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Comparison of the Effects of Individualized Postpartum Pelvic Floor Rehabilitation at Different Time Points in the Early Postpartum Period

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Abstract: *Objective:* To determine the clinical value of applying individualized postpartum pelvic floor rehabilitation at different time points in the early postpartum period. *Methods:* 184 patients admitted to the Affiliated Hospital of Jiangsu University from February 2021 to December 2022 were included in the study. Upon admission, they were divided into two groups, a conventional group (n = 46) and an intervention group (n = 138), by the random number table method. The patients in the conventional group underwent postpartum routine rehabilitation, while those in the intervention group underwent individualized postpartum pelvic floor rehabilitation. The patients in the intervention group were further divided into intervention group 1 (6–8 weeks), intervention group 2 (8–10 weeks), and intervention group 3 (10–13 weeks) according to the time of care. The rehabilitation effects were compared between the groups. *Results:* The pelvic floor muscle function of the patients in the intervention group was more ideal compared with those in the conventional group, and the incidence of adverse reactions was lower among patients in the intervention group; the comparison of the above indicators was statistically significant ($P < 0.05$); however, there was no significant difference in the relevant indicators among intervention group 1, group 2, and group 3 ($P > 0.05$). *Conclusion:* Although our study showed no significant difference in the effects of individualized postpartum pelvic floor rehabilitation at different time points in the early postpartum period, individualized postpartum pelvic floor rehabilitation in the early postpartum period has definite clinical value, as it improves pelvic floor muscle function and reduces the incidence of adverse reactions.

Keywords: Different time points; Individualized postpartum pelvic floor rehabilitation; Clinical value

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1. Introduction

In China, the proportion of second child and mothers of advanced age has shown an upward trend in recent years. Pregnancy and childbirth are events unique to women. Women are likely to develop pelvic floor dysfunction during childbirth, resulting in a series of adverse events, such as stress urinary incontinence, sexual dysfunction, and pelvic organ prolapse. Therefore, we must pay close attention to the recovery of pelvic floor function in postpartum women. Generally, exercises related to pelvic floor muscle function are performed to promote the recovery of pelvic floor muscles. Postpartum pelvic floor muscle functional rehabilitation is a form rehabilitation training. It is a non-invasive and painless intervention program that plays a significant role in helping mothers rehabilitate in the postpartum period. Based on this, the medical

records of 184 patients admitted to our hospital in the past two years were analyzed retrospectively in this study, and the clinical value of postpartum pelvic floor rehabilitation is reported in this paper.

2. Materials and methods

2.1. General patient information

A total of 184 patients admitted to our hospital from February 2021 to December 2022 were included in the study. Upon admission, they were divided into four groups by the random number table method: conventional group (n = 46); intervention group 1, intervention group 2, and intervention group 3 (n = 46). The patients in the conventional group were 22–37 years old, with an average age of 29.56 ± 3.57; the patients in intervention group 1 were 23–39 years old, with an average age of 31.46 ± 3.29; the patients in intervention group 2 were 23–38 years old, with an average age of 30.29 ± 3.17; the patients in intervention group 3 were 23–39 years old, with an average age of 31.59 ± 2.37. The differences in general patient data were not statistically significant ($P > 0.05$).

2.2. Intervention

Upon admission, patients in the conventional group underwent routine postpartum pelvic floor rehabilitation, *i.e.*, Kegel exercises, while patients in the intervention group underwent individualized postpartum pelvic floor rehabilitation.

Patients in intervention group 1 underwent rehabilitation at 6–8 weeks postpartum; those in intervention group 2 underwent rehabilitation at 8–10 weeks postpartum; and patients in intervention group 3 underwent rehabilitation at 10–13 weeks postpartum. The MLD B-2T postpartum rehabilitation instrument (Nanjing Milan, China) was used to carry out pelvic floor rehabilitation. Before treatment, Glazer Protocol was used to evaluate the pelvic floor muscle strength of the patients, and B-ultrasound of the pelvic floor was performed. The patients were under a comprehensive pelvic rehabilitation plan, which includes: (i) low-frequency electrical stimulation of the pelvic floor, in which a probe is placed in the vagina, and the pulse current is set according to the tolerability of the puerpera; the low-frequency electrical stimulation causes the pelvic floor muscles to contract, thereby strengthening the pelvic floor muscles; during the electrical stimulation, the intensity of current should be such that the puerpera feels strong contraction, yet comfortable and painless; the pulse current should be set at 60 mA, and the duration should be about 30 minutes; (ii) biofeedback, in which a vaginal probe is placed in the vagina, and the puerpera is instructed to contract her pelvic floor muscles; then, graphical feedback is given to increase the puerpera's enthusiasm for exercise; in addition, the nurses would introduce the functions of different muscles in detail and guide the puerpera in controlling her muscles, so as to accelerate pelvic function recovery; (iii) scenario simulation, in which a probe is placed in the vagina to simulate scenarios of increased negative pressure, such as when coughing, and the puerpera is instructed to contract her pelvic muscles to increase the negative pressure, so as to practice the reflexive action of protecting the pelvic floor; (iv) breathing exercises, in which abdominal breathing is taught to relax the pelvic floor, especially in women with hypertonic pelvic floor muscles. The interventions were carried out for 2 consecutive months.

