International Journal of Science, Strategic Management and Technology
Volume 02 Issue 05 May-2026 | ISSN: 3108-1762 (Online) | Impact Factor: 3.8
An International, Peer-Reviewed, Open Access Scholarly Journal Indexed in recognized academic databases

OPEN ACCESS

The Role of Pelvic Floor Rehabilitation After Surgical Intervention: Per Vaginum and Per Rectum Approaches

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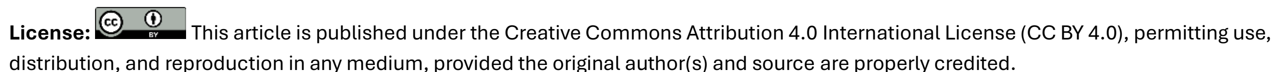
https://doi.org/10.55041/ijsmt.v2i5.461

Cite this Article: Upadhyay, D. M. & Verma, D. N. (2026). The Role of Pelvic Floor Rehabilitation After Surgical Intervention: Per Vaginum and Per Rectum Approaches. International Journal of Science, Strategic Management and Technology, *02*(05). https://doi.org/10.55041/ijsmt.v2i5.461

License:  This article is published under the Creative Commons Attribution 4.0 International License (CC BY 4.0), permitting use, distribution, and reproduction in any medium, provided the original author(s) and source are properly credited.

Abstract

After pelvic reconstructive, colorectal, and gynaecological procedures, pelvic floor dysfunction severely affects urinary, bowel, and sexual functions, often leading to poorer postoperative quality of life. After per vaginum and per rectum surgeries, pelvic floor rehabilitation (PFR) is an essential part of functional recovery. This study reviews available data on multimodal postoperative rehabilitation techniques, including neuromuscular re-education, biofeedback therapy, and pelvic floor muscle training (PFMT). Recent research in urogynecology, colorectal surgery, and physiotherapy shows that structured rehabilitation regimens significantly improve anorectal coordination, pelvic organ support, continence, and overall functional outcomes. Additionally, a multimodal care approach, early postoperative physical therapy, and individualised treatment plans are linked to improved long-term recovery and reduced symptom recurrence.

Keywords: Pelvic floor rehabilitation, pelvic floor muscle training, pelvic organ prolapse, rectal surgery, urogynecology, anorectal rehabilitation, postoperative physiotherapy.

I. Introduction

The pelvic floor is a dynamic musculoskeletal network that is necessary for intra-abdominal pressure regulation, pelvic organ support, sexual function, and urine and faecal continence. Postoperative pelvic floor dysfunction (PFD) can result from surgical procedures carried out using per vaginum and per rectum techniques that affect sphincteric integrity,

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neuromuscular synchronisation, and overall pelvic floor architecture. Vaginal hysterectomy, pelvic organ prolapse (POP) repair, rectocele repair, fistula closure, hemorrhoidectomy, and sphincter-sparing colorectal surgeries, including intersphincteric resection (ISR) and low anterior resection (LAR) are procedures commonly linked to such morbidity. Urinary incontinence, dyssynergic defecation, constipation, faecal incontinence, persistent pelvic pain, sexual dysfunction, and prolapse recurrence are common postoperative consequences. As a result, focused pelvic floor therapy has become increasingly well-known in clinical settings as a conservative, evidence-based treatment intended to improve sphincter tone, restore muscular coordination, and promote full functional recovery. PFMT, electromyographic biofeedback, behavioural changes, neuromuscular electrical stimulation, and core stability retraining are frequently included in contemporary rehabilitation protocols [3, 4, 13].

II. Anatomy and Function of the Pelvic Floor

The pelvic floor primarily consists of the levator ani muscle complex—comprising the pubococcygeus, iliococcygeus, and puborectalis—alongside the coccygeus muscles. Endopelvic fascia, sphincteric processes, and a complex network of connective tissue provide structural support for this muscular basin. The pelvic floor performs several vital physiological tasks, including supporting the pelvic viscera mechanically, maintaining urine and faecal continence, controlling vaginal tone for optimal sexual function, coordinating the intricate reflexes needed for micturition and defecation, and aiding in lumbopelvic stabilisation. Structured rehabilitation is frequently necessary to restore baseline function since these biomechanical and physiological processes can be seriously disrupted by surgical trauma, regional denervation, postoperative scarring, and fibrosis [14, 15].

