α -adrenergic receptors in the bladder floor and proximal urethra contract the bladder neck and internal sphincter, allowing for urine storage. Acetylcholine and noradrenaline serve as the neurotransmitters in this process [24].

On the other hand, parasympathetic innervation originates from preganglionic neurons located in the middle gray matter (S2-4) of the sacral level spinal cord. The preganglionic fibers terminate in the bladder wall or nearby ganglia through the pelvic nerves. Acetylcholine is released at preganglionic and postganglionic synapses. The neurotransmitter acetylcholine relaxes the internal sphincter [24]. The coordination between autonomic control of the bladder and innervation of the external urethral sphincter occurs in the brainstem, not the spinal cord. Specific regions of the brain, such as the cerebral cortex, hypothalamus, cerebellum, basal ganglia, and limbic system, modulate, facilitate, or inhibit the voiding center in the brainstem [24].

2.3.1. Pudental Nerve Innervation

The pudental nerve provides innervation to the urethral and anal sphincters, in addition to the deep and superficial perineal muscles. It also supplies sensory innervation to the external genitalia. Originating at the S2-S4 level, the pudental nerve follows a complex course. It runs medially to the ischium, passing behind the sacrospinous ligament, and exits the pelvis through the greater sciatic foramen. It then enters the ischiorectal fossa via the smaller sciatic foramen and traverses the pudental canal (Alcock's canal), located medial to the obturator internus muscles. Within the perineal muscles, it divides into several terminal branches.

The levator ani muscle receives innervation from two sources: the pudendal nerve on its perineal surface and direct branches of the sacral nerves. Innervation of the levator ani also occurs at the S3-S4-S5 level. After exiting the sacral foramina, the pudendal nerve courses approximately 2-3 cm medially to the ischium. It then continues along the sacrum, iliococcygeus, pubococcygeus, and puborectalis before reaching the anorectal junction [24].

2.4. Physiology Of Micturition and Voiding

The control of the voiding center resides in the pontine voiding center, located within the pontine-mesencephalic gray matter in the brainstem. It receives signals from the parietal lobe and thalamus, where coordination of detrusor afferent signals takes place. The frontal lobe and basal ganglia send inhibitory signals to this center. Disruption of pathways below this level leads to impaired bladder emptying, while destruction of pathways above this level results in detrusor hyperreflexia. Peripheral coordination is facilitated by the sacral voiding system at the S2-S4 level. Sympathetic efferent signals from the T11-L2 level induce adrenergic contraction in the urethral smooth muscles and relaxation in the bladder detrusor muscles, promoting urine storage. Sphincter closure is achieved through the contraction of striated sphincter muscles, mediated by cholinergic somatic stimulation from the S2-S4 region. The U-shaped hammock structure provides muscular support to the fascia and urethra [22].

Under normal circumstances, the bladder fills at a speed of 0.5-5 ml/min. Even during rapid filling, the pressure does not exceed 15 cm H₂O, which is known as compliance. The first urge to urinate is typically experienced at a bladder volume of 200-300 ml. If afferent stimuli from the detrusor indicate a desire to urinate, the pontine center is stimulated through sacral parasympathetic activation. This leads to muscarinic contraction of the detrusor muscle, while preganglionic sympathetic inhibition results in urethral relaxation. Furthermore, the neurotransmitter system in the bladder's epithelial layer also plays a role in contraction and relaxation processes [22].

The voiding process consists of two phases: the initial phase and the voiding phase.

A) First Phase (Initial phase): During the voiding process, relaxation occurs in the pelvic muscles. The sacral voiding center is inhibited by the inhibitory effects originating from the cerebral cortex. As a result, detrusor contraction is facilitated

by efferent parasympathetic flow through the pelvic nerves. This contraction leads to a decrease in urethral pressure, allowing urine to flow [22].

B) Second Phase (Voiding phase): At the initiation of voiding, the bladder walls are initially thin. This phenomenon can be explained by Laplace's law ($P=2T/R$, P: pressure, T: tension, R: diameter), which states that the pressure (P) inside a spherical structure is directly proportional to the tension (T) in its walls and inversely proportional to its radius (R). As the tension in the bladder walls increases, there is a corresponding rise in intravesical pressure. To maintain a constant pressure as the bladder empties, the bladder's radius must decrease. This is achieved through the shortening of the muscle fibers within the bladder walls. By contracting and reducing their length, the muscle fibers contribute to the reduction in bladder radius, allowing for effective urine elimination during voiding [22].

A voluntary interruption of flow in the middle of voiding occurs, thanks to the contraction of the PFMs. Babies do not have voluntary control, and the bladder empties reflexively as soon as tension occurs. Therefore, the voiding reflex is a spinal reflex that can be facilitated or inhibited by higher brain centers. The ability to contract the external urethral sphincter and delay urination is a learned condition. After voiding, the male urethra is emptied by gravity. In women, the urethra is emptied by contraction of the bulbocavernosus muscle [22].

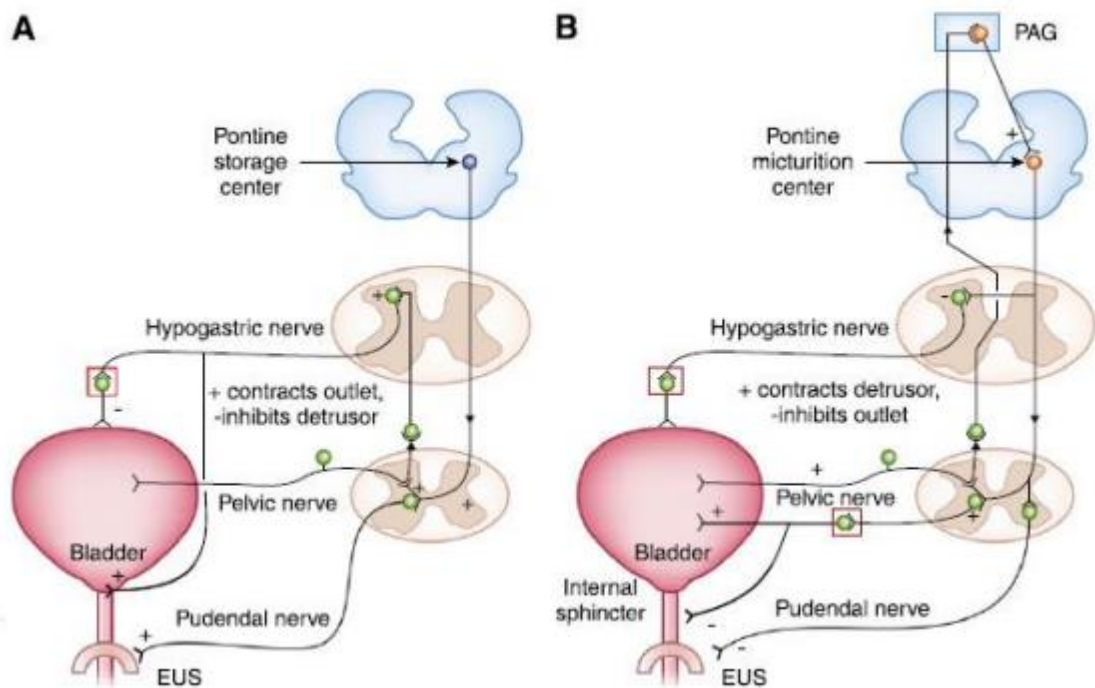


Figure 2.4. Voiding Mechanism [25]

2.5. Continence Mechanism

The main factors that contribute to continence are the capability to store urine in the bladder at low pressure and in sufficient quantity, a solid bladder neck, an effective external urethral sphincter, and adequate support of the PFM (PFMs) [26].

The bladder's compliance, which means it does not respond to increasing urine volume with increasing pressure, has a crucial role in the continence mechanism. Inhibition of detrusor contractions during the storage phase, the absence of inelastic connective tissue in the bladder, and the relaxation and elongation of the detrusor muscles due to bladder filling are key components of compliance. The bladder neck, comprised of the trigone, collum, and urethra, serves as a powerful sphincter with urinary and genital functions. Its important role is to prevent retrograde ejaculation in men. Just before the increase in intra-abdominal pressure, it contracts together with the striated sphincter to maintain continence. However, the bladder neck in women is a much weaker structure than in men and can easily become inadequate. The external urethral sphincter is the most critical part of the continence mechanism, actively closing the bladder outlet. In cases where the effectiveness of the bladder neck is compromised, such as due to surgical incisions, the external urethral sphincter alone can maintain continence [26].

The support of PFMs primarily provides anatomical support. As intra-abdominal pressure increases, the urethra becomes compressed between the pressure and the intact pelvic support tissue. When the PFMs are weakened, this compression becomes insufficient, and continence cannot be sustained [26].

2.6. Urinary Incontinence (UI)

UI is the involuntary leakage of urine. It is considered an embarrassing situation that causes sexual, psychological, social, physical, and economic problems in females of all age groups and has a negative impact on the life quality [27]. Urinary incontinence is a common problem among females from all ages, although it can also occur in both sexes. Prevalence studies have shown a linear increase over the years. In studies conducted in Turkey, the prevalence of UI in females was documented to be between 20.5% and 68.8% [27].

The primary aim in managing urinary incontinence is to identify its causes. It is crucial to investigate the type of incontinence by evaluating factors such as onset, duration, frequency, severity, amount of urine leaked, aggravating and mitigating factors, and associated symptoms (including intermittent flow or feeling of incomplete emptying). Based on this evaluation, recommendations for lifestyle modifications and a treatment plan should be developed [28].

2.6.1. Clinical Classification Of Urinary Incontinence

2.6.1.1 Acute, Transient Incontinence

If the acute causes of urinary incontinence are identified and treated, it may be possible to manage incontinence effectively, as most of the causes are reversible pathologies. These reasons can be easily classified using the DIAPPERS analogy: Delirium (delirium, acute confusional state), Infection (urinary tract infection), Atrophic vaginitis (urethritis caused by atrophic vaginitis), Pharmaceuticals (medications), Psychological (psychological causes), Excess fluids (excessive fluid intake), Restricted mobility (limited movement), and Stool impaction (prolonged hardening of stool in the large intestine) [29].

2.6.1.2. Chronic, Persistent Incontinence

2.6.1.2.1. Urge Urinary Incontinence (UI)

It is a complaint of involuntary loss of urine in relation with the urgency. Spontaneous, unhindered detrusor overactivity during bladder filling causes urge urinary incontinence (UI) when the sphincter resistance is exceeded by a sudden increase in pressure. Detrusor overactivity may be of myogenic, neurogenic, or idiopathic origin.

Another reason is the inability of the bladder to expand sufficiently, resulting in poor detrusor compatibility. This situation can cause UI with increased pressure by limiting the bladder capacity [30]. Symptoms include frequent urination (8 or more times a day) and nocturnal urge to urinate (waking up 2 or more times a night). Generally, one feels a strong urge to urinate when visiting the toilet. Urinary incontinence is defined as a result of delaying the need to void [31]. It is the most common type of urinary incontinence in the elderly. Approximately 40-70% of the elderly population experience detrusor instability [32].

2.6.1.2.2. Stress Urinary Incontinence (SUI)

It is the involuntary leakage of urine that occurs in situations including laughing, sneezing, coughing, and physical effort, where intra-abdominal pressure rises without the detrusor muscle contraction. The most prevalent kind of urine incontinence in young females is stress urinary incontinence. Its incidence is highest in women between the ages of 45 and 49, and it decreases after the age of 50 [33]. SUI is characterized by a small amount of urine leakage that occurs suddenly with stress, without any warning. Several classifications have been proposed for SUI [7].

It develops due to insufficient urethral closure pressure during increased intra-abdominal pressure. Two important factors are believed to play a role in the pathophysiology of stress urinary incontinence [7].

The first factor is external sphincter insufficiency, which occurs due to inadequate pressure applied to the bladder neck and proximal urethra, resulting in increased mobility due to weakening of anatomical support. This factor accounts for 90% of patients with stress urinary incontinence. Various factors, especially birth-related trauma, that cause pelvic relaxation may contribute to the development of this condition. The second factor is inadequate internal sphincter structure, which results from scarring, fibrosis, decreased

vascularity, and loss of elasticity due to previous surgeries, radiotherapy, trauma, and atrophy [7].

2.6.1.2.3. Mixed Urinary Incontinence (MUI)

It is the coexistence of two or more UI types. The most prevalent incontinence types that coexist are stress and urge incontinence [32]. The frequency of mixed urinary incontinence (MUI) increases after menopause and is more prevalent in females from the age of 70 [34].

2.6.1.2.4. Functional Urinary Incontinence

It is a type of incontinence that occurs as a secondary condition to an underlying problem and resolves when the underlying issue is treated or corrected. This type of incontinence is temporary in nature. Reasons for transient incontinence include delirium, diabetes, gait disturbance, infections, urethritis, hypercalcemia, medication side effects, among others [35].

2.6.1.2.5. Overflow Urinary Incontinence

It is a type of incontinence that occurs due to the overstretching of the bladder. While the urethra plays an active role, there is no contraction in the detrusor muscle. This type of incontinence can be observed particularly in diseases such as multiple sclerosis and diabetes, as well as in situations that prevent the bladder from relaxing such as radiotherapy, or conditions like cystocele [35].

2.6.1.2.6. Reflex (Total-Continuous) Urinary Incontinence

It is defined as the persistent involuntary leakage of urine without any sensory factor or stimulus. It may occur as a result of brain tumors, spinal cord injuries, various surgical procedures, or overflow urinary incontinence. This type of incontinence is characterized by persistent urinary leakage [35].

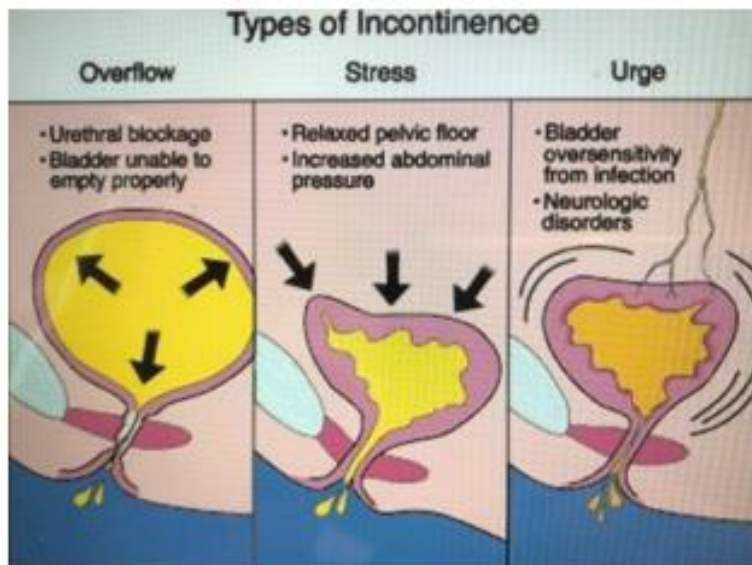


Figure 2.5. Types Of Urinary Incontinence [7]

2.7. Pathophysiology Of Stress Urinary Incontinence (SUI)

The pathophysiology of SUI has been reported to be associated with two main mechanisms: urethral/bladder neck hypermobility and intrinsic sphincter insufficiency. It has been concluded that sphincteric insufficiency, particularly, is directly related to SUI [7].

In addition, studies have proposed three anatomical theories for the development of SUI.

2.7.1. Integral Theory

According to this theory, the pelvic floor functions as a cohesive unit. The pelvic floor is pulled anteriorly by the pubococcygeus muscles, posteriorly by the levator plate, and downwards by the longitudinalis ani muscle. The vectorial summation of these forces causes the transformation of the pubocervical fascia into a hammock-like shape, providing support for the bladder. Any anatomical condition that disrupts these vectorial forces can lead to SUI [7].

2.7.1. Hammock Hypothesis

The compression exerted by the PFMs and endopelvic fascia creates a hammock-like force that provides support to the urethra. This compression effectively closes the urethra and prevents the involuntary loss of urine, even when there is an increase in intravesical pressure. However, tissue damage or weakening of the tissues due to factors

such as obesity, constipation, chronic cough, childbirth, or menopause can prevent complete closure of the urethral lumen. In the absence of proper support, the urethra descends, resulting in the escape of urine [36].

2.7.2. Pressure Transmission Theory

According to this theory, the proximal urethra is positioned above the pelvic floor. When it remains above the pelvic floor, the rise in intra-abdominal pressure that occurs during physical activity is evenly distributed between the bladder and the urethra. However, if the urethra is displaced below the pelvic floor, the increase in intra-abdominal pressure cannot be transmitted effectively, and any pressure increase in the bladder directly affects the urethra. In such cases, the urethra is unable to generate sufficient intraurethral pressure, leading to SUI during physical activity [7].

2.8. Risk Factors for Urinary Incontinence

2.8.1. Age And Gender

While urinary incontinence is observed in one out of every four individuals under the age of 60, it is seen in one out of every two individuals over the age of 60 [37]. The type of incontinence also changes with advancing age. While stress incontinence is common in younger individuals, mixed urinary incontinence becomes more prevalent in older individuals [38].

Urinary incontinence is more commonly experienced by women [39]. The morphology of PFMs, the ligaments supporting the bladder and sphincters, the effects of delivery and maternal injuries on pelvic structures and sphincters, hormones with receptors in the bladder, sphincters, and vaginal area are among the causes of this gender difference [40].

2.8.2. Race And Genetics

The incontinence prevalence is affected by genetic factors. Epidemiological studies have indicated that race has a role in the development of urinary incontinence, with lower prevalence observed in Chinese, Black, and Eskimo women [42]. Furthermore, the risk of developing SUI is higher in white women compared to African-American women [43].

2.8.3. Obstetric History

There are several obstetric risk factors linked with the UI development, including pregnancy, childbirth, parity, mode of delivery, multiple pregnancies, and delivery of large babies. However, research findings regarding the impact of these factors on UI are inconsistent. It is known that the incidence of incontinence is lower in females of all age groups who have not given birth [44].

Pregnancy is a significant risk factor for the development of SUI. The incidence of SUI in pregnant females ranges from 18% to 75%. The growing uterus and increased pressure from fetal weight, along with pregnancy-related hormonal changes, may weaken the supportive PFMs and sphincteric function. This weakness can lead to urethral hypermobility and sphincter insufficiency, causing urine leakage when abdominal pressure increases [45]. Vaginal birth, especially multiple births, is a major risk factor for urinary incontinence. The risk increases with the number of vaginal deliveries. Compared to women who have never given birth, the risk is approximately 11 times higher for women who have had four or more vaginal deliveries. Factors such as muscle, ligament, and nerve distension and damage during vaginal delivery are considered potential contributors to urinary incontinence [46]. There are conflicting results regarding the correlation between childbirth, pelvic floor changes, and SUI. While SUI may occur as a result of childbirth, it can also exacerbate existing incontinence [47].

