

## Case Report



## Investigating the Effects of Manual Therapy and Pelvic Floor Training on Erectile Dysfunction: A Case Study

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*Department of Physical Therapy, Physiotherapy Research Center, School of Rehabilitation, Shahid Beheshti University of Medical Sciences, Tehran, Iran.***Citation** Afshar Safavi M, Niknam H, Okhovatian F, Roostayi MM. Investigating the Effects of Manual Therapy and Pelvic Floor Training on Erectile Dysfunction: A Case Study. 2024; 18(3):392-398. <http://dx.doi.org/10.18502/jmr.v18i3.16426> <http://dx.doi.org/10.18502/jmr.v18i3.16426>**Article info:****Received:** 31 Aug 2023**Accepted:** 30 Oct 2023**Available Online:** 01 Jul 2024**Keywords:**Erectile dysfunction (ED);  
Prostate; Aging; Type 2  
diabetes; Massage; Exercise**ABSTRACT****Introduction:** Erectile dysfunction (ED) is a common issue in men, often associated with various factors, such as obesity, diabetes, and more. This case study examines the impact of friction massage combined with pelvic floor exercises on ED in three patients, linked to prostatic adenectomy, aging, and diabetes.**Case Description:** Patients followed a one-month regimen of pelvic floor exercises and techniques. The technique's progress was monitored via video calls twice a week. Exercises lasted for 10 min daily, along with a 10-min massage. We assessed improvement using the international index of erectile function 15 (IIEF15) questionnaire and erection hardness score (EHS), as well as ultrasound scans.**Results:** Following treatment, all three patients showed increased EHS and IIEF15 scores. Muscular thickness increased in the ischiocavernosus and bulbospongiosus muscles, while the cavernosal artery exhibited higher systolic velocity and lower diastolic velocity, although maximum blood flow velocity in the posterior vein decreased. Treatment had the most significant impact on the adenectomy patient, followed by the elderly patient and then the diabetic patient.**Conclusion:** Combining friction massage and pelvic floor exercises led to improved erection-related indicators and increased patient satisfaction.**\* Corresponding Author:****Mohammad Mohsen Roostayi, Associate Professor.***Address: Department of Physical Therapy, Physiotherapy Research Center, School of Rehabilitation, Shahid Beheshti University of Medical Sciences, Tehran, Iran.**Tel: +98 (912) 1597349**E-mail: [roosta@sbmu.ac.ir](mailto:roosta@sbmu.ac.ir)*Copyright © 2024 Tehran University of Medical Sciences. Published by Tehran University of Medical Sciences  
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## Introduction

**E**rectile dysfunction (ED) is defined as the inability to achieve and maintain a sufficient erection to permit satisfactory sexual intercourse [1]. Several factors cause ED, such as aging, obesity, type 1 and 2 diabetes, various cardiovascular diseases, rheumatic diseases, such as myositis, pudendal nerve entrapment, back pain, pelvic pain, cramps and trigger points in the thigh area, and various surgeries in the pelvic area [2].

So far, various treatments have been used to treat ED which includes physiotherapy and non-physiotherapy treatment, non-physiotherapy methods, such as the use of stem cells [3] medication [4], and surgery [5]. Physiotherapy treatments have also been performed; for example, Taniguchi et al. (2014) in a case-control study examined the effect of acupuncture on ED in diabetic men who did not respond to sildenafil [6]. Porta et al. (2012), in a single-blind clinical trial study, examined the effect of biofeedback on ED in men after prostatectomy [7]. Shendy et al. (2015) investigated the effect of trans-cutaneous electrical nerve stimulation (TENS) in patients with ED due to incomplete spinal cord injury [8]. Fojecki et al. (2017), in a double-blind clinical trial, investigated the effect of low-power shockwave on idiopathic ED [9]. Also, Dorey et al. (2005), in a clinical trial study, examined the effect of pelvic floor exercises on idiopathic ED [10].

Diabetes is a metabolic disease characterized by elevated blood sugar due to defects in insulin secretion, insulin action, or both. As a result, the amount of glucose in the blood increases while the cells are starved [11]. Uncontrolled diabetes can eventually lead to other health problems, such as vision loss, nephropathy, neuropathy, and sexual dysfunction [12]. Damage to the penile nerves causes ED.

Aging reduces the elasticity of penile tissues and blood vessels [13]. Also, due to the inactivity of ischiocavernosus and bulbospongiosus muscles, they become weak and atrophy [14]. After the lack of erection, sexual desire also decreases and this phenomenon enters a vicious cycle. Accordingly, this vicious cycle must be stopped [15].

