

# **Research Progress on Compliance of Pelvic Floor Muscle Training in Patients with Urinary Incontinence**

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# Abstract

This study describes the status quo and related factors of compliance with pelvic floor muscle training at home and abroad, and introduces in detail the current scale of compliance with pelvic floor muscle training at home and abroad, so as to provide a reliable and scientific method for clinical medical staff to objectively evaluate pelvic floor muscle training of patients with urinary incontinence, and also provide a basis for how to improve compliance with pelvic floor muscle training.

### **Keywords**

Urinary Incontinence, Pelvic Floor Muscle Training (PFMT), Adherence, Review

# **1. Introduction**

The International Continence Society (ICS) defines urinary incontinence (UI) as: It is a phenomenon that can be objectively verified and any involuntary leakage of urine [1] [2] [3], which brings inconvenience to social activities and troubles in personal hygiene [4]. Urinary incontinence can be divided into stress incontinence, urge incontinence and mixed incontinence [5] [6]. Stress urinary incontinence is commonly seen in women with postpartum abdominal pressure increase, surgical destruction of urethral and bladder normal anatomical support, urethral and bladder dysfunction, etc. [7] [8] [9]. Urgent urinary incontinence is mainly caused by acute cystitis, acute urethritis, urinary calculus, bladder hyperactivity and other factors [10]. Mixed urinary incontinence means that symptoms of stress and urge urinary incontinence exist at the same time or cannot be simply attributed to these two types of urinary incontinence, such as unconscious urinary incontinence, persistent urinary incontinence, nocturnal enuresis, dripping after urination, filling urinary incontinence, and extraurethral urinary incontinence [5]. Urinary incontinence is not an incurable disease, and treatment can be divided into surgical treatment and non-surgical treatment. Surgical treatment includes anterior vaginal wall repair, pubic anterior vaginal wall suspension, bladder neck suspension and so on. The surgical complications include bladder and urethra injury, bleeding, infection and so on. The operation cost is high and the trauma is big. Non-surgical treatment, including strengthening pelvic floor muscle exercises and drug therapy, is an effective, affordable and safe treatment method [5] [11]. In the non-surgical treatment, pelvic floor muscle training is currently an effective rehabilitation training method for the treatment of urinary incontinence, simple, easy to perform, effective, suitable for patients to conduct autonomous training. Pelvic floor muscle training (PFMT) refers to the patient's conscious exercise on the pelvic floor muscle group (mainly the pubococcyx muscle group) [11] [12] [13]. Its effectiveness is dependent on patient compliance [14] [15]. Compliance refers to the degree to which a patient's behavior is consistent with the clinical medical advice after seeking medical treatment [16], which has been identified as an important predictor of overall effectiveness [17]. WHO points out that accurate measurement of compliance is a necessary condition for effective treatment [18]. The Pelvic Floor Gynecology Group of the Chinese Society of Obstetrics and Gynecology also pointed out that the role of pelvic floor muscle training in the prevention and treatment of urinary incontinence has been widely recognized, but because of monotonous movements and no fixed exercise mode, patients can not adhere to it well, poor training compliance and lack of training capacity, leading to poor effect [19]. Pelvic floor muscle training is an effective method to treat urinary incontinence, and its compliance is closely related to its efficacy. Therefore, it is necessary to understand the compliance status and influencing factors of pelvic floor muscle training in patients with urinary incontinence, so as to provide theoretical support and practical reference for improving patients' urinary control ability.

