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Title: Effect of Physical Therapy Interventions on Postpartum Pelvic Girdle Pain: A Systematic Review

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ABSTRACT

Purpose: This literature review aims to review the efficacy of physical therapy interventions in reducing pain and improving function in women with postpartum pelvic girdle pain (PGP).

Review methods: The electronic databases were searched from the inception to May 2026. A systematic search was performed at PubMed, Scopus, Cochrane/CENTRAL, PEDro, and Google Scholar. Studies including randomized controlled trials, clinical trials, and prospective cohort studies on physical therapy interventions for postpartum PGP were examined. The risk of bias was assessed using the Cochrane Risk of Bias tool, version 2 (RoB-2), and the Newcastle-Ottawa Scale. A narrative synthesis was undertaken due to clinical heterogeneity. The review was registered in PROSPERO (CRD420261396977).

Results: A total of 2,087 participants were included. Studies found specific stabilizing exercises consistently reduced pain and disability more than general exercises or usual care (6/9 studies; effect sizes 0.78-1.49). The combination of extracorporeal shock wave therapy or low-level laser therapy plus exercise outperformed a single modality, and pelvic support was less effective than lumbar orthotic support. Kinesio taping targeting the posterior oblique sling significantly reduced pain, with a mean difference of −15.1 mm and an effect size of 1.39. Risk of bias was low in 3 studies, some concerns existed in 20, and high risk of bias was present in 1.

Conclusion: Interventions in physical therapy, including specific stabilizing exercises, combined with electrophysical modalities, lumbar orthotic support, and posterior oblique sling kinesio taping, are effective for postpartum PGP. Trials of high quality, adequate power, and long-term follow-up are justified.

Keywords: pelvic pain; postpartum; physical therapy; exercise therapy; systematic review.

Highlights

- The findings indicate that specific stabilizing exercises showed the most consistent evidence of benefit among the physical therapy interventions examined for postpartum pelvic girdle pain.
- Combining electrophysical modalities with exercises, lumbar orthotic support, and posterior oblique sling kinesio tape results in significant reductions in pain and disability.
- Lumbar corsets are more effective than pelvic belts in postpartum pelvic girdle pain.
- Available evidence suggests that unsupervised home-based exercise programs may not yield outcomes superior to the natural course of recovery.

Plain Language Summary

This research explores which physical therapy (PT) interventions are most beneficial in postpartum women with pelvic girdle pain. The study systematically reviewed the six physical therapy intervention methods. The study found that specific stabilization exercises for the pelvic girdle showed the most consistent benefit. Also, this study suggests that the use of electrophysical modalities alone is less effective than combining them with exercises, lumbar orthotic support, and posterior oblique sling kinesio tape. The review found that the use of a lumbar corset is more effective than pelvic belts. The findings suggest that using stabilization exercises for the pelvic girdle could be beneficial for rehabilitation and should be considered in rehabilitation programs for these individuals. The study suggests that home routine training does not help reduce pain, as the women train without supervision.

These results can help physical therapists to choose the best intervention category that will have the greatest effect on reducing pain and restoring normal biomechanics. Also, this study identifies the gaps found in previous research and offers suggestions for future randomized controlled trials.

INTRODUCTION

PGP is characterized by pain felt between the posterior iliac crest and the gluteal fold, sometimes extending to the back of the thigh [1], typically beginning during pregnancy or within the first three weeks after childbirth [2].

Previous studies found that certain women may experience PGP for 10 years postpartum, contradicting the notion that the condition is always short-lived [3]. Research into detecting which women are likely to have a high risk of developing persistent symptoms is an ongoing area, with predictive factors encompassing psychological, occupational, and biomechanical aspects [4].

A previous study indicated that clinical diagnoses of PGP rely on a combination of provocation test results rather than a single definitive test [1]. The active straight leg-raising test is a validated method for assessing load transfer impairment [5]. Clinical tests for the sacroiliac joint have been informed by anatomical and biomechanical descriptions, which highlight the joint's function in transferring loads between the spine and lower limbs [6]. The overlap with nonspecific low back pain presentations can lead to under-recognition of postpartum PGP in primary care settings [1].

The women who experienced PGP had a lower quality of life, higher activity restrictions, and higher levels of kinesiophobia compared to those whose symptoms subsided [7]. During the postpartum period, a reciprocal relationship exists between physical and mental well-being, with ongoing pelvic girdle and lumbar pain also linked to postpartum depression [7]. Pregnancy-related back and pelvic pain at a population level is linked to higher rates of absenteeism and a greater use of healthcare services throughout the postpartum period [8]. These findings collectively position postpartum PGP as a condition with implications that extend into occupational, psychological, and health-system domains [8].