2.8.4. Menopause

Low estrogen levels during menopause can lead to histological changes such as epithelial atrophy, collagen loss, and devascularization in the uterus, urethra, and vagina. These changes can result in urinary system symptoms including urgent urination and recurrent urinary tract infections in a short period of time [48]. During menopause, there exists a decrease in maximal urethral pressure and urethral length, as well as a reduction in urethral vascularity, intraurethral pressure at rest, and insufficient response to stress [2].

While urinary incontinence is common in the postmenopausal period, the definitive impact of estrogen hormone deficiency has not been established. Estrogens have been found effective in treating vaginal dryness, vasomotor complaints, and improving other urogenital symptoms, but their effectiveness in treating stress

incontinence is still uncertain. Some studies have shown that estrogen supplementation can reduce incontinence symptoms when employed in the management of SUI [49].

2.8.5.Obesity

Obesity is a significant factor that contributes to urinary incontinence and exacerbates its severity. Increased weight can lead to stretching, weakening, and laxity of the pelvic muscles and nerves, as well as an elevation in abdominal and intra-bladder pressure [50]. Consequently, achieving continence during activities that involve increased abdominal pressure becomes challenging [30].

Epidemiological studies have demonstrated that obesity is an independent and strong risk for urinary incontinence. There exists a clear dose-dependent relationship between weight and urinary incontinence, with each 5-unit increase in body mass index (BMI) linked with a 20-70% rise in the risk of UI [51]. Additionally, obese individuals often experience a reduction in incontinence symptoms following weight loss [52]. Particularly, SUI exhibits a significant association with obesity [53]. Research indicates that the prevalence of SUI rises proportionally with increasing Body Mass Index (BMI) [30].

2.8.6.Cigarette

Cigarette consumption is widely recognized as a common risk factor that can trigger urinary incontinence, although there is ongoing debate on this topic. The exact mechanism underlying the development of incontinence due to smoking is not fully understood. However, it has been reported that chronic cough caused by smoking can increase abdominal pressure, leading to potential rupture or weakening of the PFMs. Additionally, the harmful substances present in cigarettes can irritate the bladder, contributing to urinary incontinence [54].

Studies have consistently highlighted smoking as a risk factor for the occurrence of SUI, either directly or in relation to conditions that cause chronic cough [55]. In a study investigating urodynamic factors in patients with SUI, it was found that smokers exhibited higher maximum intravesical peak pressure during coughing compared to non-smokers [56]. Research has demonstrated that smokers have a 2-3 times higher risk of urinary incontinence overall and a 1.8-2.92 times higher risk of SUI specifically in comparison with non-smokers [7].

2.8.7. Caffeinated/Fizzy/Fizzy Drinks And Liquid Consumption

Although the effect of caffeine in coffee and tea on incontinence is not certain, it is thought to cause incontinence by increasing detrusor muscle contractions due to its diuretic effect. Consuming more than 2 cups of caffeine a day (approximately 200/204 mg) increases the occurrence of SUI. In some studies, tea intake has been found to be associated with incontinence more than coffee. Despite the fact that the total caffeine content of tea is one-third that of coffee, other substances in tea are believed to contribute to the increase in incontinence. Compared to individuals who never consume tea, those who consume 1-2 cups of tea a day have a 1.2 times higher risk of incontinence, while consumption of 3 or more cups of tea a day increases the risk by 1.3 times [7].

Acidic drinks, which contain ascorbic and citric acid, are also thought to increase incontinence by causing bladder muscle contractions through increased presynaptic neurotransmitter release and calcium influx. Furthermore, artificial sweeteners in acidic drinks can increase the frequency of urination. Acidic beverages, which contain high fructose corn syrup, sugar, and artificial sweeteners, can also lead to weight gain, urinary incontinence, and pose a threat to our health. Consumption of carbonated drinks is also a SUI risk factor [7].

Moreover, excessive daily water consumption and insufficient intake of less than 2 liters per day can increase the risk of incontinence. Restricting fluid intake can lead to constipation and increased urine concentration. This increase in urine concentration causes irritation in the bladder mucosa, frequent urination, and urinary tract infections, ultimately resulting in urinary incontinence. As a general rule for women, it is recommended to consume 24 ml of fluid per kilogram of body weight every 24 hours [7].

2.8.8. Constipation

Constipation causes a chronic rise in intra-abdominal pressure due to repetitive and prolonged straining. This elevated pressure leads to dysfunction in the PFMs and can cause damage to the pelvic nerves through stretching, resulting in urinary incontinence. The increased chronic intra-abdominal pressure specifically raises the risk of SUI [7].

2.8.9. Physical Activity

In women with low physical activity levels, the risk of urinary incontinence (UI) increases due to a lack of mobilization and weakened muscles. On the other hand, high-intensity and frequent physical activities such as running and jumping can also raise the risk of incontinence. These activities contribute to increased intra-abdominal pressure, leading to fatigue and weakness in the PFMs. This effect is particularly observed in athletes, trampoline athletes, aerobic gymnasts, and ballerinas, with urinary incontinence rates ranging from 28% to 80%. To prevent urinary incontinence, it is recommended that both active and non-active women engage in light to moderate physical activity [7].

2.8.10. Urinary System Infections

Urinary tract infections (UTIs) are frequently observed in females having urinary incontinence. Furthermore, urinary incontinence is particularly prevalent in the first few days after an acute infection [57]. Infections in the urinary system lead to mucosal inflammation and can trigger involuntary detrusor contractions. Among the various types of urinary incontinence, urinary tract infections are particularly associated with urge urinary incontinence (UUI) [44]. It has been suggested that the increased occurrence of UTIs may be one of the mechanisms linking diabetes and urinary incontinence [58].

2.8.11. Drugs

Alpha adrenergic agents increase the tone activity of the smooth muscles in the urethral wall, whereas beta adrenergic agents decrease it. Drugs commonly used for treating hypertension relax the proximal urethra by blocking alpha adrenergic receptors, which can result in the development of urethral sphincter insufficiency [59].

2.8.12. Chronic Diseases

Diabetes mellitus, diabetes insipidus characterized by increased diuresis, congestive heart failure, systemic diseases causing diffuse edema, chronic obstructive pulmonary disease, and neurological diseases are the primary conditions that serve as risk factors for urinary incontinence [2].

2.8.13.Hysterectomy

UI can be a consequence of hysterectomy. It has been observed that some patients who were asymptomatic before surgery develop incontinence after undergoing hysterectomy. The risk of developing SUI after hysterectomy is higher than the risk of developing urge urinary incontinence (UUI). This difference in risk may be attributed to muscle, fascia, pelvic nerve injury, and estrogen deficiency [44, 60].

2.9. Evaluation In Urinary Incontinence

A detailed story: It includes questions about the patient's demographic information, background, and family history; general health status; onset time of urinary incontinence complaint; duration; degree of discomfort; type of urinary incontinence; severity; frequency; amount; time; and risk factors that initiate and increase urinary incontinence. Obstetric history, gynecological history, history of bowel and sexual functions, presence of chronic diseases, drug use, previous surgeries, and lifestyle habits, which are accepted as risk factors that increase urinary incontinence, should be questioned. It should be learned whether the patient has applied to a doctor with these complaints before, and if they have applied, whether they have received any treatment. The sociocultural status of the patient, their attitude towards the disease, their wishes and expectations from treatment, and the effects of symptoms on quality of life should also be noted [61]. Symptom questionnaires can be used in the assessment of urinary incontinence. The reason for using this type of questionnaire is that the patient's symptoms are associated with quality of life [4].

2.9.1. Physical And Neurological Examination

In the urological and gynecological physical examination of a patient with urinary incontinence, a detailed evaluation is performed to determine abdominal and pelvic masses, pelvic relaxation, and other accompanying gynecological problems [7]. It is investigated to determine patient's general health status and any urological, gynecological, neurological, systemic, and psychological problems that may cause lower urinary system problems. In the urological and gynecological physical examination of a patient having urinary incontinence, a detailed evaluation is performed to identify abdominal and pelvic masses, pelvic relaxation, and other accompanying gynecological problems. Especially detailed pelvic evaluation is very important [7].

To determine a neurological problem affecting the lower urinary system function, the lower extremity innervated from the same spinal segments as the lower urinary system should be examined for muscle strength and deep tendon reflexes. For this purpose, the bulbocavernosus muscle (bulbocavernosus reflex) can be examined with clitoral stimulation, the anal sphincter (anal reflex) with perianal skin stimulation, and perineal muscle contractions with coughing (cough reflex). Anal sphincter and pubococcygeal muscle tone, perineal and perianal region sensation should be evaluated by vaginal examination and rectal touch [62].

2.9.2. Urinary Diary

This method is based on the principle of monitoring the patient for a certain period of time to detect the diagnosis of urinary incontinence (UI). It involves observing the individual's daily fluid intake and output, including the amount and types of fluids consumed, the frequency of urination or instances of urinary incontinence, if present. All this data is recorded to analyze the type and severity of incontinence. The recorded data is then compared with normal daily values, and assessments are made based on these values. The typical daily normal values are as follows: Women usually urinate between 4 to 6 times during the day, while at night, urination occurs once or twice. Therefore, exceeding these specified values is considered abnormal [63].

2.9.3. Specific Tests

Urinalysis and urine culture are conducted to detect various conditions such as infection, hematuria, proteinuria, glycosuria, cystitis of the bladder, and urethritis of the urethra. Urinary incontinence is commonly observed in females having urinary tract infections, and its symptoms may worsen in the initial days following an acute infection. Therefore, it is recommended to perform urinalysis prior to urodynamic tests for patients with urinary complaints, and urogynecological evaluation should be postponed until after infection treatment for patients with an active infection [7].

2.9.3.1. Stress Test

It is performed to determine the presence of SUI. Firstly, the patient is positioned in lithotomy position, and then they are asked to perform activities that increase intra-abdominal pressure, including coughing or straining, while the bladder is full. The healthcare provider evaluates whether there is urine leakage from the urethral opening

during these activities. The test is repeated with the patient in a standing position if no urine leakage is detected. The occurrence of urine leakage during these activities indicates a positive result for SUI [64].

2.9.3.2. The Boney Marchetti Test

This method is used when the stress test yields a positive result. The healthcare provider applies clamps or uses fingers to compress the bladder neck and paraurethral tissues, and then asks the patient to cough or strain. In the past, in case the patient did not experience incontinence during this test, it was considered as an indication of anatomical disorder. However, current urodynamic measurements demonstrate that urine flow is prevented during the test due to urethral obstruction, rather than bladder neck elevation. Therefore, this test is not considered a diagnostic method [64].

2.9.3.3. Pad Test

This test is a simple and objective method used to assess the presence and severity of urinary incontinence, as well as the amount of urine leakage. It is commonly employed in clinical settings by physiotherapists. The test involves weighing the pad before and after a specified duration of time, with options including 1-hour, 24-hour, and 48-hour pad tests. The 1-hour pad test is the most frequently used in clinics [7].

During the 1-hour test, the patient is provided with 500 cc of hydration. They are then instructed to perform activities that increase intra-abdominal pressure or stimulate detrusor contractions a specific number of times. These activities may include coughing, climbing stairs, sitting up, washing hands, and listening to the sound of water. The amount of urine leakage is determined by calculating the difference between the weight of the wet pad and the weight of the dry pad using a precision balance. Based on the results of the 1-hour pad test, urinary incontinence is classified as follows: <1 g = normal, 2-10 g = mild to moderate, 10-50 g = severe, and >50 g = very severe urinary incontinence [7].

2.9.3.4. Q Type Test

This test is utilized to objectively assess the mobility of the bladder neck and proximal urethra, in addition to the effectiveness of the urethral support structure. If the urethrovesical angle exceeds 30°, it indicates hypermobility of the bladder neck and proximal urethra, along with reduced urethral support [61].

2.9.4. Urodynamic Tests

Urodynamics is a general term used by urologists in clinical practice to refer to a group of tests that assess bladder and urethral functions, including cystometry, pressure-flow study, ambulatory urodynamics, and videourodynamics. It is not routinely necessary for the evaluation prior to physiotherapy interventions [7].

The diagnosis of SUI typically involves urodynamic testing when other methods fail to provide confirmation, previous treatments have been unsuccessful, or when more detailed analysis is required [7].

2.9.5. Pelvic Floor Assessment

PFMs have opening, closing, supporting, and sexual functions. In addition to these functions, they also play an important role in labor, respiration, postural control, micturition, defecation, and sexual functions [65]. The dysfunction of the PFM is called pelvic floor dysfunction, and symptoms including micturition, defecation, sexual dysfunction, prolapse, and pain occur [66]. As pelvic floor dysfunction causes a variety of symptoms, evaluation of PFM function is of clinical importance [67].

Normal function of PFM includes normal resting tone and symmetry, which depend on the ability to contract and relax both voluntarily and involuntarily. Muscle tone is defined as the tension in the muscles at rest or the resistance that occurs when trying to move the muscles passively. Muscles with low tone are hypotonic muscles, and muscles with high tone are hypertonic muscles [15].

The functions of the anterior and posterior or right and left PFM should be symmetrical. Voluntary contraction is the ability of the patient to contract the PFM at will, and during the contraction, the finger of the examiner is squeezed and lifted. Voluntary relaxation is the patient's ability to relax the PFM after contraction. In other words, relaxation is expressed as the return of the PFM to their resting state after contraction. Involuntary contraction occurs before activities that give a rise in intra-abdominal pressure, including coughing, to prevent incontinence. Involuntary relaxation occurs during normal micturition, defecation, and the Valsalva maneuver [68].

In evaluating PFM function, various methods are used, including visual observation, digital palpation (using modified Oxford grading, Brink scale, PERFECT system, trigger point map, etc.), electromyography, pressure measurements

(manometers), dynamometers, computed tomography, and ultrasonography, both intravaginally and superficially [69].

2.9.5.1. Measurement With Digital Palpation

Evaluation of PFM strength with digital palpation is a method in which PFM strength is manually evaluated subjectively. In the patient lithotomy position, the person performing the test places two fingers in the vagina and asks the patient to contract the PFMs as if to stop the flow of urine and gas. The modified Oxford scoring system is mostly used for scoring the test [70].

- Grade 0: No contraction.
- Grade 1: Minimum contraction, with fingers held under 1 second.
- Grade 2: Weak contraction, with no elevation of the fingers, and the ability to hold for 1-3 seconds.
- Grade 3: The therapist's fingers are raised up to the posterior vaginal wall during contraction, applying light pressure and holding for 4-6 seconds.
- Grade 4: The fingers of the therapist are raised to the posterior vaginal wall, experiencing more strong pressure, and having a hold time of 7-9 seconds.
- Grade 5: A powerful contraction lasts for nine seconds, and the therapist's finger is met with a lot of resistance [70].



Figure 2.6.Digital Palpation [70]

2.9.5.2. Perfect Method

Laycock has developed a **PERFECT method** for pelvic floor examination consisting of the following parameters:

- **Performance:** Measurement of muscle strength in voluntary muscle contraction.

- **Endurance:** Time to sustain voluntary muscle contraction of a muscle whose muscle strength has not fallen below 50% (seconds).
- **Repetitions:** The number of consecutive voluntary contractions.
- **Fast:** Maximum number of voluntary contractions per second.
- **Elevation:** Ability to lift the posterior vaginal wall during voluntary contraction.
- **Co-contraction:** The lower abdominal muscles contraction simultaneously with the PFMs.
- **Timing:** Involuntary contraction of PFMs concurrent with coughing (can be used to raise patient's pelvic floor awareness) [10].

After all these evaluations on the PFMs, the functional status of these muscles is decided. Physiotherapy methods used in the treatment of these four conditions are different from each other: Normal PFMs, Overactive PFMs , Underactive PFMs, and nonfunctional PFMs [69].

2.9.6. Questionnaires Used In Urinary Incontinence Assessment

The most valid way to measure the effect and severity of symptoms, patient activity, and well-being is through the usage of psychometrically powerful questionnaires. For a questionnaire to be used in practice and research, it must demonstrate validity, reliability, and sensitivity [71].

In general, questionnaires are divided into three groups:

- Symptom questionnaires that assess the presence of specific symptoms and their severity.
- Quality of life questionnaires which assess life quality.
- Sexual function questionnaires that evaluate sexual functions.

2.9.6.1. Suggested Symptom Questionnaires In Urinary Incontinence (UI)

- Urogenital Distress Inventory (UDI)
- Urogenital Distress Inventory-6 (UDI-6)
- Incontinence Severity Index (ISI)
- International Consultation on Incontinence Questionnaire short form
- Bristol Female Lower Urinary Tract Symptom Questionnaire
- Female Urinary Incontinence Diagnostic Questionnaire [71].

2.9.6.2. Recommended Quality of Life Questionnaires in Urinary Incontinence (UI)

General Quality of Life Surveys

- Short Form-36
- Euro Quality of Life
- EORTC QLQ-30 (Quality of Life Assessment) Questionnaire Form [71].

Situation-Specific Quality of Life Surveys

- Incontinence Impact Questionnaire (IIQ-)
- Incontinence Impact Questionnaire-7 (IIQ-7)
- Incontinence Quality of Life Questionnaire(I-QOL)
- King's Health Questionnaire (KHQ)
- Urge Incontinence Impact Questionnaire
- SEAPI Incontinence Quality of Life Scoring [71].

Sex Life Questionnaires Recommended in UI

- Female Sexual Function Index
- McCoy's Female Sexual Function Questionnaire
- Prolapse and Incontinence Sexual Function Questionnaire
- Prolapse and Incontinence Sexual Function Questionnaire-12
- Pelvic Organ Prolapse / Urinary Incontinence Sexual Function Questionnaire [71].

2.10. Treatment Of Urinary Incontinence

Treatment algorithms for urinary incontinence have been developed by the International Continence Society (ICS). In these algorithms, first and second line treatment methods were determined. Conservative treatment methods are among the first-line treatment methods [71]. Pelvic floor exercises reduce urinary incontinence symptoms by 70% [21].

Despite urine incontinence is not a life-threatening situation, patients may develop emotional disorders, including depression, because of the discomfort caused by constant wetness and irritation. It is known that the sexual lives, daily domestic and work activities of patients with UI are affected, and they may try to restrict social and physical activities and even reduce their fluid intake in order to prevent this situation [73].

2.10.1. Conservative Treatment

2.10.1.1. Behavioral Therapy

The purpose of behavioral therapy is to increase the capacity and efficiency of the bladder and gain bladder control. Behavioral treatment methods for UI include diet, bladder training, and PFM training [74].

2.10.1.1.1. Bladder Training

Bladder training is frequently employed in the treatment of urge incontinence, frequency, and nocturia. It is a conservative treatment that deals with basic topics such as determining the problems by monitoring the status of the patients' urine during the day, starting from how much water the patient drinks and when to urinate, how long this program will take, feeling psychologically ready, and sticking to the program [63].