III. Pelvic Floor Dysfunction After Per Vaginum Surgery

Surgical interventions via the vaginal route often alter the anatomical support of the pelvic basin, leading to specific postoperative morbidities.

Per-Vaginal Procedure	Description	Common Postoperative Complications
Vaginal Hysterectomy	Surgical removal of the uterus via the vaginal canal.	Pelvic pain, dyspareunia, stress urinary incontinence, and secondary prolapse (if apical support is inadequate).
Pelvic Organ Prolapse Repair	Reconstruction of weakened anterior, posterior, or apical pelvic support structures.	Prolapse recurrence, levator ani weakness, dyspareunia, and chronic pelvic pain.
Sacrospinous Fixation	Suspension of the vaginal apex to the sacrospinous ligament to correct apical prolapse.	Posterior vaginal wall pain, nerve irritation, dyspareunia, and stress urinary incontinence.
Rectocele Repair	Reinforcement of the posterior vaginal wall to correct anterior rectal herniation.	Constipation, obstructed defecation, dyspareunia, and recurrent prolapse.
Vaginal Mesh Surgery	Implantation of synthetic mesh to augment native tissue prolapse repair.	Mesh exposure/erosion, chronic pain, dyspareunia, and potential need for surgical revision.
Fistula Repair	Vaginal closure of vesicovaginal or rectovaginal fistulas.	Fistula recurrence, stress urinary incontinence, dyspareunia, and pelvic discomfort.

Comprehensive preoperative and postoperative assessments are crucial because the structural correction of a prolapse can identify latent diseases like stress urine incontinence. Furthermore, the usage of synthetic materials, certain surgical procedures, and baseline patient features all have a significant impact on postoperative problems. Perioperative pelvic

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floor therapies significantly enhance functional outcomes, based on clinical evidence. For example, six months following vaginal reconstructive surgery, Pauls et al. demonstrated that systematic pelvic floor physical therapy resulted to significant improvements in quality-of-life indicators [9]. Preoperative and postoperative PFMT reduce pelvic floor discomfort scores and alleviate prolapse symptoms, as reported by additional research [4, 7, 8].

IV. Pelvic Floor Dysfunction After Per Rectum Surgery

Colorectal and perianal surgeries frequently disrupt the delicate neuromuscular coordination required for normal bowel function.

Procedure	Common Dysfunction and Complications
Low Anterior Resection (LAR)	Low Anterior Resection Syndrome (LARS), faecal urgency, incontinence, obstructed defecation.
Intersphincteric Resection (ISR)	Major LARS, severe urgency, faecal incontinence, obstructed defecation.
Sphincter-Sparing Rectal Cancer Surgery	LARS, urgency, faecal incontinence, anorectal dyssynergia.
Anal Sphincter Surgery	Persistent/recurrent incontinence, faecal urgency, obstructed defecation.
Hemorrhoidectomy	Faecal urgency, transient incontinence, and stricture-induced obstructed defecation.
Fistulotomy	Faecal incontinence, urgency, and anorectal dyssynergia.

After per rectum surgery, careful pelvic floor therapy is necessary to restore anorectal coordination and functional continence. According to research, organised therapy helps those with severe gastrointestinal problems. Notably, systemic, biofeedback-assisted pelvic floor therapy dramatically improves postoperative continence and bowel dysfunction scores after rectal cancer surgery, according to strong data from the FORCE Trial [1, 2]. When postoperative PT is incorporated into recovery protocols, similar improvements in bowel function have been reported after low anterior and intersphincteric resections [10, 11].

