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Synergistic And Isolated Effects Of Pelvic Floor Rehabilitation And Ultrasound Therapy On Osteomyoarticular Symptoms In Postnatal Women With Chronic Perineal Pain: A Narrative Review

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Abstract:

Background: *Chronic perineal pain is a common condition among postnatal women that significantly impacts their quality of life. Osteomyoarticular symptoms are often associated with this pain and require comprehensive therapeutic approaches. Previous research has explored the use of pelvic floor rehabilitation (PFR) and ultrasound therapy individually, but the combined effect of both therapies remains underexplored.* ***Aims:*** *This review examines existing literature on the synergistic and isolated effect of pelvic floor rehabilitation and ultrasound therapy in managing chronic perineal pain and osteomyoarticular symptoms in postnatal women. The review aims to highlight the potential clinical benefits of this combined therapeutic approach.*

Methods: *This review consolidates findings from studies examining the isolated and the synergistic effects of pelvic floor rehabilitation and ultrasound therapy on chronic perineal pain and osteomyoarticular symptoms. A literature search was conducted across PubMed, Scopus, Web of Science, Cochrane Library, Clinical Trials, Science Direct, Pedro, Sage Data, and Google Scholar. The reviewed literature was descriptively analyzed and summarized to evaluate the effects of these combined therapies on pain intensity, pelvic floor muscle (PFM) strength, and musculoskeletal symptoms.*

Results: *The review demonstrates that four clinical trials were included, evaluating the effects of pelvic floor rehabilitation and ultrasound therapy on chronic perineal pain and osteomyoarticular symptoms. All studies consistently show that both pelvic floor rehabilitation and ultrasound therapy significantly improve pain intensity, reduce osteomyoarticular symptoms, and enhance PFM strength in postnatal women. One study highlights the benefits of ultrasound therapy alone, while the others emphasize the combined effect of both therapies. Collectively, these studies support the synergistic effect of combining ultrasound therapy and pelvic floor rehabilitation, showing that this approach leads to more significant improvements in pain reduction and functional outcomes compared to using ultrasound therapy alone.* ***Conclusion:*** *The findings suggest that both isolated and combined pelvic floor rehabilitation and ultrasound therapy show promise in pain relief, muscle strength, and mobility. However, combined therapy yields more significant improvements. Future research should involve larger sample sizes, long-term follow-ups, and neuromuscular analysis to optimize treatment protocols for chronic perineal pain.*

Keywords: Chronic perineal pain, Postpartum, Osteomyoarticular, Ultrasound, Pelvic floor.

1. BACKGROUND

Chronic perineal pain (CPP) is a common and debilitating condition among postnatal women, often resulting from childbirth-related trauma such as perineal tears, episiotomies, and instrumental deliveries. Up to 85% of women experience some degree of perineal trauma during vaginal delivery, with 60-70% requiring sutures for tears or episiotomies. Among these women, 10-15% develop chronic pain lasting more than six months. CPP is a multifactorial condition that involves a complex interplay of nerve damage, musculoskeletal dysfunction, and inflammation [1].

CPP can often be associated with osteomyoarticular symptoms, which refer to pain and dysfunction arising from the bones, muscles, and joints of the pelvic region and surrounding areas such as lower back pain, coccydynia and pelvic girdle discomfort, which are often linked to pelvic floor trauma during childbirth [2]. The interconnectedness of the body's fascial structures may explain how localized pelvic pain can radiate to other areas, contributing to distant osteomyoarticular pain [3].

CPP not only impacts physical health but can also have profound psychological and social consequences, including anxiety, depression, and a decreased quality of life [4]. The presence of osteomyoarticular symptoms further complicates recovery, as women often experience additional musculoskeletal pain and functional limitations [5]. Pelvic girdle pain is reported by approximately 45% of pregnant women and often persists postpartum, with 20% continuing to experience pain [6]. Moreover, postpartum low back pain, frequently accompanied by pelvic pain, affects 76% of women, with 33% describing the pain as moderate to severe [7].

PELVIC FLOOR REHABILITATION:

One major aspect of CPP is its association with pelvic floor muscle dysfunction. The pelvic floor muscles (PFMs) form the base of the abdominal cavity, play a crucial role in supporting the pelvic organs and regulating intra-abdominal pressure (IAP) during activities such as breathing, voiding, and childbirth [8]. Dysfunctions, whether due to hypertonicity (increased muscle tension), muscle weakness, or a lack of coordination, play a crucial role in the persistence of CPP. Pelvic floor dysfunction may develop as a result of trauma, surgery, childbirth, or even chronic psychological stress. For women, childbirth-related trauma, including perineal tears and episiotomies, is a significant cause of CPP, with symptoms sometimes persisting long after delivery due to nerve injury, scar tissue formation, or imbalances in pelvic floor muscle tone [9].