Accordingly, the average of the patient's urinary incontinence time should be determined, the amount of fluid taken daily should be limited, it should be taught to keep a urine diary, 0.5-1 hour should be added according to the urinary retention hours, and the interval between two voids should be increased to 3-4 hours. The patient should be taught that they can stop urination at any time and dual voiding exercises (based on the patient's desire to start voiding again despite the presence of residual volume after voiding) should be done. Psychological support should be given to convince the patient to do these regularly for at least 6-8 weeks [63].

The training of the bladder is based on two main principles. The first of these is to urinate regularly at certain intervals, which keeps the bladder at a small volume. The second is to suppress the feeling of urgency through exercise training for patients. In this training program, patients are asked to urinate at specific time intervals [63]. In patients with cognitive impairment, urination can be assisted by a relative. The training starts by using bladder recordings during the patient's waking hours, based on the shortest incontinence period or by asking the patient to urinate every two hours. The urge to urinate earlier than this time interval can be eliminated with various exercises, which can be mental or relaxation exercises. It seems possible to achieve effective results with these exercises, which can be easily performed by the patient [63].

2.10.1.1.2. Diet

A diet program is created for patients with urinary incontinence based on their bladder diaries. The first method commonly used for patients with urinary incontinence is fluid intake restriction. However, excessive fluid intake restriction may increase urine concentration, leading to urinary tract infections, frequent urination due to bladder mucosa irritation, and overactive bladder. On the other hand, excessive fluid intake in UI patients also causes frequent urination and overactive bladder symptoms. Patients with UI should have an average intake of 6-8 glasses of fluids, and the consumption of caffeinated, spicy, acidic, and sugary foods, as well as foods that trigger the formation of urinary incontinence, such as tomatoes, honey, artificial sweeteners, milk, and dairy products, should be reduced or restricted [63].

2.10.1.1.3. Pelvic Floor Muscle Training (PFMT)

PFMT was first described by Kegel in 1948 and has since been referred to by its name. However, it can also be applied with exercises developed in different variations later. Biofeedback can be applied with the help of electrical stimulation, vaginal cones, and electromagnetic stimulation treatments [75]. These exercises are used as the first-line conservative treatment for SUI. With these exercises, the aim is to increase PFM strength and teach muscle functionality, provide pelvic organ support, and increase urethral pressure. Composition of PFMs are 30% fast-twitch and 70% slow-twitch muscle fibers. Therefore, the treatment program should be designed considering both muscle fibers. Studies have shown that the positive effect of PFMT on SUI ranges from 44% to 70% [30].

2.10.1.2. Biofeedback

Biofeedback is a method that makes the patient aware of their PFMs and monitors their contractions and relaxations using sensors placed in the vagina or anal region. Depending on the commands given, the method converts the readings into visual and auditory stimuli, which facilitates compliance with the treatment. This method was first used by Arnold Kegel, who determined that 30% of females could not voluntarily contract the M.pubococcygeus muscle adequately [76]. Using this method helps women to effectively contract their PFMs without causing contractions in their abdominal muscles [63].

2.10.1.3. Electrical Stimulation

It was first used by Caldwell in 1963 to stimulate the PFMs in patients having urinary incontinence problems or to strengthen the muscles below 3/5, mostly due to muscle group weakness [63]. In electrical stimulation, faradic current, which is a low-frequency current, or interference current, which is a medium-frequency current, is used. It is preferred because the distribution of medium-frequency currents is regular and can penetrate deeper. As a mechanism of action, muscle strength increases, passive Kegel exercises are performed, urethral pressure increases, local circulation improves, and cortical consciousness increases [77].

Electrical stimulation is applied in different methods such as superficial, anal, and intravaginal stimulation. High-frequency currents are preferred for SUI. The success rate of electrical stimulation for SUI is between 37-92%. [7].

2.10.1.4. Electromagnetic Stimulation

In electromagnetic stimulation therapy, the PFMs and nerves are stimulated at regular intervals to increase sphincter function, decrease bladder contractions, and strengthen PFMs. During the treatment, women sit in a chair with a magnetic field generator, and the magnetic field waves emitted from the chair are allowed to penetrate the pelvic floor [4]. This strengthens the external sphincter and PFMs, stimulates the pelvic and/or pudendal nerves in SUI, and the success rate has been reported as 41-66% [7].

2.10.1.5. Vaginal Cones

The conical shape, used to work the PFMs, consists of gradual weights. It is utilized to teach patients exercises and to enhance muscle strength. By providing a contraction stimulus to the PFMs, the conical shape prevents the subject, placed in the vagina, from falling. The weights range from 20 to 90 grams, and as muscle strength improves, the weight is increased accordingly. This method is preferred for patients with SUI who are underweight, haven't given birth, or have had a low number of births. The success rate for SUI has been reported to be 70% [7].

2.10.2. Medical Treatment

Many drugs with different mechanisms of action are employed in the medical treatment of urinary incontinence. The purpose of medical treatment is to increase bladder closure, decrease sensory input, and reflex inhibition of the bladder. Medical treatment can be combined with other conservative treatments [24].

Medical treatment is more efficient in urge incontinence and aims to reduce symptoms rather than providing a cure [24]. In recent studies, alpha adrenergic agonists, antidepressants, and hormone replacement therapies are not preferred due to their limited improvement in patients with SUI. Duloxetine, a serotonin and norepinephrine reuptake inhibitor, is approved and licensed as adjunctive therapy for SUI. Increasing sphincter resistance and relaxing the bladder are two ways that norepinephrine and serotonin support in urine storage [30].

2.10.3. Surgical Treatment

The aim of surgery is to correct anatomical defects and restore normal function. Different surgical methods are performed to address specific disorders and complaints. Abdominal or vaginal approaches are used to support and rise the junction of the urethra and bladder, thereby increasing urethral closure pressure. Surgery is also employed in cases where artificial urethral sphincters are needed to address urethral dysfunctions [4]. Examples of surgical procedures include abdominal retropubic colpopexy (Marshall-Marchetti-Krantz, Burch colposuspension), suburethral sling, and midurethral sling surgeries including tension-free vaginal tape, transobturator tape, and single incision procedures [7].

2.11. Telerehabilitation In Urinary Incontinence

The term "telemedicine" refers to a system or platform that enables medical practitioners to assess, identify, and treat patients remotely employing telecommunications networks [78]. Telerehabilitation, a sub-branch of telemedicine, is a system designed for remote management of rehabilitation using telecommunication-based applications. It facilitates communication between patients and healthcare professionals through telephone, computer, videoconference, email, and messaging services [79].

The goal of telerehabilitation includes distance education through teleconsultations, continuity of counseling services and rehabilitation, monitoring and evaluation of remote rehabilitation processes through tele-monitoring and tele-assessments, as well as the development and evaluation of technologies for remote therapeutic intervention [80]. Telerehabilitation offers advantages such as providing access to rehabilitation services for patients who may face economic barriers, ensuring continuity in rehabilitation, saving time and expenses associated with traveling, and reducing hospital stays. Furthermore, it has been reported that rehabilitation provided in a natural environment is more effective than clinical settings, as it allows patients to combine long-term treatment programs with a social and productive life [81,82]. Due to various factors, such as increased patient demand, limited rehabilitation services and resources, especially a shortage of therapists specializing in pelvic floor and rehabilitation, and the recent emergence of the Covid-19 pandemic, telerehabilitation has been suggested as a potential solution to ensure the continuity of urogynecological physiotherapy and rehabilitation, as well as to provide new perspectives [83,84].

A recent systematic review examining treatment approaches for pelvic floor dysfunctions with telerehabilitation concluded that internet-based therapy shows promise as an alternative treatment for this patient group, but further studies are required to confirm its true benefits in treating pelvic floor dysfunctions [85].

In this regard, the aim of our study is to compare the effects of PFM training (PFMT) applied through telerehabilitation and bladder training on urinary symptoms, quality of life, PFM strength, subjective improvement perception, and patient satisfaction in individuals with SUI.

3.MATERIAL AND METHOD

3.1. Type Of Study

The study is experimental observational research type.

3.2. Study Protocol

This study was carried out at Zeynep Kâmil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi. Since relationship and group differences analysis were conducted in the study, the power analysis results for these two methods were provided to determine the minimum number of required samples. According to the power analysis, a total of 71 samples were calculated with 80% power, a significance level of 0.05, a confidence level of 95%, and an effect size of 0.3.

3.3.Subjects

72 individuals with SUI were included in the research on a voluntary basis. Patients who met the inclusion criteria were recruited for the study. Once initial assessments were completed, patients were assigned randomly to one of two possible sequences: the home VTG, which involved PFM exercises twice a week for six weeks, or the online conference telerehabilitation group (OTG), which also included PFM exercises twice a week for six weeks. Both groups were evaluated before and after the intervention. Subsequently, the efficacy of the home VTG and the online conference telerehabilitation group (OTG) were compared.

3.4. Inclusion Criteria

- Being a woman between the ages of 18-65,
- To be diagnosed as SUI or Stress dominant Mixed urinary incontinence for the symptom by a gynecologist and obstetrician / urogynecologist or urologist,
- Have PFM contraction,
- To be a reader-writer in turkish

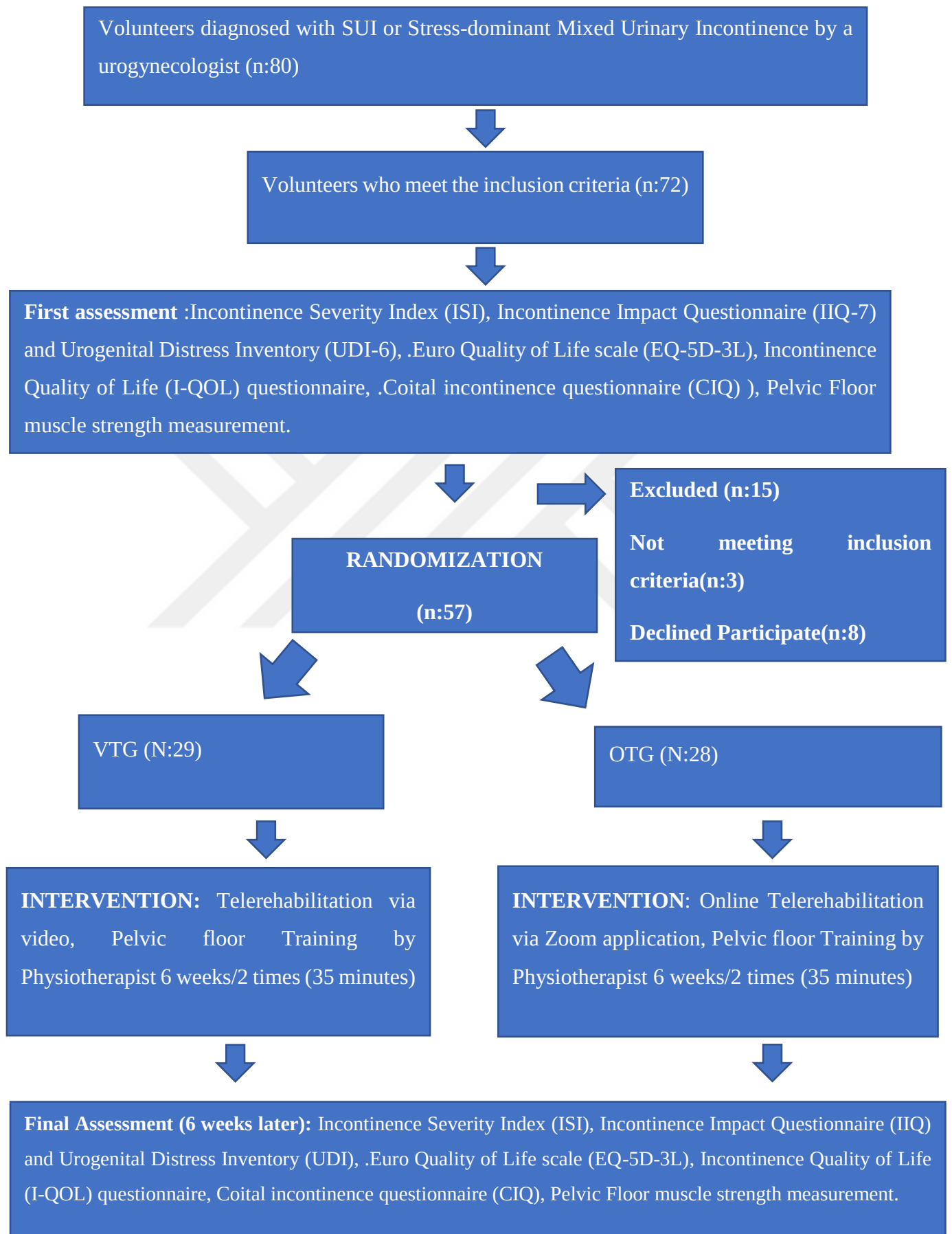
3.5. Exclusion Criteria

- Being pregnant
- Current vulvovaginitis or urinary tract infections or presence of malignancy
- Having undergone urogynecological surgery,

- Presence of neurological disease and inability to cooperate,
- Vestibular problems, lower extremity injuries, dizziness and a record of falling,
- Serious Hearing and visual problems
- Autoimmune diseases, presence of acute inflammatory conditions,
- Presence of stage2 or higher pelvic organ prolapse (POP)



3.6.Flow Chart of the Study



3.7.Method

Individuals diagnosed with SUI or Stress-dominant Mixed Urinary Incontinence by a urogynecologist were included in the study. The group allocation for each individual was determined by randomly selecting a paper from the randomization boxes containing 72 numbered papers. Even-numbered papers determined OTG, and odd-numbered papers determined VTG.

Participants who agreed to participate in the research were assessed and assigned to one of two treatment groups through simple randomization. The first group was the 6-week home VTG, which included twice-weekly Pelvic Floor Muscle Training (PFMT). The second group was the OTG, which also included twice-weekly PFMT for 6 weeks.

After the completion of PFMT, individuals were re-evaluated. The group allocation for each individual was determined by selecting a paper from the randomization boxes containing 72 numbered papers, where even-numbered papers determined the OTG, and odd-numbered papers determined the VTG.

3.8. Evaluation

3.8.1.Demographic Features and History

Ages, BMIs, professions, education levels, menopausal status, and smoking habits of the patients participating in the study were recorded. In relation to the urinary complaint, the duration and severity of urinary incontinence, pad usage, the number of daily urinations, nocturia, pain and burning sensations during urination, as well as parity and delivery patterns, were assessed and questioned (Appendix3)

3.8.2. Incontinence Severity Index (ISI)

In this study, the severity of incontinence in patients will be assessed using the ISI. The ISI consists of 2 questions that evaluate the frequency and volume of leakage. Based on the responses to these questions, urinary incontinence (UI) is categorized as slight, moderate, severe, or very severe [86,87] (Appendix 4).

3.8.3. The Incontinence Impact Questionnaire (IIQ-7) And The Urogenital Distress Inventory (UDI-6)

The IIQ and the UDI were improved and combined to evaluate the impact of urinary incontinence on quality of life (QOL) [17]. However, these instruments are

lengthy, which limits their practicality for routine use, despite being validated and effective in assessing treatment efficacy. As a result, shorter versions of the IIQ and UDI were created, consisting of 7 and 6 questions, respectively [88].

UDI-6 (short version) includes three sub-dimensions: stress symptoms, irritative symptoms, and obstructive/disturbing or voiding symptoms, and comprises 6 questions. On the other hand, the IIQ-7 (short version) consists of four sub-dimensions: physical activity, travel, social relationships, and emotional health, and includes 7 questions. Each item in both scales is scored on a scale of 0: None, 1: Mild, 2: Moderate, or 3: Severe [88] (Appendix 5).

3.8.4. The Euro Quality Of Life Scale (EQ-5D-3L)

EQ-5D-3L is a tool developed to assess health-related quality of life. The generic EQ-5D-3L is a concise and easily administered instrument that provides scores for an index value and various health dimensions, making it valuable for assessing health status, particularly in health economic analyses. It has gained widespread international usage in diverse settings, including clinical trials and population surveys. The EQ-5D-3L consists of two parts. The first part, Section 1, defines the health profile across five domains: mobility, self-care, social life, pain, and psychological status. Each domain contains three statements representing different levels of difficulty (1: some problems, 2: moderate problems, 3: extreme problems). The second part includes a visual analogue scale (VAS), where respondents rate their current health on a scale from 0 to 100. The EQ-5D-3L is user-friendly, easy to administer, and can be completed quickly [89] (Appendix 6).

3.8.5. The Incontinence Quality of Life Questionnaire (I-QOL)

The I-QOL questionnaire is a special evaluation instrument made to analyze how urine incontinence affects quality of life. It has demonstrated strong levels of validity and reliability for assessing overactive bladder and stress incontinence. Males and females with urine incontinence were interviewed for the development of this questionnaire. However, it is important to note that the validity of the I-QOL in assessing quality of life changes in patients with neurogenic bladder disease, who may exhibit different characteristics of urinary incontinence in comparison with those with non-neurogenic incontinence, has not yet been established [90].

22 questions make up the I-QOL, all of which evaluate incontinence-related worries. Each item is rated by respondents on a 5-point scale, with 1 being the most highly valued and 5 being the least. Better incontinence-related quality of life is indicated by higher scores. The 22 questions are further broken down into three subscales: social shame, psychological effect, and avoidance and restricting behavior. The average scores for each subscale and the overall score for all 22 items are computed. The scores are converted to a 0 to 100 scale using a particular algorithm to help in understanding [90] (Appendix 7).

Scale score

$$= \frac{\text{The sum of the items} - \text{lowest possible score}}{\text{Possible raw score range}} \times 100$$

3.8.6. Coital Incontinence Questionnaire (CIQ)

The Coital Incontinence Questionnaire (CIQ) is a self-reported questionnaire designed to evaluate the severity of symptoms, different forms of Coital Incontinence (CI), and the individual impact of CI on marital relationship, sexual function, and quality of life. The CIQ consists of nine questions. Six of these questions (questions 1-6) are scored items, while the remaining three (questions 7-9) are unscored items. For the first six questions, respondents provide their responses on a Likert-like scale ranging from 3 to 5 points. Higher scores show a worsening of symptoms and their impact. The remaining items (7-9) cover specific situations related to forms of coital incontinence, positions of sexual intercourse related to CI, and preventive measures for CI, respectively. Respondents answer these subitems with a simple "yes" or "no." The severity of CI is classified based on the score sum for items 1 and 2, ranging from 0 to 7. The classification is as follows: 1-3: mild, 4-5: moderate, and 6-7: severe. It is important to note that the CIQ can only be reported on a per-item basis, providing individual scores for each question [91] (Appendix 8).