Prostate surgery, like any other surgery, can affect the surrounding myofascial system [16]. Pain and complications after this surgery cause the atrophy of pelvic floor muscles and adhesion in the fascia tissue around these muscles [17]. These atrophy and pain cause dysfunction of the ischiocavernosus and bulbospongiosus muscles.

Since the contraction of the ischiocavernosus muscle causes more blood to enter the cavernosal artery and the contraction of the anterior fibers of the bulbospongiosus muscle blocks the way of blood return, the dysfunction of these two muscles makes it impossible to get an erection [18].

One of the therapeutic branches in physiotherapy is the field of manual therapy [19]. This type of treatment can also be used as an adjunct treatment in the discussion of ED. Based on the literature search, no study was found in which friction massage has been used to treat ED. Hence, this study focuses on the implementation of friction massage for the treatment of ED in these patients. Also, friction massage of the bulbospongiosus and ischiocavernosus has been used to treat other pelvic floor muscle disorders, such as pelvic pain with dry needling [20].

Accordingly, this study investigates the effect of friction massage with pelvic floor muscle exercises on ED in three patients secondary to prostatic adenectomy, aging, and type 2 diabetes.

## Case Description

### Chief complaint: ED

### Patients history

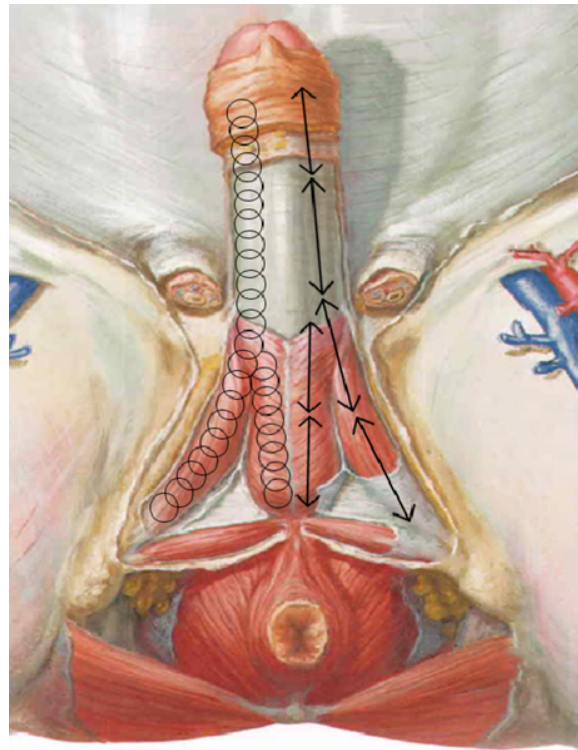
Three patients were referred to a urologist secondary to type 2 diabetes, aging, and prostatic adenectomy, with ED (Table 1). The patients were suffering from ED for six months. They did not have any history of lumbar surgery, unstable medical or psychiatric disorders, neurological diseases, chronic hematological diseases, or penile anatomical abnormalities and were non-responders to phosphodiesterase 5 Inhibitors. Diagnosing ED, the doctor referred these patients to the physiotherapy clinic.

### Case 1

The first case was A 62-year-old man affected by diabetes type 2 (HbA1c: 7.4). The patient had no history of tobacco or alcohol use and he had not undergone major surgery. He was not taking drugs and his routine blood tests, hepatitis markers, coagulation parameters, thyroid function, and chest radiography were normal.

### Case 2

The second case was a 70-year-old, married businessman with a poor erection and a dissatisfying sexual relationship with a wife for 6 months. On evaluation, a monogamous relationship with his wife presented with



**Figure 1.** Friction massage technique

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a depressive episode for the past 2 months characterized by anhedonia, sadness of mood, no refreshing sleep, and depressive ruminations.

### Case 3

The third case was a 65-year-old man who was referred to a urologist with the main complaint of urinary retention. In the investigations, the patient has no underlying diseases, such as diabetes, high blood pressure, depression, obesity, etc. Hence, according to the doctor's diagnosis, prostatic adenectomy was performed for the patient. After this operation, the patient had ED.

### Treatment plan

At first, the consent form was provided to the patients to read and sign. Then, the patients were examined and all the required information, such as age, weight, height, and gender was recorded in the file assigned to each patient. Also, the patients completed the international index of erectile function 15 (IIEF15) questionnaire and the erection hardness score (EHS). Using the image, the basic anatomy of the pelvic floor structures and how each of these structures plays a role in erection was taught to the patients. The patient's treatment consisted of two parts, manual technique and exercise therapy, which are described separately.