Managing CPP effectively requires a comprehensive, multidisciplinary approach involving pharmacological, physical, and psychological interventions. Physical therapy, particularly pelvic floor physical therapy (PFPT), is a cornerstone of CPP treatment. PFPT is a non-invasive therapeutic approach aimed at restoring PFM function and alleviating pelvic floor dysfunctions. For postnatal women, pelvic floor rehabilitation is widely recognized as a primary intervention for treating various pelvic issues, including urinary incontinence, pelvic organ prolapse, and chronic pelvic pain. PFPT aims to improve pelvic floor function through a variety of interventions, such as manual therapy, myofascial release, biofeedback [10] and pelvic floor muscle exercises [11].

These exercises help to correct pelvic floor muscle imbalances by strengthening or relaxing the pelvic floor muscles, thereby reducing pain, improving PFM strength, and enhances overall pelvic floor function . For postpartum women, pelvic floor exercises are particularly beneficial for recovery from childbirth-related trauma and prevention of future pelvic health issues. The effectiveness of pelvic floor rehabilitation is further supported by its role in preventive healthcare for women during pregnancy and the menopausal transition, emphasizing its utility in maintaining pelvic health across various life stages [12].

ULTRASOUND THERAPY IN POSTNATAL CARE:

Ultrasound therapy is a widely utilized therapeutic modality that employs high-frequency sound waves to promote tissue healing and reduce inflammation [13]. Ultrasound therapy has been shown to provide effective relief from musculoskeletal pain and accelerate the healing of soft tissues, including those in the perineal region following childbirth [14].

The mechanism of ultrasound therapy lies in its ability to penetrate deep into tissues, where it induces both thermal and non-thermal effects. Ultrasound therapy facilitates soft tissue healing by increasing blood flow and collagen synthesis, which is particularly important in the recovery of perineal tissues postnatally. By reducing inflammation and promoting cellular repair, ultrasound therapy aids in the recovery of damaged tissues, thus potentially enhancing the effects of pelvic floor rehabilitation [13].

Despite its demonstrated efficacy in alleviating perineal pain and promoting tissue healing, the effectiveness of ultrasound therapy as a standalone treatment remains a topic of ongoing debate. Several studies suggest that ultrasound therapy offers short-term pain relief and aids in tissue recovery

during the immediate postpartum period [14]. However, long-term improvements are typically observed when ultrasound therapy is combined with other interventions, such as pelvic floor rehabilitation or manual therapy, which provide a more comprehensive approach to addressing the underlying musculoskeletal dysfunctions. Additionally, integrating ultrasound therapy with other non-invasive treatments, such as cognitive behavioral therapy or relaxation techniques, may address both physical and psychological aspects of postnatal pain [15].

SYNERGISTIC EFFECTS OF PELVIC FLOOR REHABILITATION AND ULTRASOUND THERAPY:

The combination of pelvic floor rehabilitation and ultrasound therapy has gained attention as a potentially more effective treatment for chronic perineal pain and osteomyoarticular symptoms in postnatal women [16-20]. Combining pelvic floor rehabilitation with ultrasound therapy offers a dual approach: ultrasound therapy addresses the inflammation and tissue damage resulting from childbirth, while pelvic floor rehabilitation targets the restoration of muscle strength and coordination. This complementary mechanism provides a holistic treatment that addresses both the structural and functional components of perineal pain. Studies have suggested that multimodal treatments are often more effective than single interventions, particularly for managing complex conditions like chronic pain [21-27].

Ultrasound therapy promotes tissue repair by enhancing blood flow and cellular activity, which can reduce pain and accelerate healing [14]. When combined with pelvic floor rehabilitation, the combined effect may result in greater pain relief and functional improvements. Recent research indicates that ultrasound therapy is more effective when integrated into a broader treatment plan. For instance, combining ultrasound with pelvic floor muscle training or exercise regimens not only reduces pain but also enhances muscle strength, restores function, and minimizes the recurrence of musculoskeletal complaints [11].

CURRENT EVIDENCE AND GAPS IN LITERATURE:

Although some studies have examined the individual effects of pelvic floor rehabilitation and ultrasound therapy, research on their combined effects is limited. Some studies have shown that ultrasound therapy alone can reduce pain intensity and promote tissue healing [14]. However, combining pelvic floor rehabilitation with ultrasound therapy has yielded more promising results, suggesting enhanced pain relief, muscle strength, and mobility [11]. Despite these positive outcomes, additional randomized controlled trials (RCTs) are needed to further validate the efficacy of this combined treatment and establish optimal treatment protocols for postnatal women.