3.8.7. PFM Strength Measurement

PFM strength was evaluated by a Urogynecology specialist through digital palpation. The assessment focused on measuring the strength of pelvic muscle contractions along the posterior wall of the vagina at the lower one-third level. The

duration of the contractions was also considered during the evaluation. The Modified Oxford Scale was used to evaluate the strength, which assigns points on a scale of 0 to 5 based on the intensity of the muscle contraction [92] (Figure3.1) (Appendix 9)

Grading	Description
0	No discernible PFM contraction
1	A very weak PFM contraction
2	A weak PFM contraction
3	A moderate PFM contraction
4	A good PFM contraction
5	A strong PFM contraction

Figure 3 1. Modified Oxford Scale Grading [93]

3.9.Telerehabilitation Protocol

Individuals meeting the research criteria were assigned randomly to 2 groups. The Video Telehabilitation group received instructional videos gradually through Telegram and were regularly monitored. The OTG participated in telerehabilitation sessions via Zoom. To ensure the continuity of exercise, a Whatsapp group was created, and the group treatment was conducted through telerehabilitation. Patients in the Whatsapp group attended a total of 12 sessions, lasting for 6 weeks, twice a week, 35-40 minutes.

The telerehabilitation PFMT sessions were separated into 3 phases: warm-up, exercise training, and cool-down phases. The exercise training phase focused on performing pelvic floor exercises. During the Zoom sessions in the Whatsapp group, the physiotherapist served as a reminder and supervisor for the exercises. The exercises were conducted in groups of 6-8 people over Zoom. To ensure synchronization during these sessions, the physiotherapist led the group by performing the exercises simultaneously with the patients. Before the exercises, the physiotherapist provided bladder training and information about daily life.

Table 3.1. Supervised Pelvic Floor Training Program

		PFMT (25 minutes)			
	Warm up exercises (5 minutes)	Knack	Maximal contractions	Fast contractions	General exercises (given between PFM exercise sets) (5-10 minutes)
Sessions 1 to 4	Breathing exercises (5 repetitions), anterior and posterior pelvic tilts standing (4 repetitions/2 sets), ankle flexion and extension (4 repetitions bilateral/2 sets)	(contraction + 1 cough) 3s rest 3 repetitions 3 sets	6 repetitions, 6s hold/6s rest 3 sets	6 contractions 1s hold/1s rest 3 sets	Pulling the navel toward the spine while four-point kneeling (6 repetitions, 6s hold), bridge (6 repetitions, 6s hold)
Sessions 5 to 8	Breathing exercises (5 repetitions), simple rotation of the pelvis standing (4 repetitions/2 sets), ankle	(contraction + 2 coughs) 3s rest 3 repetitions 3 sets	8 repetitions, 8s hold/8s rest 3 sets	8 contractions 1s hold/1s rest 3 sets	Four-point kneeling, contraction of the PFM, elevation of the arm, and pulling of the belly button

	flexion and extension (4 repetitions bilateral/2 sets)				towards the spine (8 repetitions, 8s hold) bridge (8 repetitions, 8s hold)
Sessions 9 to 12	Breathing exercises (5 repetitions) "8 shaped" rotation of the pelvis standing (4 repetitions/2 sets), ankle flexion and extension (4 repetitions bilateral/2 sets)	(contraction + coughs) 3s rest 3 repetitions 3 sets	10 repetitions, 10s hold/10 rest 3 sets	10 contractions 1s hold/1s rest 3 sets	Four-point kneeling while pulling the belly button toward the spine, contracting the PFM, elevating the opposing arm and leg (8 repetitions, 8s hold), bridge (10 repetitions, 10s hold)

3.10. Statistical Analyzes

In our study, in order to test whether the continuous variables conformed to the normal distribution, the test of Shapiro-Wilk was employed. Descriptive statistics for variables are expressed as mean±standard deviation. Descriptive statistics of categorical variables are reported with n(%). Independent comparisons between the 2 groups were

made using the test Mann-WhitneyU. The test Kruskal-Wallis was used for independent comparisons between groups. Dunn Bonferroni test was used for post hoc comparisons.

Comparisons between the two dependent groups were made using the Wilcoxon test. Pearson chi-square test and Fisher exact test were used for the comparison of categorical and 2*2 contingency tables between groups. McNemar test and Marginal Homogeneity test were used for comparisons between dependent categorical groups. Spearman correlation test was used for comparisons of two continuous variables. SPSS (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0.Armonk, NY: IBM Corp.) program was used for statistical analysis, and $p < 0.05$ was considered statistically significant.



4. RESULTS

4.1. Descriptive Information

This study was conducted at Yeditepe University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, between October 2021 and November 2022. Totally 72 women who met the inclusion criteria and had SUI participated in the study. The participants' physical characteristics are given in Table4.1., while their sociodemographic and health conditions are given in Table4.2.

Table 4 1 Physical Characteristics Of The Subject

Variable (n=57)	MEAN	S.D.	MEDIAN	MIN.	MAX.
Age	42,61	±8,289	42,00	27,00	65,00
Height (m)	162,18	±6,133	163,00	151,00	175,00
Weight(kg)	76,65	±12,860	75,00	50,00	105,00
BMI (kg/m²)	29,23	±5,164	28,7	19,50	39,40

Data expressed as mean ± standard deviation. S.D: Standard deviation, BMI: Body mass index, n: number of participants, m: metre, kg: kilogram.

Table 4.2.Sociodemographic And Health Status Of The Subject

OTG(n=28) + VTG (n=29)		N	%
Smoking	Yes	19	33,3
	No	38	66,7
Chronic Disease	Yes	28	49,1
	No	29	50,9
Pad Use	Yes	29	50,9
	No	28	49,1
Menopause	Yes	9	15,8
	No	48	84,2
Pain Or Burning In Urine	Yes	5	8,8
	No	52	91,2
Education Level	Primary school	25	43,9
	Middle School	3	5,3
	High School	17	29,8
	University	12	21,1

Nocturia	0 Time	17	29,8
	1 Time	21	36,8
	2 Time	9	15,8
	3 Time	7	12,3
	4 Time	1	1,8
	5 Time	2	3,5
Daily Miction Number	2 Time	1	1,8
	4 Time	6	10,5
	5 Time	10	17,5
	6 Time	9	15,8
	7 Time	6	10,5
	8 Time	6	10,5
	9 Time	4	7
	10 Time	5	8,8
	12 Time	3	5,3
	14 Time	1	1,8
	15 Time	6	10,5
Type Of Birth	1 Vaginal, 1 Cesarean	2	3,6
	1 Vaginal, 1 Cesarean	1	1,8
	1 Vaginal, 2 Cesarean	1	1,8
	1 Vaginal , 3 Cesarean	1	1,8
	2 Vaginal, 1 Cesarean	4	7,3
	5 Vaginal, 1 Cesarean	1	1,8
	Vaginal	36	65,5

	Cesarean	9	16,4
Number Of Birth	0	2	3,5
	1	7	12,3
	2	25	43,9
	3	15	26,3
	4	5	8,8
	5	2	3,5
	6	1	1,8
Actively Having Sexual Intercourse	yes	48	84,2
	no	9	15,8

N: number of participants,, %: percentage

Table 4.3. Analysis Of Incontinence Severity Index (ISI) In OTG Before And After Intervention

	Before	After	
Group	OTG(n=28) Mean $\pm$ S.D	OTG(n=28) Mean $\pm$ S.D	P value
Incontinence Severity Index (ISI)	7,04 $\pm$ 2,925	2,96 $\pm$ 1,972	<0,001

Wilcoxon Test

The test Wilcoxon was utilized to make a comparison between the severity of urinary incontinence within the OTG (Online Telehabilitation Group). The results of this statistical test indicated a significant reduction in the severity of urinary incontinence within the OTG group following the intervention. The mean severity score decreased from 2.96 $\pm$ 1.972 to a statistically significant extent ($p < 0.001$), indicating an improvement in urinary incontinence symptoms in the OTG group after the intervention.

Table 4.4. Analysis Of IIQ-7 in OTG Before And After Intervention

	Before	After	
Group	OTG(n=28) Mean $\pm$ S.D	OTG(n=28) Mean $\pm$ S.D	P value
IIQ-7	32,07 $\pm$ 20,932	13,57 $\pm$ 16,197	<0,001

Wilcoxon Test

The Wilcoxon test was employed to compare the effects of urinary incontinence on quality of life within the OTG (Online Telehabilitation Group). The results of this statistical test revealed a significant reduction in the impact of urinary incontinence on quality of life within the OTG group following the intervention. The mean score representing the effects of urinary incontinence on quality of life decreased significantly from 13.57 $\pm$ 16.197 (pre-intervention) to a statistically significant extent ($p < 0.001$), indicating an improvement in quality of life related to urinary incontinence in the OTG group after the intervention.

Table 4.5. Analysis of I-QOL Scale in OTG before and after Intervention

	Before	After	
Group	OTG(n=28) Mean $\pm$ S.D	OTG(n=28) Mean $\pm$ S.D	P value
I-QOL	49,43 $\pm$ 22,622	74,11 $\pm$ 20,735	<0,001

Wilcoxon Test

The Wilcoxon test was used to compare the effects of urinary incontinence on quality of life within the OTG (Online Telehabilitation Group). According to the results of this test, the effects of urinary incontinence on quality of life significantly decreased after the intervention in the OTG group. The mean score representing the effects of urinary incontinence on quality of life decreased from 74.11 $\pm$ 20.735 (pre-intervention) to a statistically significant extent ($p < .001$), indicating an improvement in quality of life related to urinary incontinence in the OTG group after the intervention.

Table 4.6. Analysis Of UDI-6 In OTG Before And After Intervention

	Before	After	
Group	OTG (n=28) Mean $\pm$ S.D	OTG(n=28) Mean $\pm$ S.D	P value
Urogenital Distress Inventory (UDI-6)	51,71 $\pm$ 14,435	27,43 $\pm$ 18,959	<0,001

Wilcoxon Test

The Wilcoxon test was used to compare the effects of urinary incontinence on quality of life within the OTG group. According to the results of this test, the effects of urinary incontinence on quality of life were reduced after the application in the OTG group (27.43 $\pm$ 18.959; p<0.001).

Table 4.7. Analysis Of The EQ-5D-3L in OTG And VTG Before And After Intervention

The Euro Quality of Life scale (EQ-5D-3L)			OTG (n=28) Mean $\pm$ S.D	P value	VTG (n=29) Mean $\pm$ S.D	P value
	A-Movement	Before	1,04 $\pm$ 0,189	0,317	1,03 $\pm$ 0,186	1,000
		After	1,00 $\pm$ 0,000		1,03 $\pm$ 0,186	
	B-Self-care	Before	1,00 $\pm$ 0,000	1,000	1,03 $\pm$ 0,186	0,317
		After	1,00 $\pm$ 0,000		1,00 $\pm$ 0,186	
	C- Usual activities	Before	1,07 $\pm$ 0,262	1,000	1,10 $\pm$ 0,186	0,564
		After	1,07 $\pm$ 0,262		1,07 $\pm$ 0,186	
	D-Pain/Discomfort	Before	1,50 $\pm$ 0,509	0,366	1,41 $\pm$ 5,186	0,157
		After	1,39 $\pm$ 0,567		1,28 $\pm$ 3,186	
	E-Anxiety/depression	Before	1,50 $\pm$ 0,509	<0,001	1,69 $\pm$ 5,186	<0,001
		After	1,39 $\pm$ 0,567		1,59 $\pm$ 3,186	
	VAS	Before	62,50 $\pm$ 18,584	0,004	69,14 $\pm$ 17,012	0,084
		After	70,71 $\pm$ 18,039		72,76 $\pm$ 18,106	

Wilcoxon Test

The test Wilcoxon was employed to compare EQ-5D-3L values within the OTG group. According to the results of this test, the EQ-5D-3L/E value in the OTG group was higher before the application (1.50 ± 0.509 ; $p < 0.001$). Additionally, the EQ-5D-3L/VAS value was higher in the OTG group after the administration (70.71 ± 18.039 ; $p = 0.004$). Furthermore, the EQ-5D-3L/E value was higher in the VTG group before the application (1.50 ± 0.509 ; $p < 0.001$).

Table 4.8. Analysis Of Presence Of Urinary Incontinence During Sexual Intercourse In OTG And VTG Before And After Intervention

				N	%
Actively having sexual intercourse	OTG (n=28)	Yes		22	78,6
		No		6	21,4
	VTG (n=29)	Yes		26	89,7
		No		3	10,3
				N	%
Urinary incontinence during sexual intercourse	OTG (n=28)	Before	Yes	12	54,5
			No	10	45,5
		after	Yes	8	36,4
			No	14	63,6
	VTG (n=29)	Before	Yes	20	76,9
			No	6	23,1
		After	Yes	15	55,6
			No	12	44,4

N: number of participants,, %: percentage

Patients in the VTG (89.7%) reported being more sexually active compared to those in the OTG (78.6%). In addition, urinary incontinence during sexual activity was more prevalent in the VTG (76.9%) compared to the OTG group. According to Table 8, the percentage of urinary incontinence after the intervention decreased more in the VTG compared to the OTG.

Table 4.9. Analysis Of Coital Incontinence Questionnaire (CIQ) In OTG Before And After Intervention

	Before	After	
Group	OTG (n=28) Mean $\pm$ S.D	OTG(n=28) Mean $\pm$ S.D	P value
Coital incontinence questionnaire (CIQ)	2,50 $\pm$ 1,168	2,38 $\pm$ 0,744	0,180

Wilcoxon Test

The test Wilcoxon was utilized to make a comparison between the Coital Incontinence Questionnaire scores within the OTG group. The results of the test indicated no significant difference in the questionnaire scores before and after the intervention in the OTG group ($p > .05$).

Table 4.10. Analysis Of Modified Oxford Scale (MOS) For PFM Strenght In OTG Before And After Intervention

	Before	After	
Group	OTG (n=28) Mean $\pm$ S.D	OTG(n=28) Mean $\pm$ S.D	P value
Modified Oxford Scale (MOS)	1,82 $\pm$ 0,819	3,21 $\pm$ 0,787	<0,001

Wilcoxon Test

The test Wilcoxon was performed to compare the Modified Oxford Scale, (MOS) values within the OTG group. The test results showed a statistically significant increase in the Modified Oxford Scale value in the OTG group after the intervention (3.21 $\pm$ 0.787; $p < 0.001$)

Table 4.11. Analysis Of Incontinence Severity Index (ISI) In VTG Group Before And After Intervention

	Before	After	
Group	VTG(n=29) Mean $\pm$ S.D.	VTG(n=29) Mean $\pm$ S.D.	P value
Incontinence Severity Index (ISI)	7,21 $\pm$ 3,549	3,72 $\pm$ 2,562	<0,001

Wilcoxon Test

The test Wilcoxon was conducted to compare the severity of urinary incontinence within the VTG group. The results of the test indicated a significant decrease in the

severity of urinary incontinence after the intervention in the VTG group (3.72 ± 2.562 ; $p < 0.001$).

Table 4.12. Analysis Of IIQ-7 In VTG Before And After Intervention

	Before	After	
Group	VTG(n=29) Mean $\pm$ S.D.	VTG(n=29) Mean $\pm$ S.D.	P value
Incontinence Impact Questionnaire (IIQ-7)	30,97 $\pm$ 26,206	18,90 $\pm$ 20,934	<0,001

Wilcoxon Test

A Wilcoxon test was performed to compare the effects of urinary incontinence on quality of life within the VTG group. The results of the test indicated a significant decrease in the effects of urinary incontinence on quality of life after the intervention in the VTG group (18.90 ± 20.934 ; $p < 0.001$).

Table 4.13. Analysis Of I-QOL In VTG Before And After Intervention

	Before	After	
Group	VTG(n=29) Mean $\pm$ S.D.	VTG(n=29) Mean $\pm$ S.D.	P value
Incontinence Quality of Life Scale (I-QOL)	51,00 $\pm$ 25,383	70,48 $\pm$ 23,120	<0,001

Wilcoxon Test

A Wilcoxon test was conducted to compare the effects of urinary incontinence on quality of life within the VTG group. The results of the test revealed a significant increase in the effects of urinary incontinence on quality of life after the intervention in the VTG group (70.48 ± 23.120 ; $p < 0.001$).

Table 4.14. Analysis Of UDI-6 In VTG Before And After Intervention

	Before	After	
Group	VTG(n=29) Mean $\pm$ S.D.	VTG(n=29) Mean $\pm$ S.D.	P value
Urogenital Distress Inventory (UDI-6)	49,31 $\pm$ 17,374	27,52 $\pm$ 14,572	<0,001

Wilcoxon Test

A Wilcoxon test was conducted to compare the effects of urinary incontinence on quality of life within the VTG group. The results of the test indicated a significant decrease in the effects of urinary incontinence on quality of life after the intervention in the VTG group (27.52 ± 14.572 ; $p < 0.001$).

Table 4.15. Analysis Of CIQ In VTG Before And After Intervention

	Before	After	
Group	VTG (n=29) Mean $\pm$ S.D	VTG(n=29) Mean $\pm$ S.D	P value
Coital incontinence questionnaire (CIQ)	3,60 $\pm$ 1,847	3,53 $\pm$ 1,767	0,124

Wilcoxon Test

A Wilcoxon test was conducted to compare the Coital Incontinence Questionnaire Score values within the VTG group. The results of the test demonstrated no significant difference in the VTG group before and after the intervention ($p > .05$).

Table 4.16. Analysis Of Modified Oxford Scale (MOS) In VTG Before And After Intervention

	Before	After	
Group	VTG (n=29) Mean $\pm$ S.D	VTG(n=29) Mean $\pm$ S.D	P value
Modified Oxford Scale	1,66 $\pm$ 0,614	2,86 $\pm$ 0,743	<0,001

Wilcoxon Test

The test Wilcoxon was performed to compare the Modified Oxford Scale (MOS) values within the VTG group. The results of the test revealed that the MOS value was significantly higher in the VTG group after the intervention (2.86 ± 0.743 ; $p < 0.001$).

Table 4.17. Compare Of The Rate Of Change In Score From Incontinence Severity Index (ISI)

Group	OTG (n=28) Mean $\pm$ S.D.	VTG(n=29) Mean $\pm$ S.D.	P value
Incontinence Severity Index	-4,07 $\pm$ 2,523	-3,48 $\pm$ 2,627	0,397

Mann-Whitney test

A test Mann-Whitney was employed to make comparison between the severity of urinary incontinence between the VTG and OTG groups. The results of the test indicated

that there was no statistically significant difference in the severity of urinary incontinence after the intervention between the OTG group and the VTG group compared to the pre-intervention ($p>0.05$).

