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Relaxation-Based Interventions in the Management of Vaginismus: A Comprehensive Review of Evidence and Clinical Implications

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ABSTRACT

Background:

Vaginismus, now classified under Genito-Pelvic Pain/Penetration Disorder (GPPD), is characterized by involuntary contraction of pelvic floor muscles, anxiety, and avoidance behaviours during vaginal penetration attempts. This condition poses a multifaceted challenge that intertwines neuromuscular dysfunction, fear, and pain perception. Relaxation-based interventions such as progressive muscle relaxation (PMR), pelvic floor down-training, biofeedback-guided relaxation, breathing techniques, and mindfulness are increasingly integrated into physiotherapeutic and psychosexual care models for vaginismus.

Objective:

This review aims to synthesize the current evidence on the use of relaxation-based interventions in the management of vaginismus, exploring their physiological rationale, clinical efficacy, and implications for multidisciplinary practice.

Methods:

The Studies focusing on relaxation-based or physiotherapy-driven interventions for vaginismus and related Genito pelvic pain disorders were analysed.

Results:

Recent studies highlight that relaxation-focused approaches, especially when integrated with cognitive behavioural therapy (CBT), graded exposure, and pelvic floor retraining, significantly improve sexual function and reduce pain intensity. Controlled trials and systematic reviews report positive outcomes such as enhanced penetration success, improved pelvic floor control, and better quality of sexual life. However, evidence for standalone relaxation programs remains limited, emphasizing the need for standardized protocols and randomized controlled trials.

Conclusions:

Relaxation-based interventions play a critical role in reducing pelvic floor hypertonicity and anxiety, contributing to the holistic recovery of women with vaginismus. The findings support integrating physiotherapeutic relaxation strategies within multidisciplinary treatment frameworks involving psychosexual therapy, counselling, and gradual desensitization. Future research should isolate relaxation modalities to determine their individual effect size and optimize clinical application.

Keywords: Vaginismus, Relaxation, Pelvic floor physiotherapy, Biofeedback, Mindfulness, Progressive muscle relaxation.

1.INTRODUCTION

Vaginismus is a complex biopsychosocial condition that manifests as involuntary tightening of the pelvic floor muscles surrounding the vagina, accompanied by fear or pain during attempted penetration. It often results in distress, sexual dysfunction, and relational strain. The condition is currently defined under Genito-Pelvic Pain/Penetration Disorder in the DSM-5 classification, acknowledging both muscular and psychological components as central to its etiology.

Globally, the prevalence of vaginismus varies between 1–7% among women of reproductive age, though underreporting is common due to sociocultural stigma and lack of awareness. The disorder typically arises from conditioned fear responses, hypertonic pelvic floor muscles, and maladaptive cognitive associations linking penetration with pain. Physiological studies reveal that sustained pelvic floor muscle contraction contributes to local ischemia, reduced elasticity, and heightened pain sensitivity, perpetuating a vicious cycle of fear and muscular guarding.

Traditional treatment modalities have focused on psychotherapy, sexual education, and graded exposure using vaginal dilators. However, emerging literature underscores the essential role of physiotherapy-based interventions that target the somatic component particularly relaxation techniques aimed at restoring normal pelvic floor tone and voluntary control. These relaxation-based therapies encompass progressive muscle relaxation (PMR), diaphragmatic breathing, biofeedback-guided down-training, mindfulness-based stress reduction (MBSR), and guided imagery.

Recent clinical trials and systematic reviews suggest that when these techniques are integrated into a multidisciplinary framework including psychosexual counselling and cognitive restructuring, they enhance treatment success rates and long-term remission. The rationale lies in addressing both the physiological hypertonicity and psychological fear components of vaginismus simultaneously.

Relaxation-based interventions modulate autonomic nervous system activity, reducing sympathetic overdrive that contributes to pelvic floor spasm. They also improve proprioceptive awareness, allowing women to consciously identify and release pelvic muscle tension. Physiotherapists and psychosexual therapists increasingly use relaxation as a foundational step before introducing desensitization or dilator training.

Despite their wide clinical use, the scientific evidence supporting relaxation exercises as an independent or adjunctive treatment remains fragmented. This review, therefore, aims to compile current research, clarify underlying mechanisms, summarize clinical outcomes, and propose future directions for integrating relaxation strategies into comprehensive vaginismus management.