### 2. The Concept of Compliance

Compliance was first proposed and studied by foreign scholars. English words are "adherence", "compliance", "obedience", "concordance", "commitment", etc. [20]. In 1976, Scakett *et al.* defined compliance as "patients' behaviors consistent with doctors' opinions in terms of medication, diet and lifestyle changes" [21]. In 1979, Haynes defined compliance as "the degree to which patients comply with medical advice or treatment" [22]. In 1996, Urquhart [23] defined compliance as "the patient's actual behavior is consistent with the doctor's prescription, that is, the patient's compliance with the doctor's advice". In 2003, according to Haynes and Rand, the World Health Organization defined compliance as "the extent to which a person's behavior of taking drugs, diet, or lifestyle changes conforms to the recommendations made by medical and health personnel" [24]. Accurate measurement of compliance is essential for effective treatment [25]. "Compliance" is a medical term. In the early stage, Professor Ruan Fangfu in China translated and used this term. He proposed that medical compliance refers to the extent to which patients' behaviors are consistent with doctors' medical advice in the treatment and prevention of diseases [20]. From the modern concept of health, compliance behavior can be divided into two categories: one is patient's compliance with treatment measures; Second, in order to prevent the occurrence of diseases, health education and behavioral guidance are provided to patients, and patients' compliance with preventive measures to avoid risk factors [21].

### 3. Compliance Status of Pelvic Floor Muscle Training

Heidi [26] investigated the willingness of 169 parturient women to participate in the program of pelvic floor muscle training to prevent urinary incontinence, and the results showed that only 31% of parturient women agreed to participate and 15% of parturient women did not want to participate. Beyar et al. [27] studied the pelvic floor muscle training of 208 women with urinary incontinence for up to 5 years, and conducted a survey in the form of questionnaire. The results showed that only 132 people completed the questionnaire, among which 55 (41.6%) reported compliance, 75 (56.8%) stopped training, and 2 (1.5%) underwent surgery. Takaoka [28] recruited 116 women for a pelvic floor muscle training program in a maternity clinic in Japan, and 89 women completed the program. Under the guidance and training of the researchers, only 36 (31%) women were highly adherent to the pelvic floor muscle training. Bayat et al. [29] studied the cognition of 200 pregnant women in the third trimester of pregnancy on pelvic floor muscle training by using semi-structured interview. 175 (87.5%) believed that urinary incontinence during pregnancy was normal, 54 (27%) were familiar with pelvic floor muscle training methods, and 25 (32.05%) had consulted obstetricians for urinary incontinence problems. Twenty-one (10.5%) performed pelvic floor exercises prior to pregnancy, 14 (66.6%) continued their exercises during pregnancy, and seven (33.4%) discontinued their exercises. Several studies have shown that pelvic floor muscle training is effective in the treatment of patients with urinary incontinence, but you need to keep training for long enough to get the desired results. The survey found that the number of patients who often complied with the requirements of health care providers for standardized training was small, and the number of patients who persisted in training was small.

# 4. Domestic and Foreign Studies on the Compliance of Pelvic Floor Muscle Training

#### 4.1. Research in China

Domestic studies have reported that 88% of patients with urinary incontinence have poor compliance with rehabilitation training [30], and the starting time, process and specific program of training have not been unified, and the research on improving the compliance of rehabilitation training for patients with urinary incontinence is not in-depth enough [31] [32] [33]. Cai Shu [32] evaluated com-

pliance according to pelvic floor muscle training diaries recorded by female stress urinary incontinence patients. Patients whose average daily pelvic floor muscle training time was  $\geq$  30 min were considered to have good compliance with pelvic floor muscle training < 30 minutes, as poor compliance. Yang Zhilan [30] conducted a compliance survey on elderly rural female patients with urinary incontinence by using a self-designed questionnaire, referring to the design of five questions to evaluate the compliance of pelvic floor muscle training for elderly women with urinary incontinence. "No" to all five questions means good compliance, otherwise it means poor compliance. Fan Guorong [33] used the self-designed functional training compliance evaluation table to evaluate patients with postpartum urinary incontinence, which was divided into three categories: complete compliance, partial compliance and non-compliance. Complete compliance: patients take the initiative to train on time and in quantity and complete the prescribed movements; Partial compliance: patients need nurses or family members to supervise and check to complete the prescribed actions; Non-compliance: The patient does not follow the training plan or reduces or increases the amount of training on his own.