The rise in relaxin and related hormones around the time of childbirth increases ligamentous laxity in the sacroiliac joints and pubic symphysis, reducing the contribution to pelvic stability [9]. This increases the demand on the active muscular system to achieve adequate force closure and load transfer through the pelvis [9]. The transversus abdominis has been found to provide segmental stability to the lumbar spine, and altered recruitment of this muscle has been linked to low back pain [10]. The pelvic floor muscles also contribute to postural and respiratory function as part of the lumbopelvic unit, and dysfunction in these muscles is linked to lumbopelvic pain [11].

Physical therapy approaches in postpartum, according to the pathophysiological model of PGP, focus on restoring neuromuscular control rather than providing symptomatic treatments [12]. Clinical guidelines for postpartum women now encompass recommendations in various areas, such as exercise plans, patient education, and return-to-activity protocols [13].Randomized evidence indicates that programs centred on specific stabilizing exercises generally produce greater and more durable reductions in pain and functional limitation than conventional physiotherapy [14]; however, the benefit is less consistent when such exercises are delivered with minimal supervision [15]. Despite this growing body of evidence, the systematic reviews most relevant to the topic have concentrated on pelvic girdle pain during the antenatal period rather than the postpartum population [16].

Additionally, methodological reviews have identified significant inconsistencies in the outcome measures used across pelvic girdle pain research, making it difficult to compare studies [17].

This systematic review evaluated the effectiveness of physical therapy interventions for pain and disability in women with postpartum PGP, with secondary objectives focusing on pelvic floor muscle function, quality of life, and the risk of bias in the included studies. The review was conducted in accordance with PRISMA 2020 guidelines [18].

METHODS

Study Design and Registration

The systematic review was registered prospectively on PROSPERO (CRD420261396977) prior to data collection, and the review was conducted exactly as outlined in the registration, with no deviations [18].

Eligibility Criteria

Studies were eligible for inclusion if they involved postpartum women with pelvic girdle pain or lumbopelvic pain, compared a physiotherapy-based intervention to a control group, and assessed either pain intensity or functional disability as an outcome measure. Eligibility was restricted to English-language articles that had undergone peer review. Studies consisting of abstracts from conferences, case reports, cross-sectional designs, and trials that only occurred during pregnancy and had no follow-up after birth were excluded. The full inclusion and exclusion framework, structured according to the PICOS model, is outlined in Table 1. Throughout, we use pelvic girdle pain (PGP) as the umbrella term; several included trials enrolled a broader "lumbopelvic pain" population, and this is indicated where relevant.

Information Sources and Search Strategy

Databases such as PubMed (MEDLINE), Scopus, Cochrane CENTRAL, PEDro, and Google Scholar were searched from their inception up to May 2026. The search terms were combined using MeSH headings and free-text keywords, encompassing intervention (physiotherapy-related terms), population (pelvic girdle pain and postpartum), and design filters, joined via Boolean logic. In addition to the database search, manual checks of the reference lists of all eligible articles were also conducted to identify any studies that may have been overlooked. The PubMed search string is provided in full within Supplementary File 1.

Study Selection

The duplications were removed by Rayyan [19]. Titles and abstracts were screened independently and in duplicate by both reviewers, and the full texts of potentially relevant studies were then assessed independently by the same two reviewers against the eligibility criteria. Disagreements at either stage were resolved through discussion until consensus was reached. Where outcome data were incompletely reported, we attempted to contact the corresponding authors by email to obtain the missing information. The 2020 PRISMA flow of records is fully depicted in Figure 1.

Data Extraction

The lead reviewer tested the data in a pilot phase before put into standardized use; the data extracted from each included study, this was independently verified by the second author. All extracted data included study design, setting, participant demographic data, details of the intervention and comparator, outcome measures used, and the associated results.

Risk of Bias Assessment

The methodological quality of the included RCTs and non-randomized clinical trials was independently assessed by both reviewers using the Cochrane RoB-2 tool [20], with any disagreements resolved through discussion; the tool evaluates five key domains: the randomization process, deviations from intended interventions, missing outcome data, outcome measurement, and selection of reported results. A prospective cohort study was independently assessed by both reviewers using the Newcastle-Ottawa Scale [21], with any discrepancies resolved through discussion.

Data Synthesis

The included studies showed significant disparities in intervention type, comparator, and outcome measures, making them incompatible with combining results in a meta-analysis; as a result, findings were synthesized narratively in accordance with the Synthesis Without Meta-analysis (SWiM) guidance [22], consistent with Cochrane Handbook recommendations [23], which grouped studies into six broad intervention categories for comparison. Conventional benchmarks categorize effect sizes (Cohen's d) Small (0.2), moderate (0.5), and large (0.8 or above) [24].Where primary studies did not report the data required to calculate a standardized effect size, only the reported p-values and mean differences are presented (shown as "-" in Table 2). Because no pooled hypothesis testing was undertaken, correction for multiple comparisons was not applicable, and individual study p-values should be interpreted descriptively.