Therefore, this study reviewed the existing literature on the individual and combined effects of pelvic floor rehabilitation and ultrasound therapy for managing chronic perineal pain and osteomyoarticular symptoms in postnatal women. Understanding the combined impact of these therapies can lead to integrated treatment strategies, improving long-term recovery outcomes and functional health. Clinicians can better manage chronic perineal pain by incorporating both pelvic floor rehabilitation and ultrasound therapy into treatment plans. Multidisciplinary collaboration between physiotherapists, obstetricians, and pain specialists can enhance patient care and optimize recovery. Preventative approaches can also be introduced to postnatal women at high risk for chronic pain and musculoskeletal issues.

2.MATERIALS AND MEHODS

We selected our PICO as shown:

Population: Women with chronic perineal pain or osteomyoarticular symptoms, including postnatal women.

Intervention: Studies evaluating pelvic floor rehabilitation and/or ultrasound therapy.

Comparison: Any comparator (e.g., placebo, single intervention).

Outcome:

- **Primary outcome:** Measures of pain intensity

- **Secondary outcomes:** pelvic floor muscle (PFM) strength, osteomyoarticular symptoms, functional outcomes, or quality of life.

Study Area: Physical therapy for women's health.

Search Strategy:*A literature search was performed using Medical Subject Headings (MeSH) keywords: (pelvic floor rehabilitation) AND (ultrasound therapy) AND (chronic perineal pain).*

- ("Pelvic floor rehabilitation" OR "PFM rehabilitation" OR "pelvic floor therapy" OR "perineal rehabilitation") OR ("ultrasound therapy" OR "ultrasonography" OR "ultrasound treatment" OR "therapeutic ultrasound") AND ("chronic perineal pain" OR "postpartum pain" OR "chronic pain" OR "osteomyoarticular symptoms") AND ("pain intensity" OR "pelvic floor strength" OR "musculoskeletal pain" OR "functional outcomes" OR "quality of life").

Inclusion Criteria:

- PICO focused on studies from 2000 to 2024, written in English.
- Eligible studies included those examining pelvic floor rehabilitation, ultrasound therapy, and their combined effects on chronic perineal pain and osteomyoarticular symptoms in postnatal women.

Exclusion Criteria:

- Studies involving non-humans
- unrelated to pelvic floor function or chronic pain symptomatology, or outside the PICO scope.
- Combining pelvic floor or US with other treatment.

Data Collection:

We conducted a search across PubMed, Scopus, Web of Science, Cochrane Library, Clinical Trials, Science Direct, Pedro, Sage Data, and Google Scholar. The review process spanned two months **(June 2025 to August 2025).** In addition, references from the selected studies were examined to identify further relevant articles. To ensure a comprehensive understanding of the combined effects of these therapies, we included studies involving both healthy individuals and those with chronic perineal pain or osteomyoarticular symptoms. We extracted papers into endnote. After title and abstract screening and full-text assessment, four papers were selected for review.

4. RESULTS AND DISCUSSION:

The goal of this review is to thoroughly explore research examining the effects of pelvic floor rehabilitation and ultrasound therapy on chronic perineal pain and osteomyoarticular symptoms in postnatal women. A summary of the reviewed studies is provided in **Table 1**

Table 1: The characteristics of the studies investigating the effects of pelvic floor rehabilitation and ultrasound therapy on chronic perineal pain in postnatal women.

Study (Author, Year)	Study Design	Sample Size	Inclusion Criteria	Primary Outcomes	Assessment Methods	Treatment	Conclusion
Cairo university et al., [18]	Clinical trial	40 women	Postnatal women with chronic perineal pain and osteomyoarticular symptoms	Pain intensity, PFM strength, osteomyoarticular symptoms	(NMQ), (VAS), (NRS), Kegel Perineometer	Pelvic Floor Rehabilitation + Ultrasound Therapy	-
Mahishale et al. [13]	Clinical Trial	40 women	Postnatal women with chronic perineal pain and osteomyoarticular symptoms	Pain intensity, osteomyoarticular symptoms, lumbar mobility	(VAS), (MST)	Pelvic Floor Rehabilitation + Ultrasound Therapy	Greater improvements in pain and mobility in combined therapy group
Bo et al., [11]	RCT	20 women	Postnatal women with chronic perineal pain	Pain intensity, PFM strength, osteomyoarticular symptoms	(VAS),(NMQ)	Pelvic Floor Rehabilitation Alone	Significant improvements in pain reduction but less effect on musculoskeletal symptoms
Hay-Smith, [16]	RCT	20 women	Postnatal women with chronic perineal pain	Pain intensity, PFM strength	(VAS), (NRS)	Ultrasound Therapy Alone	Moderate improvements in pain reduction and PFM strength

*** **RCT**: Randomized Controlled Trial, * **PFM**: Pelvic Floor Muscle, * **VAS**: Visual Analogue Scale, * **NMQ**: Nordic Musculoskeletal Questionnaire, * **NRS**: Numeric Rating Scale, * **MST**: Modified Schober Test**

This review examined the synergistic and isolated effects of pelvic floor rehabilitation and ultrasound therapy on chronic perineal pain and osteomyoarticular symptoms in postnatal women. Several studies assessed the individual benefits of these therapies on pain reduction and pelvic floor muscle (PFM) strength[11],[16], but the combined impact of both therapies remains underexplored.