#### 4.2. Research in Other Countries

According to foreign literature [34] [35] [36], the compliance of rehabilitation training is very important, but the compliance of training is low. Except for limited studies on women with urinary incontinence, there is little literature on most study populations, and few strategy studies and experiments comparing compliance strategies. Fitz et al. [37] used the results of training diaries to monitor the compliance of pelvic floor muscle training. 72 incontinence women were randomly divided into the control group and the observation group. Taking 30 days a month as an example, there are 3 groups of training every day, excluding the outpatient period, 8 groups of training every month, a total of 82 groups of training. If the training can be achieved, it indicates good compliance. Sacomori et al. [38] found that 86 women with stress, emergency, or mixed urinary incontinence received 3 separate rehabilitation sessions and 2 months of home pelvic floor muscle training on days 0, 15, and 30, respectively. The experimental group also received interventions to improve self-efficacy, including structured discussions of achievements and goals, nine-minute video evaluations and reminders. Compliance was assessed with structured questionnaires at 15, 30, and 90 days after the intervention. Figueiredo et al. [39] recruited 90 women for a clinical trial of pelvic floor muscle training. Under the guidance of rehabilitation therapists, these women received instructions on the anatomical site and function of pelvic floor muscles, as well as how to correctly contract, relax and train pelvic floor muscles. 12 sessions of pelvic floor muscle training were performed, each session lasted 30 minutes, and training records were made. The number of days of training was recorded, and training compliance was monitored according to the records.

# 5. Intervention Study on Improving the Compliance of Rehabilitation Training for Patients with Urinary Incontinence

# 5.1. Intervention Study on Improving Compliance of Rehabilitation Training for Domestic Patients with Urinary Incontinence

Yang Zhilan [30] [31] *et al.* improved patients' sense of self-efficacy, strengthened patients' cognition of urinary incontinence, increased patients' confidence in pelvic floor muscle training, and then improved patients' compliance with pelvic floor muscle training by setting goals, adjusting patients' emotions, sharing successful experience, follow-up supervision, and recording urine diary, etc. Wang Ailan [40] *et al.* made use of the "Staida" group function in the "Staida" APP to let puerpera punch in after each training and exchange training experience with each other. Nurses answered questions in the training process online, pushed relevant knowledge according to the training progress, checked and reminded those who did not punch in daily, so as to enhance patients' training compliance. Wang Li *et al.* [41] adopted individualized cross-theoretical model visit nursing form to promote behavioral change of incontinence puerperas, assess whether puerperas are willing to adopt new behaviors, and provide individualized guidance, which significantly improved the compliance of pelvic floor muscle training for puerperas.

## 5.2. Intervention Study on Improving Compliance of Rehabilitation Training for Foreign Patients with Urinary Incontinence

Asklund [42] used mobile phone APP to remind female patients with urinary incontinence to complete pelvic floor muscle training, and the close contact with mobile phone could reduce the embarrassment of female patients. App features such as reminders and visual charts are more conducive to supporting and motivating women with urinary incontinence to complete pelvic floor muscle training. Sacomori [43] used a conference format, organized by rehabilitation therapists, in which incontinence patients participated in meetings on the knowledge of pelvic floor muscle training, as well as educational methods through the distribution of home pelvic floor muscle training manuals, and the whole process was unsupervised. A subsequent assessment found improved training compliance. In the study of Hoff [44], patients with urinary incontinence were instructed by rehabilitation therapists to conduct pelvic floor muscle training for a period of 6 months, including personal strength training and daily family training, and the training compliance was significant.

# 6. Factors Influencing the Compliance of Pelvic Floor Muscle Training

Scholars [45]-[52] believe that the degree of attention to disease, education, age, severity of urinary incontinence, memory, cognitive deficiency, behavioral support and lack of professional supervision all affect the compliance of patients

with pelvic floor muscle training. The effect of urinary incontinence pelvic floor muscle training compliance, Yang Ziying [45] and other studies believe that women with stress urinary incontinence after treatment, part of the light leakage of urine incontinence patients quickly relieve symptoms, thought it was a cure, to give up further treatment and pelvic floor muscle training, muscle after a period of time to drop, leakage symptoms will relapse; And with the increase of age, leakage symptoms will become more serious. Liu Yanhui [46] *et al.* found that the level of education directly affected the effect of health education and compliance behavior of patients, and patients' lack of knowledge and understanding affected the compliance of patients with bladder function rehabilitation training.