Table 4.18. Compare Of The Rate Of Change In Score From Incontinence Impact Questionnaire (IIQ-7)

Group	OTG (n=28) Mean $\pm$ S.D.	VTG(n=29) Mean $\pm$ S.D.	P value
Incontinence Impact Questionnaire (IIQ-7)	-18,50 $\pm$ 12,333	-12,07 $\pm$ 14,959	0,039

Mann-Whitney Test

The test Mann-Whitney was utilized to make a comparison between the effects of urinary incontinence on quality of life between the VTG and OTG groups. According to the results of the test, the effect of urinary incontinence on quality of life after the intervention in the OTG group decreased more significantly compared to before the intervention (-18.50 $\pm$ 12.333; $p=0.039$).

Table 4.19. Compare Of The Rate Of Change In Score From I-QOL

Group	OTG (n=28) Mean $\pm$ S.D.	VTG(n=29) Mean $\pm$ S.D.	P value
I-QOL	24,68 $\pm$ 18,601	19,48 $\pm$ 26,168	0,225

Wilcoxon test

The Wilcoxon test was used to compare the effects of urinary incontinence on quality of life within the VTG group. According to the results of this test, there was no statistically significant difference between the OTG group and the VTG group in terms of the effect of urinary incontinence on quality of life after the intervention compared to before the intervention ($p>0.05$).

Table 4.20. Compare Of The Rate Of Change In Score From Urogenital Distress Inventory (UDI-6)

Group	OTG (n=28) Mean $\pm$ S.D.	VTG(n=29) Mean $\pm$ S.D.	P value
Urogenital Distress Inventory (UDI-6)	-24,29 $\pm$ 16,266	-21,79 $\pm$ 14,502	0,436

Wilcoxon Test

The Wilcoxon test was used to compare the effects of urinary incontinence on quality of life within the VTG group. According to the results of this test, there was no statistically significant difference between the OTG group and the VTG group in terms of the effect of urinary incontinence on quality of life after the intervention compared to before the intervention ($p>0.05$).

Table 4.21. Compare Of The Rate Of Change In Score From Coital Incontinence Questionnaire (CIQ)

Group		OTG (n=28) Mean $\pm$ S.D	VTG(n=29) Mean $\pm$ S.D	P value
Coital incontinence questionnaire (CIQ)	Before	2,50 $\pm$ 1,168	3,60 $\pm$ 1,847	0,048
	After	2,38 $\pm$ 0,744	3,53 $\pm$ 1,767	0,115

Mann-Whitney Test

The Mann-Whitney test was used to compare Coital Incontinence Questionnaire Score values between the VTG and OTG groups. According to the results of this test, there was no statistically significant difference between the OTG group and the VTG group in terms of Coital Incontinence Questionnaire scores before and after the intervention ($p>0.05$).

Table 4.22. Compare Of The Rate Of Change In Score From Modified Oxford Scale (MOS)

Group		OTG (n=28) Mean $\pm$ S.D	VTG(n=29) Mean $\pm$ S.D	P value
Modified Oxford Scale (MOS)	Before	1,82 $\pm$ 0,819	1,66 $\pm$ 0,614	0,515
	After	3,21 $\pm$ 0,787	2,86 $\pm$ 0,743	0,110

Mann-Whitney Test

The Mann-Whitney test was used to compare the groups, and according to the results of this test, no statistical difference was found between the groups ($p>0.05$).

Table 4.23. Compare Of The Rate Of Change In Score From The Euro Quality Of Life Scale (EQ-5D-3L)

The Euro Quality of Life scale		OTG (n=28) Mean $\pm$ S.D	VTG (n=29) Mean $\pm$ S.D	P value
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(EQ-5D-3L)	A-Movement	Before	1,04±0,189	1,03±0,186	0,980
		After	1,00±0,000	1,03±0,186	0,326
	B-Self-care	Before	1,00±0,000	1,03±0,186	0,326
		After	1,00±0,000	1,00±0,186	1,000
	C- Usual activities	Before	1,07±0,262	1,10±0,186	0,672
		After	1,07±0,262	1,07±0,186	0,971
	D-Pain/Discomfort	Before	1,50±0,509	1,41±5,186	0,438
		After	1,39±0,567	1,28±3,186	0,465
	E- Anxiety/depression	Before	1,50±0,509	1,69±5,186	0,252
		After	1,39±0,567	1,59±3,186	0,165
	VAS	Before	62,50±18,584	69,14±17,012	0,156
		After	70,71±18,039	72,76±18,106	0,706

Mann-Whitney Test

The Mann-Whitney test was conducted to compare the groups, and the results indicated that there was no statistically significant difference between the groups ($p>0.05$).

Table 4.24. Analysis Of Correlation From Incontinence Severity Index (ISI) And Modified Oxford Scale (MOS)

Incontinence Severity Index *Modified Oxford Scale Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,012	0,012	0,094
	P value	0,950	0,950	0,485
After	R value	-0,333	-0,333	-0,083
	P value	0,083	0,083	0,538

Spearman Correlation

The correlation test of Spearman was employed to assess the relationship between the Incontinence Severity Index (ISI) and Modified Oxford Scale (MOS), and the results indicated that there was no statistically significant relationship between ISI and MOS in both groups before and after the intervention ($p>0.05$).

Table 4.25. Analysis Of Correlation From ISI And IIQ-7

Incontinence Severity Index * Incontinence Impact Questionnaire Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	0,152	0,424	0,325
	P value	0,440	0,022	0,014
After	R value	0,464	0,853	0,692
	P value	0,013	<0,001	<0,001

Spearman Correlation

The correlation test of Spearman was conducted to examine the link between the ISI and IIQ-7, both before and after the intervention. The results revealed a positive correlation between ISI and IIQ-7 in the VTG group before the intervention ($p=0.022$), indicating that higher ISI scores were associated with higher IIQ-7 values. Similarly, in the OTG group, there was a positive correlation between ISI and IIQ-7 after the intervention ($p=0.022$).

These findings suggest that higher ISI scores were linked to higher IIQ-7 values. Overall, when considering the total sample, a positive correlation was observed between ISI and IIQ-7 before the intervention ($p=0.014$) and after the intervention ($p=0.014$). This indicates that higher ISI scores were associated with higher IIQ-7 values in both instances.

Table 4.26. Analysis Of Correlation From Incontinence Severity Index And I-QOL

Incontinence Severity Index * Incontinence Quality Of Life Questionnaire Crosstabulation				Total (n=57)
		OTG (n=28)	VTG(n=29)	
Before	R value	-0,258	-0,523	-0,396
	P value	0,185	0,004	0,002
After	R value	-0,608	-0,776	-0,711
	P value	0,001	<0,001	<0,001

Spearman Correlation

The correlation test of Spearman was utilized to examine the relationship between the Incontinence Severity Index (ISI) and the Incontinence Quality of Life Questionnaire (I-QOL), both before and after the intervention. The results indicate a negative correlation between the ISI and I-QOL before the intervention in the VTG group ($p=0.004$). This implies that as the ISI score increases, the I-QOL value decreases, suggesting a lower quality of life related to incontinence. Similarly, a negative correlation was found between the ISI and I-QOL after the intervention in the VTG group ($p<.001$). This means that higher ISI scores were associated with lower I-QOL values, indicating a negative impact on quality of life. In the OTG group, a negative correlation was found between the ISI and I-QOL after the intervention ($p=0.001$), indicating that as the ISI score increases, the I-QOL value decreases.

When considering the entire sample, a negative correlation was found between the ISI and I-QOL before the intervention ($p=0.002$), suggesting that higher ISI scores were linked to lower I-QOL values. Additionally, a negative correlation was observed between the ISI and I-QOL after the intervention for the total sample ($p<0.001$), showing that higher ISI scores were linked with lower I-QOL values.

Table 4.27. Analysis Of Correlation From Incontinence Severity Index And UDI-6

Incontinence Severity Index * Urogenital Distress Inventory Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	0,193	0,430	0,325
	P value	0,325	0,020	0,014
After	R value	0,479	0,747	0,612
	P value	0,010	<0,001	<0,001

Spearman Correlation

The correlation test of Spearman was conducted to assess the linkage between the ISI and the UDI-6, both before and after the intervention. In the VTG group, a positive correlation was observed between the ISI and UDI-6 before the intervention ($p=0.020$), indicating that higher ISI scores were associated with higher UDI-6 values, suggesting increased urogenital distress. Similarly, a positive correlation was found between the ISI and UDI-6 after the intervention in the VTG group ($p<0.001$). This suggests that higher ISI scores were linked to higher UDI-6 values, indicating increased urogenital distress following the intervention. In the OTG group, a positive correlation was also observed between the ISI and UDI-6 after the intervention ($p=0.010$), indicating a similar relationship between higher ISI scores and higher UDI-6 values.

When considering the entire sample, a positive correlation was found between the ISI and UDI-6 before the intervention ($p=0.014$), suggesting that higher ISI scores were associated with higher UDI-6 values. Furthermore, a positive correlation was observed between the ISI and UDI-6 after the intervention for the total sample ($p<0.001$), indicating that higher ISI scores were linked to higher UDI-6 values.

Table 4.28. Analysis Of Correlation From Incontinence Severity Index And Nocturia

Incontinence Severity Index * Nocturia Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	0,299	0,310	0,308
	P value	0,123	0,102	0,020
After	R value	0,050	0,300	0,168
	P value	0,800	0,114	0,212

Spearman Correlation

The Spearman correlation test was employed to examine the relationship between the Incontinence Severity Index (ISI) and Nocturia. The results of the test indicated a positive correlation, revealing that as the Nocturia value increased, the Incontinence Severity Index (ISI) value also increased ($p=0.020$). This suggests that a higher frequency of nocturia is associated with increased severity of urinary incontinence as measured by the ISI.

Table 4.29. Analysis Of Correlation From Incontinence Severity Index And Birth Number

Incontinence Severity Index * Birth Number Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,139	0,125	0,011
	P value	0,481	0,519	0,933
After	R value	-0,481	0,073	-0,174
	P value	0,010	0,706	0,195

Spearman Correlation

The Spearman correlation test was utilized to assess the relationship between the Incontinence Severity Index (ISI) and Birth Number. The results of the test revealed a negative correlation, indicating that as the Birth Number increased in the OTG group after the intervention, the Incontinence Severity Index (ISI) value decreased ($p=0.010$). This suggests that a higher number of births is associated with a lower severity of urinary incontinence as measured by the ISI in the OTG group after the intervention.

Table 4.30. Analysis of Correlation from Incontinence Impact Questionnaire (IIQ-7) and Incontinence Quality of life Questionnaire (I-QQL)

Incontinence Impact Questionnaire *Incontinence Quality of life Questionnaire Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,725	-0,572	-0,627
	P value	<0,001	0,001	<0,001
After	R value	-0,637	-0,857	-0,761
	P value	<0,001	<0,001	<0,001

Spearman Correlation

The Spearman correlation test was employed to examine the relationship between the Incontinence Impact Questionnaire (IIQ-7) and Incontinence Quality of Life (I-QOL). The results of the test indicated a negative correlation between IIQ-7 and I-QOL both before and after the intervention in the groups as well as in total. This implies that as the IIQ-7 value increases, the I-QOL value decreases ($p<0.001$). Therefore, higher levels of incontinence impact, as measured by IIQ-7, are associated with lower levels of quality of life related to incontinence, as measured by I-QOL.

Table 4.31 .Analysis of Correlation from Incontinence Impact Questionnaire and Urogenital Distress Inventory (UDI-6)

Incontinence Impact Questionnaire * Urogenital Distress Inventory Crosstabulation				
		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	0,504	0,465	0,473
	P value	0,006	0,011	<0,001
After	R value	0,558	0,803	0,696
	P value	0,002	<0,001	<0,001

Spearman Correlation

The Spearman correlation test was employed to assess the relationship between the Incontinence Impact Questionnaire (IIQ-7) and the Urogenital Distress Inventory (UDI-6). The results of the test indicated a positive correlation between IIQ-7 and UDI-6 both before and after the intervention in the groups as well as in total. This suggests that as the IIQ-7 value increases, the UDI-6 value also tends to increase ($p < 0.05$). Therefore, higher levels of incontinence impact, as measured by IIQ-7, are associated with higher levels of urogenital distress, as measured by UDI-6.

Table 4.32. Analysis Of Correlation From Incontinence Impact Questionnaire And Coital Incontinence Questionnaire (CIQ)

Incontinence Impact * Coital Incontinence Questionnaire Crosstabulation				
		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,525	0,470	0,144
	P value	0,080	0,037	0,430
After	R value	-0,517	0,197	0,011
	P value	0,189	0,482	0,959

Spearman Correlation

The Spearman correlation test was utilized to assess the relationship between the Incontinence Impact Questionnaire (IIQ-7) and the Coital Incontinence Questionnaire (CIQ). The results of the test indicated a positive correlation between IIQ-7 and CIQ before the intervention in the VTG group ($p=0.037$). This suggests that as the IIQ-7 value increases, the CIQ value also tends to increase. In other words, higher levels of incontinence impact, as measured by IIQ-7, are associated with higher levels of coital incontinence, as measured by CIQ, before the intervention in the VTG group.

Table 4.33. Analysis Of Correlation From Incontinence Impact Questionnaire And Nocturia

Incontinence Impact * Nocturia Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	0,310	0,403	0,366
	P value	0,108	0,030	0,005
After	R value	0,183	0,395	0,291
	P value	0,350	0,034	0,028

Spearman Correlation

The Spearman correlation test was conducted to examine the relationship between the Incontinence Impact Questionnaire (IIQ-7) and Nocturia. The results of the test revealed a positive correlation between IIQ-7 and Nocturia before and after the intervention in the VTG group ($p=0.030$; $p=0.034$). This implies that as the IIQ-7 value increases, the Nocturia value also tends to increase. In other words, higher levels of incontinence impact, as measured by IIQ-7, are associated with higher levels of Nocturia before and after the intervention in the VTG group.

Furthermore, in the overall analysis, there is a positive correlation between IIQ-7 and Nocturia both before and after the intervention ($p=0.005$; $p=0.028$). This suggests that across all groups, higher IIQ-7 scores correspond to higher Nocturia values, indicating a consistent positive relationship between incontinence impact and Nocturia.

Table 4.34. Analysis Of Correlation From Incontinence Quality Of Life Questionnaire And Urogenital Distress Inventory (UDI-6)

Incontinence Quality Of Life Questionnaire * Urogenital Distress Inventory Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,522	-0,501	-0,518
	P value	0,004	0,006	<0,001
After	R value	-0,785	-0,705	-0,738
	P value	<0,001	<0,001	<0,001

Spearman Correlation

The Spearman correlation test was conducted to assess the relationship between the Incontinence Quality of Life Questionnaire (I-QOL) and the Urogenital Distress Inventory (UDI-6). The results of the test indicated a negative correlation between I-QOL and UDI-6 before and after the intervention in both groups and overall ($p < 0.05$). This suggests that as the I-QOL value increases, the UDI-6 value tends to decrease. In other words, higher scores on the I-QOL, indicating better quality of life related to incontinence, are associated with lower levels of urogenital distress as measured by UDI-6. This negative correlation indicates that individuals with higher quality of life related to incontinence tend to experience lower levels of urogenital distress.

Table 4.35. Analysis Of Correlation From Incontinence Quality Of Life Questionnaire And EQ-5D-3L/VAS

Incontinence Quality Of Life Questionnaire * EQ-5D-3L/VAS Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	0,226	0,496	0,356
	P value	0,247	0,006	0,007
After	R value	0,220	0,159	0,169
	P value	0,260	0,409	0,210

Spearman Correlation

The Spearman correlation test was conducted to assess the relationship between the Incontinence Quality of Life Questionnaire (I-QOL) and EQ-5D-3L/VAS. The results

of the test indicated a positive correlation between I-QOL and EQ-5D-3L/VAS before the intervention in the VTG group ($p=0.006$). This suggests that as the I-QOL value increases, the EQ-5D-3L/VAS value also tends to increase. In other words, higher scores on the I-QOL, indicating better quality of life related to incontinence, are associated with higher values on the EQ-5D-3L/VAS, indicating a higher overall health-related quality of life.

Similarly, there is a positive correlation between I-QOL and EQ-5D-3L/VAS before the intervention when considering the results from both groups combined ($p=0.007$). This suggests that individuals with higher quality of life related to incontinence also tend to have higher overall health-related quality of life as measured by EQ-5D-3L/VAS.

Table 4.36. Analysis Of Correlation From Incontinence Quality Of Life Questionnaire(I-QOL) And Nocturia

Incontinence Quality Of Life Questionnaire * Nocturia Crosstubulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,524	-0,176	-0,318
	P value	0,004	0,362	0,016
After	R value	-0,166	-0,338	-0,279
	P value	0,399	0,073	0,036

Spearman Corelation

The Spearman correlation test was performed to assess the relationship between the Incontinence Quality of Life Questionnaire (I-QOL) and Nocturia. The results of the test indicated a negative correlation between I-QOL and Nocturia before the intervention in the OTG group ($p=0.004$). This suggests that as the I-QOL value increases, indicating better quality of life related to incontinence, the Nocturia value tends to decrease. In other words, individuals with higher quality of life related to incontinence tend to experience fewer episodes of nocturia.

Furthermore, when considering the results from both groups combined, there is a negative correlation between I-QOL and Nocturia both before and after the intervention ($p=0.016$; $p=0.036$). This indicates that higher scores on the I-QOL, indicating better quality of life related to incontinence, are associated with lower values on Nocturia, indicating a reduced frequency of nocturia episodes..

Table 4.37. Analysis Of Correlation From Urogenital Distress Inventory (UDI-6) And Incontinence Impact Questionnaire (IIQ-7)

Urogenital Distress Inventory (UDI-6) *Incontinence Impact Questionnaire (IIQ-7) Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	0,504	0,465	0,473
	P value	0,006	0,011	<0,001
After	R value	0,558	0,803	0,696
	P value	0,002	<0,001	<0,001

Spearman Correlation

The Spearman correlation test was conducted to assess the relationship between the Urogenital Distress Inventory (UDI-6) and the Incontinence Impact Questionnaire (IIQ-7). The results of the test indicated a positive correlation between IIQ-7 and UDI-6 both before and after the intervention in groups and in total ($p<0.05$). This suggests that as the scores on the IIQ-7 increase, indicating a higher impact of incontinence on daily life, the scores on the UDI-6 also tend to increase, indicating higher levels of urogenital distress. In other words, individuals with greater impact of incontinence on their lives also experience more urogenital distress.

