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Current Situation of Pelvic Floor Muscle Rehabilitation for Women after Childbirth

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Abstract. During pregnancy, as the fetus grows, the pelvic ligaments and muscles of the female are overly stretched. During childbirth, the pelvic floor tissue expands and the tension of the pelvic floor muscles decreases, leading to functional disorders. Therefore, the repair of the pelvic floor muscles after childbirth has become the main recovery target for women after giving birth. The core rehabilitation goal is to restore the function of the pelvic floor muscles in supporting organs. This article starts from the anatomical structure changes of the pelvic floor muscles during pregnancy and childbirth, analyzes and summarizes the damage suffered by the pelvic floor muscles and their nerves during this process, and elaborates on the methods of pelvic floor muscle repair and care after childbirth, as well as compares different methods in terms of learning difficulty, required time, and operability, providing a reference basis for postpartum recovery for women. The main rehabilitation methods involved in this article include Kegel exercises, pelvic floor repair devices, electrical stimulation, and methods such as Pilates and yoga. This article only discusses the above non-surgical methods.

Keywords: Post-birth Recovery, Nursing, Exercise Rehabilitation

1. Introduction

Female pelvic floor muscle dysfunction disorders (PFD) have become one of the significant issues affecting the physical and mental health of postpartum women. Their clinical manifestations are diverse, including pelvic organ prolapse and stress urinary incontinence, as well as chronic pelvic pain, fecal incontinence, and other symptoms. These clinical symptoms significantly reduce the quality of life of postpartum women [1]. According to epidemiological surveys, PFD has been listed as one of the top five chronic diseases affecting the quality of life of postpartum women, and its harm cannot be ignored [2]. It is estimated that the prevalence of urinary incontinence among adult Chinese women is approximately 16%, and the risk increases with the number of pregnancies and age [3]. However, although about 52.7% of postpartum women are aware of the related symptoms of pelvic floor dysfunction, due to a lack of correct understanding of pelvic floor rehabilitation, no professional diagnosis, and some women's sense of shame regarding the symptoms they have experienced, the proportion of those who ultimately choose to receive formal treatment is only 10.1% [3].

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Pregnancy and childbirth are the main causes of PFD. During pregnancy, as the fetus gradually increases in size, the abdominal pressure of pregnant women continues to rise, and the pelvic floor muscle group remains in an over-stretched state for a long time; during childbirth, the pelvic floor tissue further expands, and even may have varying degrees of lacerations, resulting in damage to the pelvic floor muscles and nerve functions [4]. Even if a cesarean section is chosen, the changes in hormone levels during pregnancy and weight gain also have an impact on the pelvic floor structure [5]. Therefore, regardless of the mode of delivery, pelvic floor muscle rehabilitation is indispensable in the overall rehabilitation process.

In recent years, with the development of rehabilitation medicine, there are diverse methods for postpartum pelvic floor muscle repair, including Kegel exercises, combined training of biofeedback electrical stimulation, and Prenatil combined with yoga [6]. Each method has its own characteristics in terms of operation methods, applicable populations, rehabilitation effects, and implementation convenience, providing more choices for postpartum women while also bringing difficulties in selection. Therefore, introducing and comparing the advantages and disadvantages of different rehabilitation methods, and then combining them with the individual conditions and rehabilitation needs of postpartum women to propose suggestions, is of great significance.

This article analyzes three non-surgical rehabilitation methods: Kegel exercises, combined training of biofeedback electrical stimulation, and Prenatil combined with yoga, through a literature review method. It conducts a comprehensive comparison from dimensions such as learning difficulty, time investment, operation convenience, and rehabilitation effect, and combines the physical characteristics of postpartum women at different stages to propose corresponding rehabilitation suggestions, providing practical reference for postpartum women.

2. Anatomical structure of the female pelvic floor muscles

2.1. Layers and corresponding functions of the pelvic floor muscles

The female pelvic floor can be divided into three layers from the abdominal cavity to the perineum: the superficial, middle, and deep layers. These layers consist of fascia, muscles, and ligaments. The upper layer can support the pelvic organs; the middle layer serves as a support and has the function of an anal sphincter; the lower layer plays a role in stabilizing the overall structure of the pelvic cavity [7]. The pelvic floor has four main muscle groups: the pubococcygeus muscle, which can assist in vaginal contraction; the puborectalis muscle, which participates in defecation control; the pubococcygeus muscle, which affects urination and sexual function; and the ilioischial muscle, which can close the pelvic floor and provide basic support [4].