2.3. Observation indicators

(i) The indicators of pelvic floor muscle function used in this study include the strength of type I muscle fibers, the strength of type II muscle fibers, and the duration of contraction of type I muscle fibers.

(ii) A self-made questionnaire was used to observe the incidence of adverse reactions in patients, including stress urinary incontinence, pelvic organ prolapse, and infection.

2.4. Statistical analysis

SPSS 21.0 was used for data processing. Variable data were mean ± standard deviation (s) and tested by *t*-test, while qualitative data were expressed in percentage (%) and verified by chi-square (χ^2). $P < 0.05$ was considered statistically significant.

3. Results

3.1. Maternal pelvic floor muscle function

The pelvic floor muscle strength, type I muscle fiber contraction duration, and other indicators of the intervention group were better than those of the conventional group, and the differences were statistically significant ($P < 0.05$). See **Table 1** for details.

Table 1. Comparison of maternal pelvic floor muscle function

Group	Number of cases	Type I muscle fiber strength (%)	Type II muscle fiber strength (%)	Type I muscle fiber contraction duration (s)
Intervention group 1	46	28 (71.74%)	18 (28.26%)	5.32 ± 1.16
Intervention group 2	46	28 (60.87%)	18 (39.13%)	5.27 ± 1.20
Intervention group 3	46	30 (65.22%)	16 (34.78%)	5.10 ± 0.93
Conventional group	46	32 (47.83%)	14 (52.17%)	4.21 ± 1.01

3.2. Adverse reactions

The incidence of adverse reactions in the intervention group was lower than that in the conventional group, and the difference was statistically significant ($P < 0.05$). See **Table 2** for details.

Table 2. Comparison of incidence of adverse reactions

Group	Number of cases	Stress urinary incontinence	Pelvic organ prolapse	Infection	Incidence rate
Intervention group 1	46	2	0	1	6.52%
Intervention group 2	46	1	1	0	4.45%
Intervention group 3	46	1	0	2	6.52%
Conventional group	46	6	3	4	28.26%

4. Discussion

The pelvic floor muscles are composed of multiple layers of muscles and fascia, which are rich in elastic fibers and can provide elasticity and support for the pelvic floor organs. Pregnancy and childbirth are relatively unique physiological events in females. Significant fluctuations in estrogen levels and altered collagen metabolism in pelvic floor connective tissues are evident during pregnancy and childbirth. These changes weaken the support function of the pelvic floor. Moreover, as the fetus continues to grow during pregnancy, the uterus enlarges; along with the weight of the amniotic fluid and placenta, the pelvic floor muscles are stretched over a period of time, resulting in injuries that might lead to complications such as pelvic organ prolapse, stress urinary incontinence, and sexual dysfunction. Maintaining the normal function of the pelvic floor is the key to maintaining the health of women. Therefore, it is necessary to restore the function of their pelvic floor muscles after delivery. The early postpartum period is the best time for recovery of neuromuscular injuries. If active care is not given, the function of the pelvic floor in these women will be affected to a great extent. Improving the pelvic floor muscle function is the most important

step in postpartum rehabilitation. Studies have found that women over the age of 50 with reproductive history have a 50% chance of pelvic organ prolapse. Chinese women, however, are more conservative when comes to matters pertaining to their private parts owing to the influence of tradition. Hence, they tend to pay less attention to minor issues that have no bearing on their quality of life. They often only seek medical attention when the issue worsens. This would affect the prognosis and affect their quality of life. In personalized postpartum rehabilitation, targeted pelvic floor rehabilitation is carried out on the basis of understanding postpartum pelvic floor injuries. After delivery, it is necessary to evaluate the pelvic floor function. Based on the results, rehabilitation measures such as electrical stimulation therapy, biofeedback, scenario simulation, and Kegel exercises are adopted, the intensity of therapy is adjusted accordingly, while ensuring purposeful, predictable, and targeted intervention, and the quality of nursing is improved [1].