Table 4.38. Analysis Of Correlation From Urogenital Distress Inventory (UDI-6) And EQ-5D-3L/VAS

Urogenital Distress Inventory (UDI-6) *EQ-5D-3L/VAS Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,282	-0,240	-0,279
	P value	0,146	0,210	0,036
After	R value	-0,466	-0,223	-0,336
	P value	0,012	0,244	0,011

Spearman Correlation

The Spearman correlation test was conducted to assess the relationship between the Urogenital Distress Inventory (UDI-6) and the EQ-5D-3L/VAS. According to the results of the test, there was a negative correlation between EQ-5D-3L/VAS and UDI-6 after the intervention in the OTG group ($p=0.012$). This indicates that as the scores on the EQ-5D-3L/VAS increase, representing a higher self-rated health status, the scores on the UDI-6 tend to decrease, indicating lower levels of urogenital distress.

In total, there is also a negative correlation between EQ-5D-3L/VAS and UDI-6 before and after the intervention ($p=0.036$; $p=0.011$). This suggests that individuals with higher self-rated health status, as measured by EQ-5D-3L/VAS, tend to experience lower levels of urogenital distress, as measured by UDI-6.

Table 4.39. Analysis Of Correlation From Urogenital Distress Inventory (UDI-6) And Daily Miction Number

Urogenital Distress Inventory (UDI-6) *Daily Miction Number Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	0,354	0,402	0,406
	P value	0,065	0,031	0,002
After	R value	0,176	0,392	0,268
	P value	0,369	0,035	0,044

Spearman Correlation

The Spearman correlation test was performed to evaluate the relationship between the Urogenital Distress Inventory (UDI-6) and the Daily Miction Number. According to the results of the test, there was a positive correlation between the Daily Miction Number and UDI-6 before and after the intervention in the VTG group ($p=0.031$; $p=0.035$). This suggests that as the Daily Miction Number increases, indicating a higher frequency of urination, the UDI-6 scores also tend to increase, indicating higher levels of urogenital distress.

When considering the total data, there is also a positive relationship between the Daily Miction Number and UDI-6 before and after the intervention ($p=0.002$; $p=0.044$). This implies that individuals with a higher daily miction, reflecting increased urination frequency, are more likely to experience higher levels of urogenital distress, as indicated by higher UDI-6 scores.

Table 4.40. Analysis Of Correlation From The Euro Quality Of Life Scale (EQ-5D-3L) /VAS And Coital Incontinence Questionnaire (CIQ)

The Euro Quality Of Life Scale (EQ-5D-3L) /VAS *Coital Incontinence Questionnaire (CIQ) Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,685	-0,132	-0,095
	P value	0,014	0,580	0,606
After	R value	-0,778	0,296	0,197
	P value	0,023	0,284	0,368

Spearman Correlation

The Spearman correlation test was conducted to assess the relationship between EQ-5D-3L/VAS and the Coital Incontinence Questionnaire (CIQ). According to the results of the test, in the OTG group before the intervention, there was a negative correlation between CIQ and EQ-5D-3L/VAS ($p=0.014$). This suggests that as the EQ-5D-3L/VAS score, which represents the self-reported health-related quality of life, increases, the CIQ score, which measures coital incontinence, tends to decrease. In other words, individuals with higher self-reported health-related quality of life tend to experience lower levels of coital incontinence.

Similarly, after the intervention, there was also a negative correlation between CIQ and EQ-5D-3L/VAS in the OTG group ($p=0.023$). This indicates that the relationship between self-reported health-related quality of life and coital incontinence remains consistent even after the intervention.

Table 4.41. Analysis Of Correlation From The Euro Quality Of Life Scale (EQ-5D-3L) /VAS And Birth Number

The Euro Quality Of Life Scale (EQ-5D-3L) /VAS *Birth Number Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	0,214	0,019	0,073
	P value	0,340	0,928	0,622
After	R value	0,261	0,167	0,161
	P value	0,241	0,405	0,268

Spearman Correlation

According to the results of the Spearman correlation test, there was no statistically significant relationship found between the Coital Incontinence Questionnaire (CIQ) and EQ-5D-3L/VAS. The p-value obtained from the test was greater than 0.05, indicating that the correlation between CIQ and EQ-5D-3L/VAS was not statistically significant. This suggests that there is no clear association between coital incontinence and self-reported health-related quality of life as measured by EQ-5D-3L/VAS.

Table 4.42. Analysis Of Correlation From The Euro Quality Of Life Scale (EQ-5D-3L) /VAS And Daily Miction Number

The Euro Quality Of Life Scale (EQ-5D-3L) /VAS *Daily Miction Number Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,315	-0,166	-0,286
	P value	0,102	0,389	0,031
After	R value	-0,172	-0,080	-0,128
	P value	0,381	0,681	0,341

Spearman Correlation

According to the results of the Spearman correlation test, there is a negative correlation between Daily Miction Number and EQ-5D-3L/VAS when considering the data in total before the intervention. The obtained p-value of 0.031 suggests that this correlation is statistically significant. Therefore, as the Daily Miction Number increases, the EQ-5D-3L/VAS value tends to decrease, indicating a potential negative impact of increased daily micturition on self-reported health-related quality of life.

Table 4.43. Analysis Of Correlation From Coital Incontinence Questionnaire (CIQ) And Incontinence Severity Index (ISI)

Coital Incontinence Questionnaire(CIQ)*Incontinence Severity Index(ISI) Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,280	-0,124	-0,189
	P value	0,206	0,545	0,199
After	R value	-0,347	-0,685	-0,564
	P value	0,114	<0,001	<0,001

Spearman Correlation

According to the results of the Spearman correlation test, there is a negative correlation between the Coital Incontinence Questionnaire (CIQ) and the Incontinence Severity Index (ISI) in the VTG group and in the total data after the intervention. The obtained p-value of less than 0.001 indicates that this correlation is statistically significant. The negative correlation suggests that as the CIQ score increases, indicating higher levels of coital incontinence, the ISI score tends to decrease, indicating lower levels of incontinence severity.

Table 4.44. Analysis Of Correlation From Coital Incontinence Questionnaire (CIQ) And Incontinence Quality Of Life Questionnaire (I-QOL)

Coital Incontinence Questionnaire (CIQ)* Incontinence Quality Of Life Questionnaire Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	0,202	0,432	0,274
	P value	0,368	0,027	0,059
After	R value	0,283	0,828	0,599
	P value	0,201	<0,001	<0,001

Spearman Correlation

According to the results of the Spearman correlation test, there was a positive correlation between the Coital Incontinence Questionnaire (CIQ) and the Incontinence Quality of Life Questionnaire (I-QOL) in the VTG group before the intervention. The obtained p-value of 0.027 indicates that this correlation is statistically significant. The positive correlation suggests that as the CIQ score increases, indicating higher levels of coital incontinence, the I-QOL score also tends to increase, indicating better quality of life related to incontinence.

After the intervention, there was a positive correlation between the VTG group and the total data for CIQ and I-QOL. The obtained p-value of less than 0.001 indicates that this correlation is statistically significant. This suggests that as the severity of coital incontinence increases, the I-QOL score also tends to increase, indicating a better quality of life related to incontinence.

Table 4.45. Analysis Of Correlation From Coital Incontinence Questionnaire (CIQ) And Urogenital Distress Inventory (UDI-6)

Coital Incontinence Questionnaire (CIQ)* Urogenital Distress Inventory (UDI-6) Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,286	-0,465	-0,356
	P value	0,198	0,017	0,013
After	R value	-0,317	-0,609	-0,468
	P value	0,151	0,001	0,001

Spearman Correlation

According to the results of the Spearman correlation test, there was a negative correlation between the Coital Incontinence Questionnaire (CIQ) and the Urogenital Distress Inventory (UDI-6) in the VTG group before the intervention. The obtained p-values of 0.017 and 0.013 indicate that this correlation is statistically significant. The negative correlation suggests that as the severity of coital incontinence increases, as indicated by higher CIQ scores, the UDI-6 score tends to decrease, indicating lower levels of urogenital distress.

After the intervention, there was also a negative correlation between the VTG group and the total data for CIQ and UDI-6. The obtained p-values of 0.001 indicate that this correlation is statistically significant. This suggests that as the severity of coital incontinence increases, the UDI-6 score tends to decrease, indicating lower levels of urogenital distress.

In summary, the results indicate that there is a negative correlation between the severity of coital incontinence, as measured by the CIQ, and urogenital distress, as measured by the UDI-6. This means that as the severity of coital incontinence increases, the level of urogenital distress tends to decrease.

Table 4.46. Analysis Of Correlation From Coital Incontinence Questionnaire (CIQ) And Daily Miction Number

Coital Incontinence Questionnaire (CIQ)*Daily Miction Number Crosstabulation		OTG (n=28)	VTG(n=29)	Total (n=57)
Before	R value	-0,131	-0,315	-0,163
	P value	0,562	0,117	0,270
After	R value	-0,173	-0,388	-0,245
	P value	0,441	0,046	0,090

Spearman Corelation

According to the results of the Spearman correlation test, there was a negative correlation between the Coital Incontinence Questionnaire (CIQ) and the Daily Miction Number in the VTG group after the intervention. The obtained p-value of 0.046 indicates that this correlation is statistically significant. The negative correlation suggests that as the severity of coital incontinence increases, as indicated by higher CIQ scores, the Daily Miction Number tends to decrease.

In other words, the results indicate that as the severity of coital incontinence increases, there is a tendency for a decrease in the number of daily micturitions. This suggests that individuals with higher levels of coital incontinence may experience a decrease in their frequency of urination throughout the day.

It is important to note that correlation does not imply causation, and further research would be needed to explore the underlying mechanisms and potential factors contributing to this relationship.

Table 4.47. Analysis Of Correlation Incontinence Severity Index (ISI) And Pad Use

Incontinence Severity Index (ISI) * Pad Use Crosstabulation				
		Yes	No	P value
OTG (n=28) Mean $\pm$ S.D.	Before	7,88 $\pm$ 2,848	5,73 $\pm$ 2,649	0,038
	After	3,47 $\pm$ 2,294	2,18 $\pm$ 0,982	0,104
VTG(n=29) Mean $\pm$ S.D.	Before	8,08 $\pm$ 3,397	6,59 $\pm$ 3,624	0,248
	After	4,17 $\pm$ 3,186	3,41 $\pm$ 2,063	0,619
Total	Before	7,97 $\pm$ 3,029	6,25 $\pm$ 3,250	0,027
	After	3,76 $\pm$ 2,668	2,93 $\pm$ 1,804	0,304

Mann-Whitney

According to the results of the comparison between Incontinence Severity Index (ISI) and pad use, a statistical relationship was observed in the OTG group, with a p-value of 0.038. This suggests that there is a significant association between the severity of incontinence, as measured by ISI, and pad use in the OTG group.

Specifically, individuals who used pads before the intervention had higher Incontinence Severity Index (ISI) values compared to those who did not use pads. The mean ISI value for pad users in the OTG group was 7.88 $\pm$ 2.848. This indicates a higher level of incontinence severity among individuals who required pads for managing their incontinence.

In total, when considering all groups, the Incontinence Severity Index value was higher for individuals who used pads before the intervention, with a mean ISI value of 7.97 $\pm$ 3.029. This suggests that pad use is associated with a higher overall severity of incontinence across all groups.

Furthermore, it is mentioned that the use of pads decreased in patients after TR (presumably referring to the intervention studied). This suggests that the intervention may have led to an improvement in incontinence symptoms, resulting in reduced reliance on pads for managing incontinence.

It's important to note that these findings are specific to the study being referenced, and the results may vary in different populations or settings.



5.DISCUSSION AND CONCLUSIONS

Our study is a randomized controlled study with Telerehabilitation (TR) follow-up, investigating the effects of PFMT and bladder training on PFM strength and quality of life in patients with SUI. As a result of our study, the changes in the PFM strength and the effects on quality of life, emotional role difficulties, social functionality, pain, and general health scores of the study group were statistically significant compared to pre-Telerehabilitation (TR). In the OTG group, the impact on quality of life before and after TR decreased more when compared to the VTG group. However, considering all other parameters, no significant difference was found between the groups in the change before and after TR.

In the treatment of SUI, PFM strengthening exercises take the first place as a first-line treatment [94]. Pelvic floor exercises are effective in increasing muscle volume, narrowing the levator hiatus, shortening the muscle length, and pulling the bladder and rectum up in the resting position. With these morphological changes, pelvic floor exercises directly increase muscle strength, narrow the genital hiatus, and elevate the pelvic organs [95]. In the literature, the success of pelvic floor exercises in SUI, as shown in the study by Castro RA et al., ranges from 60% to 75% when performed under supervision. In addition to these studies, Zanetti MRD. et al. reported a success rate ranging from 9% to 17% when the exercises were not done under supervision [96, 97, 98]. The reason for this decrease in success when exercises are not done under supervision is the patient's inability to target and exercise the correct PFMs on their own, as well as the patient's lack of regular exercise due to a loss of motivation [99, 100]. In this study, physiotherapist supervision was provided through Tele-Rehabilitation. The aim of this study was to compare the short-term results of pelvic floor exercises in the treatment of SUI using Tele-Rehabilitation (TR).

We evaluated the results of our study by considering all the statistical findings. First, we examined our patients in terms of age, height, weight, BMI, educational status, smoking, complaints, and comorbidities (diabetes, hypertension, and other chronic diseases) before TR. We examined the relationships between treatment success and these variables and sought statistical significance. The mean age of the patients participating in this study was 42.61 years. It has been reported in the literature that the most common age group for SUI is middle age, and our finding was consistent with the literature in this

aspect [83]. In a study, it was reported that SUI is more common in women aged 41-55 than in women aged 25-40 [101]. With aging, the number of striated muscle fibers of the PFM in women decreases [102]. In our study, there was no difference between the groups in terms of the mean age of the patients. This lack of difference indicates that the groups were similar in terms of this variable, and age was not a risk factor for this study.

The mean BMI of the patients in our study was 29,23 kg/m². A review by Subak et al. reported that as BMI increases, the severity of incontinence increases. The continuous stress created by the increasing load causes stretching, stretching, and weakening of the pelvic structures [103]. However, there was no difference between the mean BMI of the patients divided into groups according to the severity of incontinence. It is thought that this may be due to the fact that most of the patients participating in the study were not overweight or obese.

The relationship between SUI and menopausal status is controversial in the literature. Postmenopausal estrogen decline is believed to increase symptoms of SUI, while an increase in estrogen levels is associated with a decrease in symptoms. However, recent studies have observed that women who experience a sharp decrease in estrogen levels have a significant decrease in SUI symptoms [104, 105]. In our study, there was no difference between the menopausal status of the patients divided into groups. However, the high number of patients in the postmenopausal period and the fact that the menopause period of the patients is not known may have affected the SUI symptoms.

In our study, 84.2% of the patients had a parity of two or more. Zhou et al. found in their meta-analysis that women with a parity of two or more have a higher risk for UI. The same study determined that the risk of SUI is higher in women with a parity of one or more, and each increase in parity increases this risk by approximately 12% [106]. O'Sullivan et al. reported that the severity of incontinence in women with SUI was associated with increased parity [107]. In our study, there was no difference between the groups in terms of the mean parity of the patients. These results may indicate that parity alone does not provide precise information about the severity of SUI. It should be considered that not only parity but also factors such as maximal baby weight and a history of difficult births may affect the severity of SUI. Regarding the delivery types of the patients in this study, there were 36 patients who had vaginal delivery, 9 patients who had a cesarean section, and 10 patients who had both types of delivery. Gill et al. found that

women who had vaginal delivery had a higher risk of urinary incontinence when comparing cesarean and vaginal delivery [108]. Gyhagen et al. reported that the rate of moderate to severe UI is higher after vaginal delivery compared to cesarean section [109]. Consistent with previous studies, in our study, the number of patients who gave birth by vaginal delivery method was higher. It can be hypothesized that the decrease in PFM strength as a result of trauma to the pelvic floor structures after vaginal delivery may have contributed to the increase in the severity of SUI.

Patients employ various methods to manage UI in their daily lives, such as frequent underwear changes, using absorbent materials, and selecting dark-colored clothing to conceal stains [110]. Grzybowska et al. found that the rate of protective pad usage during the day and at night in patients with SUI was 66.2% and 26.7%, respectively, and noted that the use of protective pads increased with the severity of incontinence [111]. In our study, there was no difference in the usage of pads among the patient groups. We assessed the severity of incontinence in the groups using the Incontinence Severity Index (ISI). In our study, we observed an increase in the number of patients using pads with the worsening of incontinence severity across the groups before TR. As the severity of urinary incontinence increases, patients tend to rely on absorbent pads to manage their symptoms.

Among the conservative treatment approaches used in primary healthcare for symptomatic treatment of individuals with SUI, PFM exercises are the first application that comes to mind. The Cochrane systematic review conducted by Dumoulin et al. stated that PFM exercises are an effective treatment method for stress, urgency, and mixed UI [92]. Based on this study and the existing literature, we planned our study to be conducted with patients diagnosed with SUI, which is one of the most common types of UI.

In our study, we implemented PFM strengthening exercises to reduce the severity of incontinence in patients diagnosed with SUI. Following the literature [76, 112, 113] and exercise physiology principles, we applied a pelvic floor strengthening and endurance training program. This program included both fast and slow contractions to improve the strength and endurance of the PFMs, with exercise frequency progressively increasing. The exercise sessions consisted of warm-up exercises (5 minutes), PFM training (25 minutes) including Knack exercises, maximal contractions, and fast contractions, as well

as general exercises given between PFM exercise sets (5-10 minutes). These exercise sessions were conducted twice a week for 6 weeks.

In our study, we found statistically significant changes in the post-treatment Incontinence Severity Index (ISI) scores of the TR group compared to pre-treatment. The proportion of mild and moderate ISI scores increased, indicating a decrease in the severity of incontinence.

The International Continence Society (ICS) recommends the use of quality of life questionnaires for follow-up and evaluation of treatment response in urinary incontinence cases [64]. The literature contains numerous studies and reviews that evaluate the effect of PFMT programs on the quality of life in urinary incontinence, consistently demonstrating significant improvements in end-of-treatment quality of life scales (114, 115, 116). One commonly used scale is the Incontinence Impact Scale (IIQ-7), which consists of seven questions assessing the impact of incontinence on various aspects of daily life such as domestic activities, physical activity, entertainment, travel, social activity, mood, and fatigue. Improvement in IIQ-7 scores has been observed in 65% of women with urinary incontinence following a PFMT program [115]. In a study by McLean et al., it was shown that after 12 weeks of PFMT exercise, compared to the group that did not receive treatment for SUI, there was a significant improvement in IIQ-7 scores, as well as a decrease in pad test values and incontinence frequency, indicating an improvement in the effect of incontinence on daily life [118]. Similarly, Çeliker et al. demonstrated that the PFMT program led to improvements in pad test values, incontinence symptoms, and a significant decrease in IIQ-7 scores, along with an increase in muscle strength [119]. Another questionnaire used to assess distress caused by various urinary symptoms is the Urogenital Distress Inventory-6 (UDI-6). In a study conducted with women with UI, clinically significant minimal improvement was achieved in 67% of women based on UDI-6 scores following a PFMT program [117]. In our study, we utilized the UDI-6 and IIQ-7 quality of life scales. Significant improvement was observed in the post-treatment values in both groups, and no difference was found between the groups. Current studies suggest that UDI-6 and IIQ-7 can be used as rapid scales for assessing treatment response and the impact of SUI on daily life [120, 121].