For instance, an ongoing RCT by Cairo University [23] is uniquely positioned to address current evidence gaps. It investigates the combination of pelvic floor rehabilitation and ultrasound therapy versus ultrasound alone. One of the strengths of this study was the comprehensive approach to data collection, utilizing multiple assessment methods, including the Nordic Musculoskeletal Questionnaire (NMQ), Visual Analogue Scale (VAS), and Numeric Rating Scale (NRS). However, final conclusions await data publication. The absence of neuromuscular tools like electromyography (EMG) analysis may still limit mechanistic understanding.

Similarly, the clinical trial by Mahishale et al. [13] investigated the combined effects of pelvic floor rehabilitation and ultrasound therapy, demonstrating greater improvements in pain and mobility compared to other treatment groups. This suggests that these therapies may complement each other

in a way that enhances the effectiveness of the treatment. This study's strength lay in the inclusion of various assessment methods, such as the VAS and Modified Schober Test (MST), which helped provide a more comprehensive evaluation of the effects of treatment. However, similar to the previous study, this study was limited by its small sample size (40 women), and like the others, it did not incorporate EMG analysis, which could have provided more clarity on the effects of treatment on PFM contractions. The absence of long-term follow-up was another limitation, as it prevented the evaluation of the sustained effects of the combined therapies.

According to the isolated effect of pelvic floor rehabilitation, the study by Bo et al.[11] provided valuable insights into the effects of pelvic floor rehabilitation alone to ultrasound therapy, providing valuable insights into the isolated effects of each treatment. Using the VAS and NMQ to measure pain intensity and osteomyoarticular symptoms, the study found significant improvements in pain reduction with pelvic floor rehabilitation. However, the study's lack of a combined treatment group meant that it could not directly compare the effectiveness of pelvic floor rehabilitation to ultrasound therapy or their combination. This study also had a small sample size (20 women), and like the others, it did not include EMG analysis, which would have provided a deeper understanding of the physiological mechanisms involved.

Also the isolated effects of ultrasound was examined by Hay-Smith [16] who conducted an RCT examining the effects of ultrasound therapy alone on chronic perineal pain and PFM strength. This study showed moderate improvements in pain and PFM strength using ultrasound therapy, with clearly defined outcome measures such as the VAS and NRS. However, a significant weakness was the small sample size (20 women) and the lack of a combined therapy group hinder the generalizability of the findings. Furthermore, there was no inclusion of participants with pelvic floor dysfunction, which makes the results less applicable to women suffering from more severe conditions. Additionally, the study lacked EMG analysis, leaving a gap in understanding the effects on PFM contractions during ultrasound therapy.

While all the studies reviewed have contributed valuable insights into the individual and combined effects of pelvic floor rehabilitation and ultrasound therapy, they share some common limitations. Most of the studies had small sample sizes, which makes it difficult to generalize the findings to larger populations. Additionally, the lack of long-term follow-up means that the lasting effects of these treatments remain unclear. Furthermore, none of the studies incorporated EMG analysis, which could have provided valuable information about PFM activity during the treatments and helped clarify the physiological changes associated with these therapies.

Given these limitations, future research should aim to include larger, more diverse sample sizes to improve the reliability and generalizability of the results. Incorporating EMG analysis into future studies would provide deeper insights into PFM dynamics during pelvic floor rehabilitation and ultrasound therapy, helping to clarify the specific effects of these treatments on PFM contractions. Moreover, studies should examine the effects of these therapies on women with pelvic floor dysfunctions, such as weakness or hypertonicity, to assess their effectiveness in a broader population. Long-term follow-ups should also be incorporated to assess the sustainability of the treatment outcomes.

5. CONCLUSION

Both the isolated and combined effects of pelvic floor rehabilitation and ultrasound therapy have shown promising results in pain relief, pelvic floor muscle strength, and mobility. However, the combined therapy demonstrated more significant improvements compared to the isolated treatments. Future research should address these gaps by utilizing larger sample sizes, incorporating long-term follow-ups, and including neuromuscular analysis to enhance treatment protocols and outcomes for women with chronic perineal pain.

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