Postpartum pelvic floor muscle training is a non-invasive, painless, non-surgical rehabilitation training program that strengthens the physiological feedback function. Although the practical value of early pelvic floor muscle training in preventing pelvic organ prolapse and improving the quality of life of women is recognized worldwide, this intervention is still developing in China. The time during which this intervention is carried out is related to the recovery of women's pelvic floor function. In the postpartum stage, earlier rehabilitation care is conducive to the recovery of the pelvic floor function. Based on the rehabilitation standard, when performing pelvic floor muscle contraction, type I fibers are given priority, followed by type II fibers [2]. Therefore, during rehabilitation, nurses need to adopt appropriate methods to control the intensity of training and the duration of contraction of type I fibers. Generally, pelvic floor rehabilitation is commenced 42 days after delivery and once lochia has subsided. This rehabilitation helps strengthen pelvic floor muscles and improves nerve function, so that the vagina will be in the best state and size again, thereby reducing the risk of pelvic floor disorders.

Bioengineering technology is used in pelvic floor functional rehabilitation. With high-tech therapeutic equipment, patients are provided with personalized treatment plans. At the same time, electrical stimulation, biofeedback, and scenario simulation can be used to stimulate the damaged pelvic floor, tighten the vagina, and relax vaginal muscles, thereby improving the quality of life of patients. The methods to repair damaged muscles and nerves include pelvic floor muscle training, electrical stimulation, biofeedback, and scenario simulation. Pelvic floor assessment and biofeedback therapy are based on the measurements of guided surface electromyography and guided vaginal contraction, which are fed back into the electromyography or pressure curves through effect display and sound prompts. In that way, patients would have a clearer understanding of their own pelvic floor muscle function and actively participate in the treatment process [3]. Pelvic floor muscles return to the normal state at a faster rate when stimulated by personalized electrical stimulation on this basis. It addresses postpartum vaginal anteroposterior wall bulging, urinary incontinence, pelvic organ prolapse, *etc*., and has a good preventive effect on pelvic floor diseases.

According to a survey, the "golden period" for pelvic floor muscle function recovery is within one year. One to two weeks after delivery, Kegel exercises should be done at home. The intensity and time of exercise should be increased gradually. Start by contracting the anus and perineum for 5–10 seconds, relax, and then repeat it every 5–10 seconds, twice a day for 5 minutes or repeat the exercise 20–30 times in each set, totaling 3 sets per day. There should be a gradual increase in the amount of training. The longer it is, the better [4]. Once lochia has subsided, about 42 days after delivery, a pelvic floor function examination should be performed. If there are problems, measures must be taken as soon as possible, and systematic pelvic floor rehabilitation exercises should be initiated at once. The effect is better with early exercise. However, if the exercises are not done correctly, stress urinary incontinence, pelvic organ prolapse, and sexual dysfunction may develop with aging, leading to progressive worsening of symptoms as a result of decreased estrogen levels and muscle strength. The present study showed that the pelvic floor muscle function of the intervention group was significantly better than that of the conventional group after intervention ($P < 0.05$).

However, there were no significant differences in the indicators among intervention group 1, intervention group 2, and intervention group 3 ($P > 0.05$). This indicates that early individualized postpartum pelvic floor rehabilitation has high clinical value, as its application in puerpera can significantly promote the improvement of pelvic floor muscle function. The main reason for pelvic floor complications in puerpura, including weakening of muscles, pelvic organ prolapse, *etc*., is the prolonged stretching of pelvic floor muscles as a result of the continuous growth and development of the fetus and the enlarged uterus [5,6]. Hence, more attention should be paid to early pelvic floor rehabilitation in clinical practice. In this study, the intervention group received individualized postpartum pelvic floor rehabilitation at 6–8 weeks, 8–10 weeks, and 10–13 weeks postpartum, and the results showed that individualized postpartum pelvic floor rehabilitation can effectively promote the recovery of pelvic floor muscle function [7,8]. Moreover, the early implementation of this rehabilitation can also effectively reduce the incidence of adverse events. The incidence of adverse events such as stress urinary incontinence, pelvic organ prolapse, and infection in the intervention group was significantly less than that in the conventional group ($P < 0.05$). However, the difference in incidence of adverse events among intervention groups 1, 2, and 3 was insignificant ($P > 0.05$). The results are consistent with those of other clinical studies, indicating that early individualized postpartum pelvic floor rehabilitation for puerpera can effectively prevent or reduce the incidence of postpartum adverse events, improve the quality of life, and aid the recovery of pelvic floor muscles, although it has no significant effect on the occurrence of adverse events at different time points in the early postpartum period [9]. In view of the influence of factors such as time and samples, early individualized postpartum pelvic floor rehabilitation has a certain impact on the intervention effect in mothers after normal vaginal delivery, and additional clinical trials are needed [10,11].

In conclusion, the clinical application of early individualized pelvic floor rehabilitation in puerpera is of great significance to promote the rehabilitation of pelvic floor function, reduce the incidence of adverse events, and ensure the physical and mental health of puerpera. However, no significant difference was observed in the effects of individualized postpartum pelvic floor rehabilitation at different time points in the early postpartum period.

Disclosure statement

The author declares no conflict of interest.

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