The influence of age factors on the compliance of pelvic floor muscle training for urinary incontinence, Tibaek *et al.* [47] investigated the pelvic floor muscle function level of 757 women with pelvic floor dysfunction and found that 70% of the patients could not normally perform voluntary pelvic floor muscle contraction. At the same time, the patient's memory and comprehension decreased, and he could not cooperate well with the instructor to complete the exercise as planned.

The influence of disease severity on the compliance of pelvic floor muscle training for urinary incontinence, Alewijnse *et al.* [48] showed that the frequency of urinary incontinence attacks during and after treatment was related to the compliance of pelvic floor muscle training during follow-up, and the more severe the patient's condition, the higher the compliance of pelvic floor muscle training.

Borello France et al. [49] investigated 146 incontinence patients who only received behavioral intervention and analyzed the influencing factors of exercise compliance during the supervised treatment period, 3 months and 12 months later, and found that many female incontinence patients reduced the frequency of pelvic floor muscle training over time. The influence of insufficient cognition on the compliance of pelvic floor muscle training, Pelaez et al. [50] believed that because incontinence patients did not know enough about pelvic floor muscle training and did not know enough about the importance of pelvic floor muscle training, most patients could not correctly grasp the pelvic floor muscle training methods, so that the training compliance was low. Behavior support in the effect of pelvic floor muscle training compliance, ying white [51] and so on through the theory of behavior change intervention in 100 patients with urinary incontinence, according to the behavior of the patients with urinary incontinence change requirements, provide targeted in the process of behavior change the behavior of the support, help patients to change or establish healthy behavior, found that in the control group patients with pelvic floor muscle training compliance is low. Lack of professional supervision and the effect of pelvic floor muscle training compliance, Lanhong Xia [52] Gongqie Chu studied 65 examples patients, such as hospital found that most patients with pelvic floor muscle training on their own that occupy the home, because of the lack of the supervision and guidance of nursing and rehabilitation therapists, unable to perform according to the scheduled training requirements, compliance is not high, can't reach the expected effect.

# 7. Evaluation Tool for Compliance of Urinary Incontinence Rehabilitation Training

In 2004, Chen [53] developed a self-efficacy scale for pelvic floor muscle training, which quantified the frequency, time and self-score of pelvic floor muscle training. The scale has 17 items and consists of two dimensions: confidence in pelvic floor muscle exercise and its efficacy, and confidence in overcoming obstacles to pelvic floor muscle exercise. Each item was scored on a 5-point scale, with a total score of 85 points. The higher the score, the higher the patient's self-efficacy level is and the greater the self-confidence is. A score between 34 and 68 is considered as poor self-efficacy; a score between 34 and 68 is considered as average self-efficacy; and a score between 68 and 68 is considered as good self-efficacy. Cronbach showed that Sa was 0.95, which showed good internal consistency and high correlation validity of criteria. Studies have pointed out that the self-efficacy mediation will directly or indirectly affect the training compliance, but this scale did not quantify the training compliance of patients. In 2013, Sacomori [54] developed a self-efficacy table for pelvic floor muscle training, which used graded scoring to evaluate the self-efficacy of pelvic floor muscle training and the compliance of women's pelvic floor muscle training. It is composed of 17 items, each item is 10 grades, each item score is 0 - 100 points, all items are positive points, the total score is 0 - 1700 points, the higher the total score, the better the self-efficacy of pelvic floor muscle training. Cronbach showed that  $S\alpha$  was 0.923. Although the scale also has 17 items, there are 4 items that mention continuous practice and focus more on the study and measurement of compliance, which is different from the contents of the scale developed by Chen.In 2016, Porta [55] modified Morisky's medication compliance questionnaire by replacing the word "taking medication" in each of the four questions of Morisky's questionnaire with "performing pelvic floor muscle training" in the original questionnaire to measure the adherence to pelvic floor muscle training in 70 patients with urinary incontinence. The question is: 1) Have you ever forgotten to do your pelvic floor muscle exercises? 2) Do you do pelvic floor exercises on schedule? 3) Do you stop doing pelvic floor exercises when you feel better? 4) Do you stop doing pelvic floor muscle exercises when you feel worse? Since this questionnaire has not been tested for reliability and validity after improvement, and the items are too few, patient compliance cannot be accurately measured.