2.2. Damage to the pelvic floor during pregnancy and childbirth

During pregnancy, the increase in the mother's weight causes the pelvic floor to decrease by up to 2.5 centimeters under its own gravity [4]. At the same time, under the influence of progesterone, the uterus continuously enlarges, and the pressure on the pelvic floor also increases accordingly. Under the action of these two pressures, the pelvic floor tissue will deform and reshape. As the fetus grows, the mother's waist protrudes forward, the abdomen bulges forward, and the body's gravity axis moves forward, thereby exerting pressure on the pelvic cavity. At this time, the weight of the pelvic organs all points to the pelvic floor muscles, causing them to gradually relax. Therefore, pregnancy itself will cause certain damage to the pelvic floor muscles. In addition, during pregnancy, due to the transformation of estrogen and progesterone, the content of collagen in the body decreases, resulting

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in the relaxation of the pelvic floor muscle structure. Therefore, choosing a cesarean section for pregnant women cannot completely avoid damage to the pelvic floor muscles, but the mechanical damage caused during childbirth will aggravate the damage to the female pelvic floor, resulting in perineal laceration, which can be classified into grades one to four: Grade one laceration only affects the skin and mucosa of the vaginal opening and does not involve the muscle tissue, usually with less bleeding; Grade two laceration further involves the perineal muscles (such as the bulbospongiosus muscle, superficial transverse perineal muscle, etc.), but the anal sphincter remains intact; Grade three laceration extends the damage to the anal sphincter complex, and according to the degree of sphincter tearing, it can be further divided into IIIA (<50% external sphincter tearing), IIIB (≥50% external sphincter tearing), and IIIC (both internal and external sphincters torn) [8]. Grade four laceration is the most severe, with the laceration penetrating the anal sphincter and involving the anal rectal mucosa, allowing the vagina to communicate with the rectum [5]. The tissue damage is extensive and severe.

3. Methods for postpartum pelvic floor muscle rehabilitation

3.1. Kegel exercise combined with biofeedback electrical stimulation training

The basic method for pelvic floor muscle rehabilitation was first proposed by Arnold Kegel in 1948, which is called Kegel exercise. The core of this rehabilitation method lies in actively contracting the levator ani muscle group to enhance muscle strength and endurance. The selection of this rehabilitation method should be combined with the mode of delivery: for women who have no laceration during a normal delivery, they can attempt mild contraction 24 hours after delivery; for those with lateral incision or tear, the wound needs to heal (approximately 1-2 weeks after delivery); for those who have undergone cesarean section, it is recommended to start 4-6 weeks after the operation under the assessment of the doctor [9]. The standard Kegel training consists of two types. The first type is the exercise of type I muscles, which is performed in the supine position, with legs bent and feet touching the ground, slowly contracting the perineum and anus to reach the maximum force, maintaining for 3-5 seconds, then slowly relaxing for 3-5 seconds; the second type is the exercise of type II muscles, which is performed in the same position as type I, using maximum force to quickly contract the perineum and anus and immediately relax, performing 3-5 times and then relaxing for 6-10 seconds. Usually, type I muscles are exercised first, followed by type II muscles, twice a day, 15 minutes each time, and 6-7 weeks constitute one course [5].

However, simple pelvic floor muscle contraction exercises have obvious disadvantages. When women perform contraction exercises, the involuntary inhalation and downward force will increase the abdominal pressure on the pelvic floor. Studies have found that 57% of women will mistakenly contract the gluteus maximus and abdominal muscles during contraction training, and cannot correctly use the levator ani muscle, resulting in the pelvic floor sinking instead during contraction [10]. This phenomenon indicates that although Kegel exercise has low learning difficulty and the most convenient operation (no need for any equipment, no restrictions on location and time), it requires high self-discipline and accuracy of the patient. If there is no professional guidance, the effect may not be significant [11].

To overcome this limitation, clinicians often combine biofeedback electrical stimulation with Kegel training. This method applies biofeedback electrical stimulation on the basis of Kegel training, using electrodes to stimulate the pelvic floor muscles to passively contract, and then converting the electrical physiological signals of the pelvic floor muscles into image feedback for the women, allowing them to intuitively perceive the contraction state and force of the pelvic floor

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[11]. This immediate feedback greatly reduces the learning difficulty and helps patients quickly correct incorrect force patterns. From the perspective of required time and ease of operation, this method usually requires phased treatment in hospitals or rehabilitation centers (such as 2-3 times per week, approximately 20-30 minutes each time), and it needs to be frequently treated at the hospital or rehabilitation center within a regular time cycle. Therefore, compared with Kegel training alone, the rehabilitation method of biofeedback electrical stimulation combined with Kegel training has more significant effects, and the combined action can more efficiently improve pelvic floor strength and pelvic floor function, reduce the incidence of complications, and improve the quality of life of the parturient [11].