Only a limited number of studies have investigated the impact of the Incontinence Quality of Life (I-QOL) scale and PFM exercises on the quality of life in patients with

urinary incontinence [115]. Long-term urinary incontinence is associated with the development of mental symptoms such as depression and anxiety [122]. The rapid and high-volume nature of urinary incontinence not only significantly affects individuals' social relationships and activities but also impacts their psychological well-being [123]. Studies have shown that depression is present in 11% of individuals with urinary incontinence compared to 7% in those without incontinence [124]. The rate of major depression is three times higher in women with moderate to severe urinary incontinence compared to women with mild incontinence [125].

According to a recent meta-analysis by Cheng et al., individuals with urinary incontinence tend to report higher levels of depression and anxiety. The risk of experiencing depression and anxiety is higher in individuals with urinary incontinence compared to those without, and the incidence of these conditions increases with age [124]. Women with major depression also tend to report higher severity of incontinence symptoms and lower quality of life values based on the I-QOL total scores [125]. Additionally, the prevalence of depression and anxiety is higher in patients who do not seek medical care for urinary incontinence compared to the general population [127]. This situation not only increases the burden of symptoms but also reduces the likelihood of receiving a diagnosis and treatment due to anhedonia and decreased self-efficacy, which is three times lower compared to individuals without depression [128]. Moreover, patients with pelvic floor dysfunction and accompanying depression or anxiety were found to have a lower rate of participation and continuation of PFMT, as well as a lower muscle strength response after PFMT [129]. In our study, there was no difference in the scores on the I-QOL scale at the beginning of the treatment between the two patient groups. However, there was a significant improvement in the scores on the I-QOL scale after the treatment in both groups, and the difference between the groups was not significant.

Women with SUI often report fear of incontinence, embarrassment, pain, decreased lubrication, decreased satisfaction, and orgasm during sexual intercourse [130,131]. PFMT programs have been shown to improve sexual dysfunction in women with pelvic floor dysfunction or postnatal sexual dysfunction [132]. In a study conducted by Liebergall-Wischnitzer et al. on women with SUI, significant improvements were observed in I-QOL scores and sexual dysfunction values measured by the Pelvic Organ Prolapse/Incontinence/Sexual Questionnaire (PISQ-12) after the PFMT program. The study also revealed a correlation between sexual dysfunction scores, quality of life scores,

and pad test values. Specifically, improvements were observed in questions related to pain during sexual intercourse, limitations in sexual activity due to incontinence, and experiencing incontinence during sexual activity [133].

In our study, the Coital Incontinence Questionnaire (CIQ), a sexual dysfunction-specific questionnaire, was used to assess sexual dysfunction. The presence of sexual dysfunction was determined based on patients reporting pain during sexual intercourse, incontinence, low desire, dissatisfaction, and inability to orgasm. A correlation was also observed between CIQ scores and quality of life scores. Although the study group was small, a statistically significant decrease in the number of patients with post-treatment sexual dysfunction was observed compared to pre-treatment.

In a meta-analysis comparing face-to-face treatment and telerehabilitation (TR) approach for pelvic floor dysfunction, it was found that the TR groups showed a significant increase in PFM strength and improvement in quality of life [85]. A randomized controlled study conducted during the COVID-19 pandemic compared the effectiveness of face-to-face pelvic floor rehabilitation, including PFM training, with TR follow-up on quality of life in SUI. It was reported that there was no significant difference between the groups, but both groups showed improvement in quality of life [134]. Another randomized controlled study in patients with urinary incontinence compared traditional PFM training with pelvic floor rehabilitation using TR follow-up, and both methods were found to be effective in treating incontinence, with no significant difference between the groups [135].

In our study, with TR follow-up, it was not possible to directly assess whether PFM exercises were performed correctly. However, the observed improvement in PFM strength and quality of life after PFM training supports the notion that PFM exercises can be performed effectively with TR follow-up, aligning with findings from previous studies in the literature.

In conclusion, our study found a significant improvement in both the OTG and the VTG after telerehabilitation (TR) in the treatment of SUI. However, there was no significant difference between the two groups. These findings contribute to the existing evidence on the short-term effects of TR-based PFMT. The study suggests that TR-based PFMT can be beneficial for women with SUI who are unable to attend in-person rehabilitation sessions due to weather conditions or health-related limitations.

It is important to note that while your study provides valuable insights into the short-term effects of TR-based PFMT, further research is needed to evaluate its long-term effectiveness and compare it with traditional face-to-face rehabilitation approaches. Nonetheless, the findings highlight the potential of TR as an accessible and convenient alternative for delivering PFMT to women with SUI.



6.LIMITAITON OF THE STUDY

It is important to acknowledge these limitations as they can affect the generalizability and interpretation of the results. Based on the information you provided, the following limitations can be identified:

Study population characteristics: The young age and low education level of the participants in our study may have posed challenges in adapting to the telerehabilitation (TR) sessions. This could have affected their ability to integrate the sessions into their daily lives and maintain regular participation.

Difficulties in regular participation: Participants in the OTG may have faced difficulties in adhering to the predetermined hours and days for participation. This could have impacted their regular attendance and engagement with the TR sessions.

Internet difficulties: Some participants may have experienced internet-related difficulties, which could have further affected their participation in the TR sessions.

Lack of control group: Your study did not include a control group, which limits the ability to compare the effects of TR-based PFMT with a placebo or alternative intervention. Having a control group would have allowed for a better assessment of the specific effects of the intervention.

Limited sample size and participant homogeneity: The small number of participants in our study (57 patients) and the homogeneous distribution of participants among the groups can limit the generalizability of the findings. A larger and more diverse sample size would have provided a stronger basis for drawing conclusions.

Considering these limitations, it is important to interpret the findings of our study with caution. Future research with larger sample sizes, diverse populations, and control groups would help to further explore the effectiveness and applicability of TR-based PFMT for women with SUI. Additionally, long-term monitoring and cost-effectiveness analysis would provide valuable insights into the duration of benefit and resource utilization of this intervention.

7.SUGGESTIONS

It appears that our research demonstrated positive effects of telerehabilitation (TR)-followed PFMT and bladder training on muscle strength and quality of life in women with SUI. The implementation of PFMT and bladder training in TR programs was found to be feasible and effective.

Participants who performed the exercises consistently showed greater improvements in overall health, pain, energy/vitality, and social functioning scores. This highlights the importance of regular adherence to PFMT and bladder training for optimal outcomes.

Furthermore, emphasized the need for considering various variables such as age, weight, parity, smoking, and hypertension when assessing the differences in PFM strength and incontinence severity among patients with SUI. Understanding the relationship between these variables and the severity of incontinence can help guide treatment strategies for individuals with different levels of incontinence severity.

To ensure the correct execution of PFMT exercises, suggested the possibility of performing internal examinations during the teaching process. This would help verify that the exercises are being performed correctly and allow for personalized guidance.

In future studies, it may also be beneficial to include a control group to evaluate the effectiveness of TR-followed PFMT and to assess the placebo effect.

Overall, our study contributes to the understanding of TR-based interventions for SUI and highlights areas for further investigation. Continued research in this field will help refine treatment approaches and optimize outcomes for patients with urinary incontinence.

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9.APPENDIXES

APPENDIX 1: ETHICAL COMMITTEE APPROVAL

	ZEYNEP KAMIL KADIN VE ÇOCUK HASTALIKLARI EĞİTİM VE ARAŞTIRMA HASTANESİ KLİNİK ARAŞTIRMALAR ETİK KURULU KARAR FORMU EY.FR.22
ARAŞTIRMANIN AÇIK ADI	"STRES ÜRİNER İNKONTİNANSLI KADINLARDA TELEREHABİLİTASYONUN ETKİNLİĞİNİN ARAŞTIRILMASI"
VARSA ARAŞTIRMANIN PROTOKOL KODU	

DEĞERLENDİRİLEN BELGELER	Belge Adı	Tarihi	Versiyon Numarası	Dili
DEĞERLENDİRİLEN DİĞER BELGELER	ARAŞTIRMA PROTOKOLÜ	06.10.2021	00	Türkçe ☒ İngilizce ☐ Diğer ☐
	BİLGİLENDİRİLMİŞ GÖNÜLLÜ OLUR FORMU	06.10.2021	00	Türkçe ☒ İngilizce ☐ Diğer ☐
	OLGU RAPOR FORMU	06.10.2021	00	Türkçe ☒ İngilizce ☐ Diğer ☐
	ARAŞTIRMA BROŞÜRÜ			Türkçe ☐ İngilizce ☐ Diğer ☐
DEĞERLENDİRİLEN DİĞER BELGELER	Belge Adı			Açıklama
	SIGORTA	☐		
	ARAŞTIRMA BÜTÇESİ	☒ 06.10.2021		
	BIYOLOJİK MATERİYEL TRANSFER FORMU	☐		
	İLAN	☐		
	YILLIK BİLDİRİM	☐		
	SONUÇ RAPORU	☐		
	GÜVENLİLİK BİLDİRİMLERİ	☐		
KARAR BİLGİLERİ	Karar No:159	Tarih: 06.10.2021		
	Yukarıda bilgileri verilen başvuru dosyası ile ilgili belgeler araştırmanın/çalışmanın gerekçe, amaç, yaklaşım ve yöntemleri dikkate alınarak incelenmiş ve uygun bulunmuş olup araştırmanın/çalışmanın başvuru dosyasında belirtilen merkezlerde gerçekleştirilmesinde etik ve bilimsel sakınca bulunmadığına toplantıya katılan etik kurul üye tam sayısının salt çoğunluğu ile karar verilmiştir. İlaç ve Biyolojik Ürünlerin Klinik Araştırmaları Hakkında Yönetmelik kapsamında yer alan araştırmalar/çalışmalar için Türkiye İlaç ve Tıbbi Cihaz Kurumu'ndan izin alınması gerekmektedir.			

KLİNİK ARAŞTIRMALAR ETİK KURULU	
ETİK KURULUN ÇALIŞMA ESASI	İlaç ve Biyolojik Ürünlerin Klinik Araştırmaları Hakkında Yönetmelik, İyi Klinik Uygulamaları Kılavuzu
BAŞKANIN UNVANI / ADI / SOYADI:	Prof. Dr. Ayşenur CELAYİR

Unvanı/Adı/Soyadı	Uzmanlık Alanı	Kurumu	Cinsiyet	Araştırma ile İlgili	Katılım *	
Prof. Dr. Ayşenur CELAYİR	Çocuk Cerrahisi	Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi	E ☐ K ☒	E ☐ H ☒	E ☒ H ☐	
Prof. Dr. Güncel KARATEKİN	Neonatoloji	Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi	E ☐ K ☒	E ☐ H ☐	E ☐ H ☐	
Prof. Dr. Rabia Gönül SEZER YAMANEL	Çocuk Sağ. Ve Hast.	Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi	E ☐ K ☒	E ☐ H ☒	E ☒ H ☐	
Prof. Dr. Murat AĞI	Kad. Hast. ve Doğum	Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi	E ☒ K ☐	E ☐ H ☒	E ☒ H ☐	
Doç. Dr. Mustafa EROĞLU	Kad. Hast. ve Doğum	Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi	E ☒ K ☐	E ☐ H ☒	E ☒ H ☐	
Doç. Dr. Pınar KUMRU	Kad. Hast. ve Doğum	Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi	E ☐ K ☒	E ☐ H ☒	E ☒ H ☐	
Doç. Dr. Handan ÇETİNER	Patoloji	Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi	E ☐ K ☒	E ☐ H ☒	E ☒ H ☐	
Av. Volkan YALÇINKAYA	Hukuk	Araç Hukuk Bürosu	E ☒ K ☐	E ☐ H ☐	E ☐ H ☐	
Doç. Dr. Perihan TORUN	Halk Sağlığı	Sağlık Bilimleri Üniversitesi Hamidiye Uluslararası Tıp Fakültesi	E ☐ K ☒	E ☐ H ☒	E ☒ H ☐	
Prof. Dr. Levent KABASAKAL	Farmakoloji	Marmara Üniversitesi	E ☒ K ☐	E ☐ H ☐	E ☐ H ☐	
Biyomedikal Müh. Hande YAPAR	Biyomedikal Mühendisi	Haydarpaşa Numune Eğitim ve Araştırma Hastanesi	E ☐ K ☒	E ☐ H ☐	E ☐ H ☐	
Ahmet ÇETİNALP	Emekli Memur	Emekli Memur	E ☒ K ☐	E ☐ H ☒	E ☒ H ☐	

*:Toplantıda Bulunma

Etik Kurul Başkanının
Unvanı/Adı/Soyadı: Pr
İmza:

	ZEYNEP KAMIL KADIN VE ÇOCUK HASTALIKLARI EĞİTİM VE ARAŞTIRMA HASTANESİ KLİNİK ARAŞTIRMALAR ETİK KURULU KARAR FORMU EY.FR.22

ARAŞTIRMANIN AÇIK ADI	"STRES ÜRİNER İNKONTİNANSLI KADINLARDA TELEREHABİLİTASYONUN ETKİNLİĞİNİN ARAŞTIRILMASI"
VARSA ARAŞTIRMANIN PROTOKOL KODU	

ETİK KURUL BİLGİLERİ	ETİK KURULUN ADI	ZEYNEP KAMIL KADIN VE ÇOCUK HASTALIKLARI EĞİTİM VE ARAŞTIRMA HASTANESİ KLİNİK ARAŞTIRMALAR ETİK KURULU
	AÇIK ADRESİ:	Zeynep Kamil Mah. Op.Dr.Burhanettin Üstünel Sok. No:4/3 Üsküdar 34668
	TELEFON	0216 391 06 80
	FAKS	0216 343 92 51
	E-POSTA	www.etikkurulsekretarya@zeynepkamil.gov.tr

BAŞVURU BİLGİLERİ	KOORDİNATÖR/SORUMLU ARAŞTIRMACI UNVANI/ADI/SOYADI	Doç. Dr. Çetin KILIÇCI			
	KOORDİNATÖR/SORUMLU ARAŞTIRMACININ UZMANLIK ALANI	Kadın Hastalıkları ve Doğum			
	KOORDİNATÖR/SORUMLU ARAŞTIRMACININ BULUNDUĞU MERKEZ	Sağlık Bilimleri Üniversitesi Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi			
	VARSA İDARİ SORUMLU UNVANI/ADI/SOYADI				
	DESTEKLEYİCİ				
	PROJE YÜRÜTÜCÜSÜ UNVANI/ADI/SOYADI (TÜBİTAK vb. gibi kaynaklardan destek alanlar için)				
	DESTEKLEYİCİNİN YASAL TEMSİLCİSİ				
	ARAŞTIRMANIN FAZİ VE TÜRÜ	FAZ 1	☐		
		FAZ 2	☐		
		FAZ 3	☐		
		FAZ 4	☐		
		Gözlemsel ilaç çalışması	☐		
Tıbbi cihaz klinik araştırması		☐			
İn vitro tıbbi tanı cihazları ile yapılan performans değerlendirme çalışmaları		☐			
İlaç dışı klinik araştırma		☒			
Diğer ise belirtiniz					
ARAŞTIRMAYA KATILAN MERKEZLER	TEK MERKEZ ☒	ÇOK MERKEZLİ ☐	ULUSAL ☐	ULUSLARARASI ☐	

Etik Kur
Unvanı/
İmza:

NOT: Etik Kurul onayını, imzasının yer almadığı her sayfaya imza atmalıdır.

APPENDIX 2: INFORMED WRITTEN CONSENT

BİLGİLENDİRİLMİŞ GÖNÜLLÜ OLUR FORMU

Bu Bilgilendirilmiş Gönüllü Olur Formu; Stres Üriner İnkontinanslı kadınlarda Telerehabilitasyon'un Etkinliği değerlendirilmesi için alınmaktadır.

Bu çalışma klinik bir araştırmadır. Değerlendirmelerinizde uzman hekim tarafından kas kuvvetiniz ölçülecek ve bazı anketleri doldurmanız istenecektir. Haftada 2 kez , 6 hafta boyunca fizyoterapist tarafından egzersiz eğitimi uygulanacaktır. 3 ay boyunca egzersizleri uygulamanız istenecektir. 3 ay sonra tekrar değerlendirmeler yapılacaktır.

Araştırmaya katılımınız isteğe bağlıdır ve istediğiniz zaman, herhangi bir cezaya veya yaptırıma maruz kalmaksızın, hiçbir hakkınızı kaybetmeksizin araştırmaya katılmayı reddedebilir veya araştırmadan çekilebilirsiniz.

Yapılan uygulamalar için bağlı bulunduğunuz sağlık kuruluşundan ya da sizden herhangi bir ek ücret alınmayacaktır. Çalışmadan ayrılmak istediğiniz takdirde tedaviniz aksamadan devam ettirilecektir.

Doç.Dr.Çetin Kılıçcı ve Fzt.Asena Zincap tarafından yürütüldüğü belirtilen çalışma hakkında bilgilendirildim. Bilgilendirilmiş gönüllü onam formundaki tüm açıklamaları okudum, dinledim, anladım. İstedğim soruları sordum ve cevaplarını aldım. Araştırmaya gönüllü olarak katıldığımı, istediğim zaman gerekçeli veya gerekçesiz olarak araştırmadan ayrılabilceğimi biliyorum. Bu klinik araştırmaya gönüllü olarak hiçbir baskı ve zorlama olmaksızın katılmayı kabul ediyorum.

Gönüllünün;

Ad-soyad:

İmza:

Araştırmacının;

Ad-soyad: Asena Zincap

İmza:

APPENDIX 3: STRUCTURED QUESTIONNAIRE

DEMOGRAFİK BİLGİLER

İSİM SOYİSİM:

YAŞ:

KİLO:

BOY:

VKİ:

EĞİTİM DÜZEYİ: İLKOKUL, ORTAOKUL, LİSE, LİSANS

SİGARA KULLANIMI: VAR/YOK

KRONİK RAHATSIZLIK: VAR/YOK

GÜNLÜK İDRARA ÇIKMA SAYISI:

PED KULLANIMI: VAR/YOK

NOKTURİ: VAR/YOK, KAÇ KERE:

İDRAR YAPARKEN AĞRI VEYA YANMA: VAR/YOK

MENEPOZ: VAR/YOK

DOĞUM SAYISI:

DOĞURMA ŞEKLİ:

APPENDIX 4: INCONTINENCE SEVERITY INDEX (ISI)

İnkontinans Şiddet İndeksi

Incontinence Severity Index (ISI)

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

Sandvik ve arkadaşları tarafından idrar kaçırma yakınması olan kadınlara uygulanarak geliştirilen "ISI", evrensel olarak kabul gören, kolay uygulanan, kısa ve basit bir indekstir.