V. Components of Pelvic Floor Rehabilitation

To address the unique physiological deficiencies brought on by surgery, modern rehabilitation uses a multimodal approach. In order to increase muscular hypertrophy, endurance, and reflex activation, Pelvic Floor muscular Training (PFMT), which uses repeated, voluntary contractions of the levator ani complex, continues to be the mainstay of conservative treatment [13]. Clinical evaluations of this program frequently make use of the PERFECT evaluation scheme or the Oxford grading system. Biofeedback therapy is a highly effective treatment for dyssynergic defecation and faecal incontinence. It uses electromyographic probes (rectal or vaginal) to improve patient proprioception and motor control in addition to regular exercises [2].

Neuromuscular Electrical Stimulation is used to help patients with severe muscle weakness recruit muscle fibres and start contractions in injured or denervated tissues. Behavioural therapy, which addresses bladder retraining, bowel behaviour correction, fluid management, and appropriate defecatory posturing, is also an essential educational component. In order to maximise global lumbopelvic mechanics and intra-abdominal pressure management, contemporary programs include a strong emphasis on Core and Breathing Rehabilitation, incorporating diaphragmatic breathing and transverse abdominis activation.

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VI. Rehabilitation Protocols

Usually starting four to six weeks after surgery, postoperative rehabilitation is methodically staged to correspond with physiological tissue healing. In order to avoid restrictive adhesions, the early phase places a high priority on pain treatment, diaphragmatic breathing restoration, mild neuromuscular activity, and scar mobilisation. Patients advance onto the intermediate phase, which includes functional movement retraining, biofeedback-assisted coordination exercises, and progressive PFMT, as structural integrity improves. Maximising muscle strength and endurance, enabling a safe return to high-impact daily activities, and integrating sexual rehabilitation for patients with postoperative dyspareunia or sexual dysfunction are the main objectives of the advanced phase.

VII. Clinical Evidence

The incorporation of pelvic floor treatment after pelvic surgical procedures is supported by a substantial corpus of randomised controlled trials. Structured physical therapy considerably improves postoperative quality of life following vaginal reconstruction and reduces urinary symptoms, as systematic studies have repeatedly shown [4, 9]. PFMT successfully lessens the severity of bowel dysfunction and enhances continence following cancer resections in the setting of colorectal surgery, according to evaluations by Lin et al. and others [11, 12]. Additionally, a wealth of information—including results compiled in significant meta-analyses—highlights the vital role that PFMT plays in lessening the severity of symptoms and improving the morphological success of pelvic organ prolapse procedures [14, 15].

VIII. Complications and Limitations

Despite its proven efficacy, the widespread implementation of pelvic floor rehabilitation faces several clinical and logistical barriers. Major limitations include suboptimal patient adherence, delayed postoperative referrals, a lack of standardised universal treatment protocols, and restricted access to specialised pelvic floor physiotherapists. Furthermore, therapy must be cautiously applied or deferred in the presence of specific contraindications, such as active pelvic infections, severe postoperative pain, unhealed surgical wounds, or suspected tissue dehiscence.

IX. Future Directions

The future of pelvic floor rehabilitation lies in the integration of advanced technology and personalised medicine. Emerging modalities include AI-assisted biofeedback systems, highly accessible tele-rehabilitation platforms, ultrasound-guided muscle training, and the development of robotic pelvic rehabilitation devices. By utilising functional imaging to customise therapy regimens, clinicians can offer highly targeted interventions. Ultimately, optimising long-term surgical outcomes will require a multidisciplinary collaborative care model that seamlessly integrates urogynecologists, colorectal surgeons, physiotherapists, and pain management specialists.

X. Conclusion

Pelvic floor rehabilitation is an indispensable component of the postoperative recovery pathway for patients undergoing per vaginum and per rectum surgical procedures. Evidence-based techniques—including PFMT, biofeedback, and behavioural modifications—demonstrably improve anorectal coordination, pelvic organ support, continence, sexual function, and overall quality of life. When supported by a multidisciplinary medical team and standardised clinical protocols, the early and customised implementation of pelvic floor therapy significantly optimises surgical outcomes and reduces the burden of long-term postoperative morbidity.

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