A Study on 10-Week Combined Aerobic and Resistance Training Exercise Prescription for Female Patients with Pelvic Floor Dysfunction

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BACKGROUND

- Female Pelvic Floor Dysfunction (FPFD) is a prevalent condition among postpartum women, mainly caused by connective tissue or ligament damage during pregnancy and childbirth.
- Existing treatments such as surgery are invasive and costly, while exercise therapy is a non-invasive, cost-effective alternative that needs further exploration for combined aerobic and resistance training effects.

OBJECTIVES

- Evaluate the effectiveness of a 10-week combined aerobic and resistance training program in improving pelvic floor muscle strength and function in postpartum women with FPFD.
- Explore the program's impacts on key indicators of fast-twitch (type II) and slow-twitch (type I) pelvic floor muscle fibers.

METHODOLOGY

- Study Design: Single-group pre-post design, with 30 postpartum women enrolled and 21 completing the full intervention.
- Participants: Primiparous women aged 22–35 years, 42 days to 3 months postpartum with vaginal delivery; excluded those with chronic diseases, mental disorders, or severe medical histories.
- Intervention: 10-week modular program aligned with ACSM guidelines, including resistance training (Kegel exercises, bridge hip-raises) and aerobic training (stationary cycling, brisk walking) with progressive increases in duration and intensity.

RESULTS

The electromyographic evaluation indicators of subjects at various stages.

Assessment of Different Stages	Exercise Prescription		Absolute Effect Size (Cohen's d)	*p*-Value
	After (n = 21)	Before (n = 21)		
Pre-resting stage				0.157
Average value	2.812 ± 2.06	4.41 ± 2.81	0.65	0.012
Variability	0.174 ± 0.156	0.276 ± 0.27	0.46	0.004
Fast-twitch muscle fiber stage				<0.01
Maximum value	40.73 ± 11.95	26.91 ± 14.03	1.06	<0.01
Ascending time	0.442 ± 0.145	0.523 ± 0.357	0.23	0.363
Recovery time	0.515 ± 0.156	0.751 ± 0.772	0.31	0.188
Slow-twitch muscle fiber stage				<0.01
Average value	30.357 ± 9.366	16.741 ± 8.404	1.53	<0.01
Variability	0.221 ± 0.099	0.319 ± 0.107	0.95	<0.01
Ascending time	0.469 ± 0.171	0.713 ± 0.461	0.58	0.033
Recovery time	0.793 ± 0.214	1.646 ± 1.108	0.75	0.020
Post-resting stage				0.885
Average value	4.063 ± 3.047	4.472 ± 3.639	0.12	0.420
Variability	0.166 ± 0.047	0.185 ± 0.157	0.12	0.576

Comparison of pelvic floor muscle function scores and sub-item scores before and after exercise intervention in postpartum women.

Evaluation Metrics	Exercise Prescription		*p*-Value
	After (n = 21)	Before (n = 21)	
Overall score	73.481 ± 9.642	51.129 ± 16.86	<0.01
Sub-item scores of the pre-resting stage	77.57 ± 15.43	71.71 ± 19.9	0.157
Sub-item scores of fast-twitch muscle fiber (type II muscle fibers) stage	78.05 ± 14.647	56.71 ± 26.443	<0.01
Sub-item scores of slow-twitch muscle fiber (type I muscle fibers) stage	68.38 ± 17.721	35.33 ± 23.081	<0.01
Sub-item scores of the post-resting stage	71.14 ± 24.67	70.48 ± 23.41	0.885

Pelvic Floor Distress Inventory-20 (PFDI-20) scores before and after intervention.

Subscale	Baseline	Post-Intervention
Physical Symptoms	45.2 ± 12.3	30.5 ± 10.2
Psychological Distress	38.7 ± 10.8	25.3 ± 9.1

- Fast-twitch muscle fiber (type II) maximum value rose by 36.2% (from 26.91 ± 14.03 μV to 40.73 ± 11.95 μV, $p < 0.01$), indicating improved strength and reaction speed.
- Slow-twitch muscle fiber (type I) average value increased by 81.33% (from 16.74 ± 8.40 μV to 30.36 ± 9.37 μV, $p < 0.01$), with reduced variability, rise time, and recovery time ($p < 0.05$).
- Pre-resting phase average value and variability decreased by 36.2% and 37.0% respectively ($p < 0.05$ and $p < 0.01$), relieving muscle tension and fatigue.
- PFDI-20 scores for physical symptoms (from 45.2 ± 12.3 to 30.5 ± 10.2) and psychological distress (from 38.7 ± 10.8 to 25.3 ± 9.1) decreased significantly.

CONCLUSIONS

- The 10-week combined aerobic and resistance training exercise prescription effectively improves pelvic floor muscle strength and function in postpartum women with FPFD.
- It enhances fast-twitch muscle fiber strength and reaction speed, as well as slow-twitch muscle fiber endurance and contraction stability.
- This non-invasive, cost-effective intervention alleviates FPFD-related physical symptoms and psychological distress, and is recommended for integration into postpartum care plans.

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ACKNOWLEDGEMENTS

- Special thanks to supervisor Prof. Ling Wang for her valuable guidance and support throughout the research.