The friction massage technique was used on the ischiocavernosus and bulbospongiosus muscles and the spongy structure of the penis. Since the spongy structures of the penile tissue are oriented in different directions, the force must be applied in different directions so that it is applied to the structures equally, and lengthening and release occur in all directions. Therefore, by using the image, the patient is taught to hold his testicles up with one hand, and with the index finger of the other hand and massage from the origin of the chiocavernus and bulbospongiosus muscles to the end of these muscles in a circular manner and in the up and down direction. The technique should be performed at a slow speed so that it takes 10 s for the patient to draw a circle. Then releases the testicles and continues the release technique toward the end of the penis (Figure 1). The patients were told to do this technique for 10 min.

The patients perform six sets of the exercises every day in such a way that they do 10 fast contractions of the pelvic floor muscles (for 1 s) and 10 slow contractions of the pelvic floor muscles (for 10 s) with equal rest time between the contractions [10]. The patients were taught how to pull up the testicles in front of the mirror or the position of all fours. They were also taught how to retract the penis (selective strengthening of the ischiocavernosus muscle; 10 min) [10].

**Table 1.** Characteristics of patients

No.	Patients	Age (y)	Height (m)	Weight (kg)	Body Mass Index (kg/m <sup>2</sup> )
1	Diabetes	62	1.81	88	26.86
2	Aging	70	1.73	78	26.06
3	Adenectomy	65	1.64	75	27.89

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In this study, manual techniques and exercises were taught by one person, and data analysis of the EHS index and IIEF-15 questionnaire was done by another person.

### Outcome measures

There were two main groups of outcome measures:

#### Primary outcome measures

EHS is a fundamental component of erectile function and is a very specific and easily monitored outcome. EHS is a single-item, patient-reported outcome for scoring erection hardness (0=penis does not enlarge; 1=penis is larger but not hard; 2=penis is hard but not hard enough for penetration; 3=penis is hard enough for penetration but not fully hard; 4=penis is completely hard and fully rigid. This score is valid and reliable [21].

According to IIEF-15, ED is a self-reported condition. This was assessed with the IIEF-5 score, which is the sum of the ordinal responses to the five items; thus, the score can range from five to 25. ED severity was classified into the following five categories based on the IIEF-5 scores: Severe=5–7; moderate=8–11; mild to

moderate=12–16; mild=17–21; no ED=22–25. This questionnaire is valid and reliable [22] and localized for Iranian patients. In Iran, Mehraban (2006) was involved in the standardization process of the IIEF-15 questionnaire, and the validity, sensitivity, and specificity of the Persian version of this index have been reported at 0.79, 0.88, and 0.82, respectively [23].

#### Secondary outcome measures

The secondary outcome measures include measurement of muscle thickness through simple sonography, and also investigation of penile hemodynamics through an intracavernous injection of the vasoactive drug by using the pharmacopenile duplex sonography method. All these measurements were performed using a Samsung WS80 device made in Korea with a Linear probe (7-12 MHz) with a frequency of 11 MHz, performed in two dimensions. This type of sonography is valid and reliable [12]. The parameters include the maximum thickness of ischiocavernosus and maximum thickness of bulbospongiosus which are measured by using simple sonography. For Doppler sonography, 5 mg of papaverine was injected into the patient's penis, and peak systolic velocity, end-diastolic velocity, and peak velocity of the deep dorsal vein were measured at the base of the penis.

**Table 2.** Test results

Variables	Case 1 (Diabetic)		Case 2 (Aging)		Case 3 (Adenectomy)		
	Before	After	Before	After	Before	After	
Primary outcomes	EHS score	1	2	2	4	1	3
	IIEF total score	17	33	35	55	22	45
Secondary outcomes	Max systolic velocity (cm/s)	40.13	42.74	43.03	48.25	43.24	47.39
	Min diastolic velocity (cm/s)	3.24	4.02	3.85	4.42	4.23	5.15
	Max velocity of blood flow in the posterior vein (cm/s)	3.74	3.65	3.68	3.21	3.24	2.14
	Max thickness of the ischiocavernosus	3.68	3.89	4.12	4.24	5.36	5.69
	Max thickness of the bulbospongiosus	1.85	2.14	2.68	2.90	3.27	3.84

EHS: Erection hardness score; IIEF: International index of erectile function.