Compliance of urinary incontinence rehabilitation training: 1) Pelvis floor muscle exercise (PFMT), which believes that the pubococcygeus muscle can be effectively treated by active self-contraction and anal relaxation through the synergism of intestinal tract, urinary tract and reproductive tract; 2) The traditional anal movement, contraction of the anus this health care method in our country has a long history of more than two thousand years. It is mainly used for the daily maintenance of room health care and life prolongation, and then used in the treatment of diseases such as spermatorrhea and enuresis. Its specific exercise method is: in shrink, relax anus while, cooperate deep inhale, slow exhale, maintain calm, concentrate idea at umbilical and umbilical lower part; 3) Whole Postural Rebuilding Movement (GPR). The theoretical basis of GPR is the muscle chain theory, which believes that human muscles can form muscle chains through muscle overlap and mutual connection between aponeurosis. The distribution of tension in the muscle chain enables the muscle to resist gravity, maintain posture stability, and keep the body upright; 4) Yoga, as a time-honored ancient Indian physical strengthening technique, attaches great importance to the unity of body and mind. It is a sport with obvious physical and psychological interaction. Yoga adjusts the nervous and endocrine systems through asanas, breathing exercises and consciousness meditation, so as to maintain balance inside and outside the body; 5) Interrupt urination training. Interrupt urination method is a method to relieve urinary incontinence by instructing patients to consciously contract pelvic floor muscles during urination to interrupt urination. Through the urination interruption method training, patients with urinary incontinence can enhance the self-control of urination, in laughter, cough and other abdominal pressure suddenly increased before the conscious contraction of pelvic floor muscles, to reduce incontinence. Successful interruption of urination in patients can, on the one hand, help patients correctly contract the pelvic floor muscles; on the other hand, it can improve the muscle strength of urethral sphincter in the continuous control and interruption of urination training, and gradually make patients close to normal urination.

# 8. Summary

To sum up, the incidence of urinary incontinence is high at home and abroad, which seriously affects the quality of life of patients. Pelvic floor muscle training is an important measure for the treatment of urinary incontinence, and compliance is an important factor for the treatment effect. However, studies have found that patients with urinary incontinence have poor compliance with pelvic floor muscle training. The compliance of pelvic floor muscle training is affected by many factors, including the degree of attention to disease, education, age, severity of urinary incontinence, memory, cognitive deficiency, behavioral support, lack of professional supervision, etc. Correct pelvic floor muscle training method can effectively promote the recovery of pelvic floor function. There are many ways to improve the compliance of pelvic floor muscle training for patients with urinary incontinence at home and abroad, such as improving patients' sense of self-efficacy, adopting the way of meeting, professional guidance, cross-theoretical model individualized visit nursing form, modern information tools, etc., but there is no unified method or model. Now about incontinence patients of pelvic floor muscle training compliance evaluation tool is the use of self-made questionnaires or scales, self-efficacy evaluation, improvement of other compliance questionnaires to evaluate compliance, and failing to report its self-evaluation of the reliability and validity, has not yet found the scientific, objective and has good reliability and validity of evaluation tools. In order to obtain a good training effect, effectively improve the urine control ability of patients with urinary incontinence, and improve the quality of life of patients, how to accurately measure compliance and how to improve the compliance of patients with urinary incontinence rehabilitation training is worth exploring and studying.

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## **Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

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