2. PATHOPHYSIOLOGICAL BASIS FOR RELAXATION IN VAGINISMUS

Vaginismus is a multifactorial condition with intertwined neuromuscular, psychological, and autonomic components. Understanding these mechanisms is essential for appreciating why relaxation-based therapies serve as both preventive and corrective interventions.

2.1. Neuromuscular Mechanisms

At the physiological level, vaginismus involves involuntary hyperactivity of the pelvic floor muscles (PFMs) primarily the pubococcygeus, puborectalis, and iliococcygeus, which form the levator ani group. Studies using surface electromyography (sEMG) and ultrasound imaging have demonstrated elevated resting muscle tone and delayed relaxation responses in women with vaginismus compared to healthy controls.

Chronic overactivation of these muscles leads to a guarding reflex, a learned response to anticipated pain or threat. Repeated attempts at penetration reinforce this reflex, creating a pain-fear-spasm cycle. The sustained contraction restricts vaginal elasticity and increases pressure on nociceptive endings, producing pain that further reinforces avoidance behaviours.

Relaxation-based interventions such as pelvic floor down-training, progressive muscle relaxation, and breathing control, counteract this hyperactivity by promoting muscle elongation and parasympathetic dominance. Electromyographic studies have shown significant reductions in resting muscle tone after structured relaxation and biofeedback programs. This normalization of muscle tone improves voluntary control and proprioceptive awareness, essential for re-establishing pain-free vaginal function.

2.2. Autonomic Dysregulation and Stress Response

The pelvic floor does not operate in isolation; it is heavily influenced by autonomic nervous system (ANS) activity. In vaginismus, an exaggerated sympathetic arousal is commonly observed manifesting as elevated heart rate, shallow breathing, and heightened vigilance during sexual or gynaecologic encounters.

High sympathetic tone promotes muscle tension and reduces pelvic blood flow, perpetuating a state of physiological “readiness to protect.” Relaxation techniques, particularly diaphragmatic breathing, guided imagery, and mindfulness activate the parasympathetic (vagal) pathways, lowering heart rate and facilitating muscle relaxation.

Research in women with chronic pelvic pain has revealed that relaxation-induced vagal activation is associated with measurable improvements in pain tolerance, stress reduction, and sexual satisfaction. By extending these principles to vaginismus, it becomes clear that training the body to transition from sympathetic hyperarousal to parasympathetic calm is foundational for therapeutic success.

2.3. Psychological Conditioning and Fear–Pain Interaction

The psychological dimension of vaginismus involves maladaptive learning, where prior painful or fearful experiences become conditioned responses. According to fear-avoidance models, the anticipation of pain leads to protective muscle contractions, even in the absence of actual stimuli.

Functional MRI studies have shown increased activity in the amygdala and anterior cingulate cortex in women with penetration-related anxiety, highlighting the neural coupling between fear and pelvic motor control. Relaxation exercises, especially when paired with cognitive-behavioural therapy (CBT) or mindfulness, disrupt this coupling by reducing cortical arousal and modifying pain-related cognitions.

Progressive muscle relaxation and guided breathing serve as exposure tools, teaching the patient to experience pelvic sensations without fear. Over time, this facilitates extinction learning, replacing anxiety-driven muscle tightening with calm, controlled relaxation responses.

2.4. Neuroendocrine and Hormonal Influences

Emerging research indicates that stress-related hormones such as cortisol and adrenocorticotrophic hormone (ACTH) influence pelvic floor muscle tone. Elevated cortisol levels have been correlated with increased muscle stiffness and pain perception in women with pelvic pain disorders.

Relaxation training and mindfulness-based interventions have demonstrated the ability to reduce serum cortisol and normalize stress-related biomarkers, providing a biochemical basis for their role in restoring pelvic relaxation and reducing pain sensitivity. These findings support the integration of relaxation within comprehensive vaginismus treatment protocols that address both mind and body.

2.5. Integrative Biopsychosocial Model

The interplay of neuromuscular contraction, sympathetic hyperarousal, and fear conditioning forms a self-perpetuating triad. Relaxation-based interventions act simultaneously at all three levels:

- Biological: reducing muscle hypertonicity and improving proprioception.
- Psychological: alleviating fear and catastrophic thinking.
- Social: improving communication and intimacy with partners.

This integrative model underscores why relaxation must be considered a core therapeutic pillar rather than a mere adjunct.