3.2. The method combining pilates and yoga

According to research, the core advantage of combining Pilates and yoga for postpartum recovery lies in integrating muscle strength training and mental health restoration. It can strengthen the pelvic floor muscle strength, improve the state of high muscle tension, and also correct the bad postures formed during pregnancy. This study divided postpartum women into a control group, a Kegel exercise group (experimental group A), and a Pilates combined with yoga group (experimental group B). After 12 weeks of intervention, the rehabilitation effect of experimental group B was significant. Mainly reflected in the significant improvement of urinary incontinence symptoms. In the International Urinary Incontinence Consultation Committee Questionnaire (ICI-Q-SF), the score of group B decreased from 9.79 points before the experiment to 0.64 points. The frequency of leakage, the amount of leakage, and the degree of impact on life all decreased significantly, and the symptoms were effectively improved; the pelvic floor muscle strength significantly increased, the internal muscle strength grade increased from 2.21 grade to 4.64 grade (close to the full score of 5 grades), and 92% of the subjects recovered to the level without medical intervention; the electromyographic value was close to the normal range, the fast contraction electromyographic value increased from 25.64 μV to 39.86 μV (close to the normal value of 40 μV), the slow muscle sustained contraction increased from 17.61 μV to 31.06 μV, and the endurance contraction increased from 17.09 μV to 27.94 μV.

From the perspective of learning difficulty, the breathing and basic postures (such as pelvic rotation, cat-cow pose) in the initial stage are easy to master, but as the stage progresses, the complexity of the movements increases, and the requirements for body coordination and core control ability become higher. Therefore, the learning curve is progressive and requires guidance from professionals. In terms of the required time, the research plan is 2 times a week, 60-75 minutes each time, for 12 weeks [11]. It requires postpartum women to spend a relatively long time for training. In terms of the convenience of operation implementation, initially, professional guidance is required in a specific place, and the convenience is relatively low. However, the training plan design has simple and easy-to-learn movements, which are suitable for mastering the correct method under teaching and then practicing at home. Therefore, it is a method that becomes more convenient as the training time increases [11]. The research results show that this training improved the pelvic floor muscle tension phenomenon that occurred in the Kegel group, restored the elasticity of the muscles, effectively enhanced the pelvic floor muscle strength, improved complications such as urinary incontinence, and this effect was better than using Kegel exercises alone [11].

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4. Conclusion

Although more than half of postpartum women experience related symptoms, less than 11% actively seek and receive proper treatment. Therefore, it is crucial to scientifically select rehabilitation methods.

Currently, non-surgical rehabilitation methods mainly include Kegel exercises, biofeedback electrical stimulation combined with training, and Pilates combined with yoga. Kegel exercises, as the basic method, do not require equipment, have no restrictions on the location, and have low learning difficulty. However, most women have difficulty correctly contracting the pelvic floor muscles, often mistakenly using abdominal muscles, and the effect depends on self-discipline. Biofeedback electrical stimulation combined with training converts muscle electrical signals into visual feedback, helping patients quickly master the correct force application mode, and has the highest rehabilitation efficiency. However, it requires regular visits to the hospital for treatment, and the time cost is relatively high. Pilates combined with yoga integrates muscle strength and mental health, not only enhancing pelvic floor muscle strength and improving urinary incontinence, but also correcting bad postural habits during pregnancy. Its effect is better than simple Kegel exercises, but it requires professional guidance in the initial stage, with each training session lasting 60-75 minutes, and the learning curve is gradual. Later, it can be practiced at home.

Therefore, for those in the early postpartum period or those with difficulty in movements, biofeedback electrical stimulation combined with training can be chosen as the priority to quickly establish the correct contraction pattern; for those with strong self-discipline and limited time, Kegel exercises can be started; if accompanied by body posture problems or pelvic floor muscle tension, Pilates combined with yoga is more suitable. Regardless of which method is chosen, it is necessary to combine the delivery method and wound healing situation, start after professional assessment, and adhere to an adequate course of treatment (such as 6-12 weeks) to achieve effective recovery of pelvic floor function.

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