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## Timeline

The patients performed these exercises and techniques every day for one month. EHS and IIEF15 indicators and ultrasound were measured once before the treatment and once after the treatment (after the final session).

EHS and IIEF15 indicators increased significantly. Also, with different ratios, the maximum systolic velocity and minimum diastolic velocity increased, the blood flow velocity in the posterior vein decreased, and the maximum thickness of the ischiocavernosus and bulbospongiosus muscles also increased (Table 2).

## Discussion

Changes in EHS and IIEF15 indices and ultrasound data indicate that the erection rate has increased in all three patients. Based on these data, the greatest effect of the treatment was observed in the adenectomy patient, then the elderly patient, and finally the diabetic patient.

To find the answer to why the greatest recovery was observed in the adenectomy patient and the least recovery was observed in the diabetic patient, we should pay attention to other influencing factors.

The disease of diabetes can affect the walls of the cells and cause them to become harder and reduce the flexibility of the structures [24], and the speed of recovery in this disease is slow because sugar does not reach the cells and they are hungry [25]. Also, diabetes has a psychological effect on patients in such a way that the sense of arousal decreases in these people [26]. Since there is probably an arterial disorder and damage to the vessel wall in a diabetic patient, it is expected that the rate of recovery in this patient is less than in an adenectomy or old age patient.

Aging probably causes the structures to become harder and reduce the elasticity of the tissues in the whole body as well as in the structures of the pelvic floor [27]. Also, aging can reduce the sense of arousal in these people [28]. Other factors can also be effective in the sexual activity of people with old age, factors, such as joint and muscle pains, reduced vision and hearing, or brain and nerve diseases [29].

One of the factors that caused a greater effect on the adenectomy patient is that in this patient, the ED was only secondary to the surgery and the patient was in a good sexual condition before the surgery.

Given that muscle fibers are surrounded by fascia, the freer the fascia around the muscles, the greater the possibility of muscle hypertrophy [30]. On the other hand, due to the adherence of the spongy tissues of the penis to the viscoelastic properties, increasing the length and opening of the spongy spaces makes it possible for more blood to enter and accumulate in these tissues [31].

Since body tissues follow viscoelastic properties, applying force can cause permanent and stable changes in body tissues due to creep properties. Based on these properties, applying force on body tissues can increase the length or return to the original length in the structures [32].

The application of friction massage technique along with pelvic floor exercises can have a greater effect on the recovery of patients than exercises alone. One of the mechanisms involved in erection is the increase of blood flow into the penile tissue and also the decrease of blood flow out of this tissue. Therefore, it is necessary to perform specific exercises for the contraction of the ischiocavernosus muscle, which causes more blood to enter, and the contraction of the anterior bulbospongiosus fibers, which prevents the outflow of more blood from the penile tissue. That is why increasing the strength of these two muscles causes an increase in blood input and a decrease in blood output [18]. On the other hand, the application of friction massage causes the release of the connective tissue around the muscle fibers and the possibility of creating more hypertrophy in the muscle is provided. Also, the strength of muscles depends on their thickness, and the looser the connective tissue around the muscle fibers, the possibility of increasing the thickness and of course increasing the strength of these muscles will improve ED [33].

## Conclusion

At the end of the 4-week program, significant changes in the sexual ability of the patients were observed, and the observation of these changes shows the effectiveness of pelvic floor muscle exercises along with friction massage in improving ED caused by prostate surgery, diabetes, or aging in these patients. According to the evidence of previous studies, training in pelvic floor exercises and manual therapy has no side effects, and it is easily possible to perform and learn pelvic floor muscle exercises with the help of a therapist. Also, pelvic floor muscle exercises are affordable and can be performed anywhere even during other activities.

### Study limitations

The limitations of this study include the impossibility of taking more patients due to the time limit for this study, the lack of qualitative studies about our subject, and not finding any study about friction massage in prostatic adenectomy for more discussion. Despite the positive results of this study, more research is needed in the future to provide evidence on the usage of different approaches of physiotherapy to manage ED in patients with prostatic adenectomy.

### Ethical Considerations

#### Compliance with ethical guidelines

This study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences (Code: IR.SBMU.RETECH.REC.1400.714).

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#### Authors' contributions

Conceptualization and study design: Mahdi Afshar, Farshad Okhovatian, and Hoda Niknam; Data interpretation: Mahdi Afshar; Drafting of the manuscript: Mahdi Afshar and Alireza Akbarzadeh; Review and editing: Mahdi Afshar and Mohammad Mohsen Roostayi.

#### Conflict of interest

The authors declared no conflict of interest.

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