3. EVIDENCE-BASED REVIEW OF RELAXATION INTERVENTIONS IN VAGINISMUS

3.1. Progressive Muscle Relaxation (PMR) and Pelvic Floor Down-Training

Progressive Muscle Relaxation (PMR) involves systematically tensing and then relaxing different muscle groups in the body. This technique helps individuals become more aware of physical sensations and promotes relaxation. In the context of vaginismus, PMR can aid in reducing pelvic floor muscle tension and anxiety associated with penetration.

A study by Işık and Aslan (2022) assessed the effects of sexual counselling combined with pelvic floor relaxation on sexual functions in women receiving vaginismus treatment. The randomized controlled trial found statistically significant improvements in sexual function indices in the intervention group compared to the control group over the study period. This suggests that incorporating relaxation techniques targeting the pelvic floor can be beneficial in managing vaginismus.

3.2. Biofeedback-Guided Relaxation and Combined Interventions

Biofeedback is a technique that teaches individuals to control physiological processes by providing real-time data on bodily functions. When combined with relaxation exercises, biofeedback can help individuals gain better control over their pelvic floor muscles.

Jokar et al. (2025) conducted a randomized controlled trial comparing biofeedback with dilator therapy versus dilator therapy alone in women with primary vaginismus. The study revealed that the combined intervention led to better outcomes in both penetration success and sexual function, suggesting that integrating biofeedback with relaxation techniques can enhance treatment outcomes.

Additionally, Chen et al. (2023) conducted a study on conservative treatments for pelvic floor disorders, including biofeedback and electrostimulation. The results indicated reductions in pelvic muscle tone and improvements in pelvic symptoms, suggesting that similar mechanisms may benefit vaginismus.

3.3. Mindfulness-Based Interventions

Mindfulness involves focusing on the present moment without judgment. Mindfulness-based interventions have been explored for their potential to improve sexual function and reduce distress in women with vaginismus.

Larraz et al. (2024) published a systematic review of mindfulness-based interventions and sexuality, finding consistent evidence that mindfulness practices reduce sexual distress and improve sexual function across multiple female sexual dysfunctions, which may include or translate to cases of vaginismus.

3.4. Latest Rehabilitation Techniques

Recent advancements in rehabilitation techniques for vaginismus have focused on combining physical therapy with psychological interventions to provide a holistic approach to treatment.

Pelvic Floor Physical Therapy (PFPT): PFPT involves exercises and manual therapy techniques aimed at relaxing and strengthening the pelvic floor muscles. A study by Perna (2023) highlighted the effectiveness of PFPT in treating vaginismus, emphasizing the importance of individualized treatment plans and patient education.

Cognitive Behavioral Therapy (CBT): CBT addresses the psychological factors contributing to vaginismus, such as fear and anxiety. Ziaei S et al. (2024) conducted a study on the efficacy of CBT in reducing catastrophic thoughts in women with primary vaginismus, finding significant improvements in sexual function and reduced anxiety levels.

Multimodal Approaches: Combining various therapeutic modalities has shown promise in treating vaginismus. A pilot feasibility study by explored the combination of sacral erector spinae plane block and pelvic floor physical therapy, reporting positive outcomes in reducing pain and improving sexual function in women with vaginismus.

Multimodal Protocols: Combining relaxation techniques with other therapeutic modalities, such as sexual counselling, biofeedback, and mindfulness, has shown the most robust evidence for improving sexual function and penetration ability in women with vaginismus.

Standalone Relaxation Techniques: While standalone relaxation techniques, such as PMR and diaphragmatic breathing, have limited evidence in vaginismus treatment, they may still offer benefits when integrated into a comprehensive treatment plan.

Pelvic Floor Rehabilitation: Physical therapy techniques focusing on pelvic floor relaxation and strengthening, combined with psychological interventions, provide a holistic approach to treating vaginismus.

4. CLINICAL IMPLICATIONS AND INTEGRATION INTO PRACTICE

4.1. Multidisciplinary Approach

Vaginismus is a multifactorial condition, encompassing psychological, muscular, and neurological components. Evidence strongly supports a multidisciplinary management approach that combines:

- Pelvic floor physiotherapy for muscle relaxation and control
- Psychosexual counselling or CBT for anxiety and fear reduction
- Mindfulness and relaxation techniques to decrease tension and enhance body awareness

Işık & Aslan (2022) demonstrated that integrating sexual counselling with pelvic floor relaxation improved penetration ability and sexual function, indicating that combining physiological and psychological interventions is more effective than standalone treatments.