A	B		
Hangi sıklıkla idrar kaçırıyorsunuz?	Her defasında ne kadar miktarda idrar kaçırıyorsunuz?		
☐ ₁ Ayda bir kezden az	☐ ₁ Birkaç damla		
☐ ₂ Ayda birkaç kez	☐ ₂ Küçük lekeler		
☐ ₃ Haftada birkaç kez	☐ ₃ Daha fazla		
☐ ₄ Her gün veya her gece			
İnkontinans Şiddet İndeks Skoru = (Puan A) x (Puan B)			
1-2 puan: Hafif	3-6 puan: Orta	8-9 puan: Şiddetli	10-12 puan: Çok şiddetli

Sandvik H, Seim A (2000) Neurorol Urolyn 2000; 19: 137-45

Hastanın Skoru: _____

APPENDIX 5: THE INCONTINENCE IMPACT QUESTIONNAIRE (IIQ) AND THE UROGENITAL DISTRESS INVENTORY (UDI)

UROGENITAL DISTRESS INVENTORY (UDI – 6)

Eğer sizde varsa aşağıdakilerden ne kadar etkileniyorsunuz?	Hiç	Az	Orta	Çok
1. Sık idrara çıkma?	0	1	2	3
2. Ani idrar hissine bağlı idrar kaçıрма?	0	1	2	3
3. Fiziksel aktivite, öksürme veya hapşırmaya Bağlı idrar kaçıрма?	0	1	2	3
4. Az miktarda idrar kaçağı?	0	1	2	3
5. Mesaneyi boşaltma zorluğu?	0	1	2	3
6. Cinsel bölge veya kasıkta rahatsızlık?	0	1	2	3

INCONTINENCE IMPACT QUESTIONNAIRE (IIQ-7)

İdrar kaçıрма şu durumlarda sizi nasıl etkiliyor?	Hiç	Az	Orta	Çok
1. Ev işleri yapabilme?	0	1	2	3
2. Yürüme, yüzme, egzersiz?	0	1	2	3
3. Eğlence aktivitelerine (film gibi)	0	1	2	3
4. Araba ile 30 dak.dan fazla seyahat?	0	1	2	3
5. Ev dışı sosyal aktivitelere katılım?	0	1	2	3
6. Ruh sağlığı (sinirlilik, depresyon)?	0	1	2	3
7. Engellenme hissi?	0	1	2	3
8.				

APPENDIX 6: THE EURO QUALITY OF LIFE SCALE (EQ-5D-3L)

EQ-5D-3L Genel Yaşam Kalitesi Ölçeği (1990 EuroQol Group EQ-5D-3L)

Hastanın Adı Soyadı: _____

Tarih: ____/____/____

Size en çok uyan ifadeye çarpı işareti koyun

A - Hareket

- ☐₁ Yürürken, hiç bir güçlük çekmiyorum
- ☐₂ Yürürken bazı güçlüklerim oluyor
- ☐₃ Yatalağım

B - Öz-bakım

- ☐₁ Kendime bakmakta güçlük çekmiyorum
- ☐₂ Kendi kendime yıkanırken veya giyinirken bazı güçlüklerim oluyor
- ☐₃ Kendi kendime yıkanacak veya giyinebilecek durumda değilim

C - Olağan aktiviteler (örneğin, iş, ders çalışma, ev işleri, aile içi veya boş zaman faaliyetleri)

- ☐₁ Olağan işlerimi yaparken herhangi bir güçlük çekmiyorum
- ☐₂ Olağan işlerimi yaparken bazı güçlüklerim oluyor
- ☐₃ Olağan işlerimi yapabilecek durumda değilim.

D - Ağrı / rahatsızlık

- ☐₁ Ağrı veya rahatsızlığım yok
- ☐₂ Orta derecede ağrı veya rahatsızlığım var
- ☐₃ Aşırı derecede ağrı veya rahatsızlığım var

E - Anksiyete/Depresyon

- ☐₁ Endişeli veya moral bozukluğu içinde değilim
- ☐₂ Orta derecede endişeliyim veya moralim bozuk
- ☐₃ Aşırı derecede endişeliyim veya moralim çok bozuk

Bugünkü sağlık durumunuzu bize kolayca belirtmeniz için hemen aşağıya termometreye benzer bir ölçek çizdik. Sağlık durumunuz mükemmel ise 100'ü çok çok kötü ise de 0'ı işaretleyecek şekilde bugünkü sağlık durumunuzun nasıl olduğunu belirtecek şekilde çizgi çizmenizi istiyoruz.



1990 EuroQol Group EQ-5D™

**APPENDIX 7: THE INCONTINENCE QUALITY OF LIFE (I-QOL)
QUESTIONNAIRE**

İNKONTİNANS YAŞAM KALİTESİ ÖLÇEĞİ (I-QOL)	Çok	Fazla	Orduka	Ortadüzeyde	Biraz	Hiç
1.Zamanında tuvalete yetişememe endişesi duyuyorum.	☐	☐	☐	☐	☐	☐
2.Öksürürken ve hapşırıırken endişeleniyorum.	☐	☐	☐	☐	☐	☐
3.Oturduktan sonra ayağa kalkarken, dikkatli olmam gerekiyor.	☐	☐	☐	☐	☐	☐
4.İlk kez gittiğim yerlerde tuvaletlerin nerede olduğu ile ilgili endişe yaşıyorum.	☐	☐	☐	☐	☐	☐
5.Kendimi bunalımda (depresif) hissediyorum.	☐	☐	☐	☐	☐	☐
6.Kendimi evimden uzun süre ayrılabilecek kadar özgür hissetmiyorum.	☐	☐	☐	☐	☐	☐
7.İdrar kaçırma sorunum yapmak istediklerimi engellediği için, hayal kırıklığı yaşıyorum.	☐	☐	☐	☐	☐	☐
8.Başkaları bende idrar kokusu alacak diye endişe yaşıyorum.	☐	☐	☐	☐	☐	☐
9.İdrar kaçırma sorunum sürekli kafamı meşgul ediyor.	☐	☐	☐	☐	☐	☐
10.Tuvalete sık gidip gelmek benim için gereklidir.	☐	☐	☐	☐	☐	☐
11.İdrar kaçırmamdan dolayı, her ayrıntıya önceden planlamam gerekiyor.	☐	☐	☐	☐	☐	☐
12.Yaşlandıkça idrar sorunumun daha da kötüleşmesinden endişe duyuyorum.	☐	☐	☐	☐	☐	☐
13.Geceleri iyi uyumakta zorluk çekiyorum.	☐	☐	☐	☐	☐	☐
14.İdrar kaçırmamdan dolayı utanma ya da küçük düşme endişesi yaşıyorum.	☐	☐	☐	☐	☐	☐
15.İdrar kaçırma sorunum bana sağlıklı bir insan olmadığım hissini veriyor.	☐	☐	☐	☐	☐	☐
16.İdrar kaçırma sorunum benim kendimi çaresiz hissetmeme yol açıyor.	☐	☐	☐	☐	☐	☐
17.İdrar kaçırma sorunumdan dolayı, hayattan daha az zevk alıyorum.	☐	☐	☐	☐	☐	☐
18.Altımı ıslatacağım diye endişe yaşıyorum.	☐	☐	☐	☐	☐	☐
19.İdrar kesemi kontrol edemiyormuşum gibi hissediyorum.	☐	☐	☐	☐	☐	☐
20.İçtiklerimi takip etmek zorundayım.	☐	☐	☐	☐	☐	☐
21.İdrar kaçırma sorunum giysi seçimimi sınırlıyor.	☐	☐	☐	☐	☐	☐
22.Cinsel ilişkiye girmekten endişe duyuyorum.	☐	☐	☐	☐	☐	☐

APPENDIX 8: COITAL INCONTINENCE QUESTIONNAIRE (CIQ)

CİNSEL İLİŞKİ İLE İLİŞKİLİ İDRAR KAÇIRMASI SORGULAMASI

(----/--/- ---)

Aşağıdaki soruları son 3 aylık cinsel yaşantınızı düşünerek cevaplayınız.
Cevaplardan size en uygun olanını işaretleyiniz.

1) Cinsel ilişki ile ne kadar idrar kaçıırıyorsunuz? (Bir sayıyı yuvarlak içine alınız)

Hiç	0
Az miktarda	1
Orta derecede	2
Çok miktarda	3

2) Tüm cinsel ilişkilerinizin ne kadarında idrar kaçıırıyorsunuz? (Bir sayıyı yuvarlak içine alınız)

Hiçbirinde	0
Yarısından azında	1
Yarısında	2
Yarısından fazlasında	3
Hepsinde	4

3) Cinsel ilişki ile idrar kaçırmamız cinsel yaşamınızı ne kadar etkiliyor? (Bir sayıyı yuvarlak içine alınız)

Hiç	0
Az miktarda	1
Orta derecede	2
Çok fazla	3

4) Cinsel ilişki ile idrar kaçırmamız eşinizle olan ilişkinizi ne kadar etkiliyor? (Bir sayıyı yuvarlak içine alınız)

Hiç	0
Az miktarda	1
Orta derecede	2
Çok fazla	3

5) Cinsel ilişki ile idrar kaçırmamız böyle devam ederse kendinizi nasıl hissedersiniz?

İyi	0
Ne iyi ne kötü	1
Kötü	2

6) Cinsel ilişki ile idrar kaçırmanızdan dolayı utanma, çekinme, korku, iğrenme ya da suçluluk vb. gibi herhangi bir olumsuz duygu yaşıyor musunuz? (Bir sayıyı yuvarlak içine alınız)

Hiçbir şekilde	0
Az miktarda	1
Orta derecede	2
Çok fazla	3

7) Cinsel ilişki ile idrar kaçırmanız ile ilgili olarak aşağıdakilerden sizin durumunuza uygun olanların hepsini işaretleyiniz?

a.Cinsel ilişki esnasında idrar kaçırmıyorum	Hayır 0	Evet 1
b.Eşim haznemdeyken idrar kaçıyorum	Hayır 0	Evet 1
c.Cinsel ilişki esnasında orgazm olurken (tatmin olurken) idrar kaçıyorum	Hayır 0	Evet 1
d.Kendi kendime tatmin olurken (mastürbasyon) idrar kaçıyorum	Hayır 0	Evet 1
e.Ön sevişme esnasında idrar kaçıyorum	Hayır 0	Evet 1

8) Cinsel ilişki esnasındaki idrar kaçırmamız cinsel ilişki pozisyonu ile ilişkili midir?

a.Cinsel ilişki esnasında idrar kaçırmıyorum	Hayır 0	Evet 1
b. Cinsel ilişkide tüm pozisyonlarda idrar kaçıyorum	Hayır 0	Evet 1
c.Cinsel ilişkide eşim üstteyken idrar kaçıyorum	Hayır 0	Evet 1
d.Cinsel ilişkide ben üstteyken idrar kaçıyorum	Hayır 0	Evet 1
e.Cinsel ilişkide eşim sırt tarafımdayken idrar kaçıyorum	Hayır 0	Evet 1
f.Cinsel ilişkide diğer pozisyonlarda idrar kaçıyorum	Hayır 0	Evet 1

9) Cinsel ilişki esnasında idrar kaçırmamak için bir önlem alıyor musunuz?

a.Cinsel ilişki esnasında idrar kaçırmıyorum	Hayır 0	Evet 1
b.Cinsel ilişki esnasında idrar kaçıyorum ama bir önlem almıyorum	Hayır 0	Evet 1
c.Cinsel ilişkinin hemen öncesinde idrar yapıyorum	Hayır 0	Evet 1
d.Cinsel ilişki esnasında kendimi sıkıyorum	Hayır 0	Evet 1
e.Cinsel ilişkiden kaçınıyorum	Hayır 0	Evet 1

APPENDIX 9: PELVIC FLOOR MUSCLE (PFM) STRENGTH MEASUREMENT

Modifiye Oxford skalası

<u>Evre</u>	<u>Tanım</u>
0	Yok
1	< 1sn kontr
2	1-3sn kontr parm elevØ
3	4-6sn kontr parm elev
4	7-9sn kontr 3 tekrar
5	9-10sn elev hızlı kontr 4 kez

Perinenin yukarıya doğru hareketi egzersizin doğru yapıldığına dair **"gold standard"** kabul edilmektedir

Newman DK, Health Professions Press 2002

PELVİK TABAN KAS KUVVETİ ÖLÇÜMÜ

MOS: 5/4/3/2/1/0

APPENDIX 10: CURRICULUM VITAE

FZT. Asena ZİNCAP

Kişisel Bilgiler

Doğum Tarihi :
Medeni Hali :
Cinsiyet :
GSM
Adres :

Eğitim Bilgileri

Yeditepe Üniversitesi-Fizik Tedavi ve Rehabilitasyon (%100 İngilizce), AYDIN – Aydın
Anadolu Lisesi (2014 mezun)

Not Ortalaması 2.54

Sayın yetkili,

Lenf ödem terapisi, sağlık için egzersiz dersleri lisans döneminde aldım. Şu anda Yeditepe Üniversitesi Genel Fizyoterapi ve Rehabilitasyon üzerine yüksek lisans yapmaktayım, (tez dönemindeyim). Pilates ve Kadın Sağlığında Fizyoterapi ile ilgileniyorum. Kendimi bu alanlarda geliştirmekteyim. Kendime ait aracım var ulaşımı rahat sağlayabiliyorum. Hastalarla iletişimim iyi olup takım arkadaşlarımla iyi geçinen biriyim.

Saygılarımla.

Yabancı Dil

İngilizce

Staj Deneyimleri

17 Nisan 2019- 10 Mayıs 2019- Özel Ümraniye Aktif Tıp Merkezi
13 Mart 2019- 12 Nisan 2019- Koşuyolu Özel Eğitim ve Rehabilitasyon Merkezi
6 Şubat 2019- 8 Mart 2019 -Yeditepe Üniversitesi Hastanesi Bağdat Polikliniği
5 Aralık 2018- 28 Aralık 2018 -Tuzla Devlet Hastanesi
31 Ekim 2018- 30 Kasım 2018 -Sultanbeyli Devlet Hastanesi
26 Eylül 2018- 26 Ekim 2018 -Fatih Sultan Mehmet Eğitim ve Araştırma Hastanesi
2 Temmuz 2018- 27 Temmuz 2018- Sportomed Fizik Tedavi ve Rehabilitasyon Merkezi
3 Temmuz 2017-28 Temmuz 2017- Ege Üniversitesi Tıp Fakültesi Hastanesi

İş Deneyimleri

21 Mart 2022- -Sportscareclinic
1Eylül2021 -1Kasım 2021- Fizyorem Fizik Tedavi
8 Mart 2021-1 Eylül 2021- Fitside Wellness
18 Ekim2020-22şubat 2021- G therapy Ataşehir
10 Aralık 2019-18 Ekim 2020 – Ataşehir Pilates

Kurs ve Sertifikalar

5-15 Kasım 2019 – 1.KADEME PİLATES EĞİTMENLİĞİ (TÜRKİYE CİMNASTİK FEDERASYONU)
20- 21 Eylül 2018- AC-OMT DRY NEEDLING
20 Eylül 2018 -AC-OMT CUPPING AND HIRUDOTHERAPY
19 Eylül 2018- AC-OMT OSTEOPATHIC KINESIOLOGIC TAPING
17-18 Eylül 2018 -AC-OMT OSTEOPATHIC MANUAL THERAPY
13-14 Eylül 2018- AC-OMT CRANIOSACRAL THERAPY
11-12 Eylül 2018- AC-OMT WEST ACUPUNCTURE
11-12 Eylül 2018- AC-OMT REFLEXOLOGY
18 Ekim 2020 – G THERAPY TERAPİSTLİK EĞİTİMİ
18-19 Eylül 2021-ÜROJİNEKOLOJİK REHABİLİTASYON EĞİTİMİ

-İstanbul Fizyoterapi ve Rehabilitasyon Zirvesi Katılım Sertifikası (15.12.2018)

- Osteopati ve Fizyoterapideki Yeri
- Kadın Sağlığı ve Klinik Pilates

- Fizik Tedavide Tamamlayıcı Tıp Uygulamalarının Yeri
- Manuel Terapi
- Sporcularda Görülen Kas Lezyonları, Koruyucu Rehabilitasyon ve Sahaya Dönüş
- Sayorg Kariyer Kongresi Katılım Sertifikası (22 Nisan 2017)
- Yeditepe Üniversitesi 8 Nisan Fizyoterapistler Günü Sempozyumu Katılım Belgesi (6 Nisan 2017)
- Yeditepe Üniversitesi "Sporcu Yaralanmaları Paneli " Katılım Belgesi (7 Mart 2017)
- Fonksiyonel Egzersiz 101 Katılım Sertifikası 30 Mart 2021
- Fonksiyonel Egzersizin Temel İlkeleri,Motor Kontrol Nedir?
- Squatlar,Lungelar,Deadliftler Ve Eğitim Stratejileri
- Mobilitte:Üç Boyutlu Mobilitte Ve Germeler,Düzeltici Germeler,Kinetik Zincir Esnekliği,İple Germeler
- Stabilite:Abdominal Fasilitasyon Teknikleri,Reaktif Core İle Kuvvet Ve Güç Üretimi
- Fonksiyonel Düzeltme Stratejileri
- Kuvvet Eğitimleri
- Spora Özgü Fonksiyonel Egzersizler
- Bölgesel Fonksiyonel Egzersizler
- Kan Akışı Kısıtlı Fonksiyonel Egzersizler
- Skolyopilates Kombine Fonksiyonel Egzersizler-1
- Skolyopilates Kombine Fonksiyonel Egzersizler-2

Lisans Bitirme Tezi

"Spesifik Olmayan Bel Ağrısı Olan Bireyler Üzerinde Sakroiliak Eklem Manipulasyonu ve Kinesio Bantlama'nın Etkisi ve Karşılaştırılması"

Dernek ve Kulüp Üyelikleri

- Yeditepe Üniversitesi - Sağlık kulübü (SANİTAS)
- Yeditepe Üniversitesi- Hayalimi Paylaş Kulübü

İlgi Alanları

Yöneticilik, etkili konuşma, organizasyon, pilates yapmak, keman çalmak, gitar çalmak, yeni yerler keşfetmek.

Referanslar

Prof. Dr. Feryal Subaşı Yeditepe Üniversitesi / Fizyoterapi ve Rehabilitasyon Bölüm Başkanı

Prof. Dr. Ali Cımbız Fizyoterapist

Uzman. Fzt. Gülsün Gürel Fizyoterapist