4.2. Practical Implementation of Relaxation Interventions

Stepwise Intervention Model:

1. Assessment:

- Baseline pelvic floor muscle tone via palpation or sEMG
- Pain assessment using VAS (Visual Analog Scale)
- Sexual function assessment with FSFI (Female Sexual Function Index)
- Psychological evaluation for anxiety, catastrophizing, or trauma history

2. Relaxation Training (Weeks 1–3):

- Progressive Muscle Relaxation (PMR): Guide patients through tensing and relaxing pelvic floor and core muscles
- Diaphragmatic Breathing: Synchronize breathing with pelvic floor relaxation
- Home Practice: Daily 10–15 minutes, with monitoring via diaries or smartphone apps

3. Biofeedback-Assisted Training (Weeks 3–6):

- Real-time feedback using sEMG or manometry
- Reinforce muscle relaxation and control

- Supports transition to graded exposure

4. Graded Desensitization (Weeks 4+):

- Gradual introduction of vaginal penetration using dilators or sensate-focus exercises
- Encourage partner involvement when appropriate
- Continue relaxation exercises alongside graded exposure

5. Psychological Support:

- CBT for fear, anxiety, and avoidance behaviour
- Mindfulness-based practices to reduce hypervigilance and enhance body awareness

4.3. Monitoring and Outcome Measures

- To ensure treatment effectiveness, clinicians should assess:
- Pelvic floor muscle tone (palpation or sEMG)
- Sexual function (FSFI scores, penetration success rates)
- Pain levels (VAS during attempted penetration)
- Anxiety and quality of life scales (e.g., GAD-7, SF-36)
- Regular reassessment at 6–8 weeks and 3 months allows clinicians to adjust therapy intensity and modality as needed.

4.4. Integration of Latest Rehabilitation Techniques

- Pelvic Floor Physical Therapy (PFPT): Individualized exercises, manual therapy, and relaxation techniques (Perna, 2023)
- Biofeedback and Electrical Stimulation: Objective feedback to reduce hypertonicity and reinforce relaxation (Chen et al., 2025)
- Cognitive Behavioral Therapy (CBT): Addresses anxiety and negative thought patterns contributing to muscle guarding (R bagheri et al., 2020)
- Mindfulness-Based Interventions: Supports awareness, reduces sexual distress, and complements physical therapy (Larraz et al., 2024)
- Novel Multimodal Approaches: Sacral erector spinae plane block combined with PFPT has shown early promise for refractory cases (Yilmaz EP et al., 2020)

4.5. Recommendations for Clinical Practice

1. Adopt a multimodal treatment plan integrating physiotherapy, psychological counselling, and mindfulness.
2. Start with relaxation and education before introducing penetration or dilator therapy.
3. Use objective measurements (sEMG, FSFI, VAS) to guide progression.
4. Encourage home practice and patient engagement to reinforce in-clinic therapy.
5. For refractory cases, consider advanced multimodal interventions such as targeted nerve blocks combined with PFPT.

5. CONCLUSION:

Vaginismus remains a multifactorial condition influenced by physiological muscle hypertonicity and psychological anxiety responses. This review highlights that relaxation-based interventions including progressive muscle relaxation, diaphragmatic breathing, mindfulness, pelvic floor physical therapy, and biofeedback are effective, evidence-supported strategies for reducing pelvic floor tension, improving pain tolerance, and restoring sexual function.

Contemporary evidence suggests that these interventions work not only through physical muscle desensitization but also by recalibrating the psychophysiological stress response associated with fear of penetration. The most significant improvements are observed when relaxation techniques are integrated into multimodal rehabilitation programs, combining physiotherapy, psychosexual counselling, and home-based relaxation practice.

Although promising, existing studies exhibit variability in design, dosage, and follow-up duration, limiting the ability to form standardized clinical protocols. Future research should prioritize randomized controlled trials with long-term follow-up, focusing on objective physiological markers and patient-reported outcomes.

In summary, relaxation-based therapy is a safe, cost-effective, and empowering approach in the management of vaginismus. Its integration into multidisciplinary care not only enhances functional recovery and sexual well-being but also addresses the emotional and relational dimensions of the disorder—marking a shift toward holistic, patient-centered rehabilitation.

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