RESULTS

Study Selection

A database search returned 466 records. After removing duplicates, 312 unique records were assessed, of which 256 were excluded at the title and abstract stage. One report that of Zheng et al. (2023), was not retrieved, while fifty-six reports were sought for retrieval. Out of 55 reports evaluated, 31 were excluded: 18 were trial registrations, eight had ineligible designs, and five enrolled non-postpartum populations. Twenty-four studies were included in the analysis (Figure 1).

Characteristics of Included Studies

The 24 included studies consisted of 22 randomized controlled trials, one clinical trial, and one prospective cohort study, enrolling 2,087 participants (range 16-504). Research took place in six different countries: Egypt (n=5) [25-29], Iran (n=4) [30-33], China (n=5) [34-38], Sweden (n=3) [15, 39-40], Pakistan (n=3) [41-43], as well as in Norway, Japan, the UK, and the Netherlands each (n=1) [14, 44-46]. The study characteristics are detailed in Table 1.

Risk of Bias Assessment

The results of the risk of bias assessment are shown in Table 3. Two studies were rated low overall risk [30, 37], 20 had some concerns (predominantly performance bias, Domain 2), and one was rated high risk (Shafique et al., [42]; convenience sampling, n = 8/group). The cohort study [40] was rated low risk on the Newcastle-Ottawa Scale.

Synthesis of Results

A summary of the between-group mean differences, p-values, and the direction of effect for each study is presented in Table 2.

Exercise and Stabilization Therapy (n = 9 studies)

Specific stabilizing exercises (SSE) demonstrated consistent superiority over comparators. Stuge et al. [14] reported a between-group evening pain difference of 30 mm Visual Analogue Scale (VAS) ($p < 0.001$; $d = 1.49$), with 75% of SSE participants scoring below the disability threshold versus 25% of controls, maintained at one-year follow-up. Teymuri et al. [31] demonstrated marked VAS reduction (74.4 to 11.7; $p = 0.001$) and improved pelvic floor muscle (PFM) contraction ($p = 0.04$) when stabilization was added to electrotherapy. Saleh et al. [25] confirmed significant improvements in pain pressure threshold (PPT), VAS, and Oswestry Disability Index (ODI) (all $p < 0.01$). Adding PFM training to SSE conferred additional benefit: ElDeeb et al. [29] reported a large PFM strength effect ($d = 0.96$), and Yang et al. [35] showed 100% minimal clinically important difference (MCID) attainment for pain and disability ($p < 0.001$) versus 30-35% in controls. Conversely, Gutke et al. [15] found unsupervised home SSE no more effective than a telephone contact session (disability: $p = 0.205$).The three studies that did not show clear superiority for stabilizing exercises [15, 30, 32] differed either in delivery—unsupervised or home-based rather than individually supervised—or in comparator, having been contrasted with an active general-exercise program which likely explains the attenuated between-group effect.

Orthotic and Supportive Devices (n = 4 studies)

Jafarian et al. [33] demonstrated that lumbar support was superior to pelvic support for pain ($d = 3.97$), disability ($d = 3.3$), and active straight leg raise (ASLR) effort (all $p < 0.001$). Shafique et al. [42] reported significant reductions with belt plus exercises (VAS: 7.12 to 2.62; ODI: 30.0 to 12.0; $p < 0.01$), though high risk of bias warrants caution. Halliday et al. [44] reported acceptable feasibility for a customised dynamic elastomeric fabric orthosis (DEFO) but insufficient power to assess efficacy. Sakamoto et al. [46] found that both the pelvic realignment device and stabilization exercise groups achieved significant within-group reductions in PGQ scores by 13 weeks (both $p < 0.001$ vs. $p = 0.85$ for control), although between-group differences were not significant ($p = 0.42$); for pain, only the device group showed significant within-group VAS reduction ($p = 0.043$) and was significantly superior to control ($p = 0.030$), with greater immediate (4-week) pain relief than the exercise-only group (−8.1 mm vs. −2.9 mm).

Electrophysical Modalities (n = 4 studies)

Combined therapy outperformed monotherapy across all four studies. Elhosary et al. [26] and El-Shafei et al. [27] confirmed that extracorporeal shock wave therapy (ESWT) or low-level laser therapy (LLLT) plus exercise produced significantly better outcomes than exercise alone ($p < 0.05$). Shehata et al. [28] found combined LLLT plus stabilization also reduced serum cortisol ($p = 0.001$). Tan et al. [34] reported the highest cure rate with combined focused ESWT plus manual therapy (73.3%) versus focused ESWT (33.3%) or manual therapy alone (50%).

Kinesio Taping and Muscle Energy Techniques (n = 2 studies)

Lu et al. [37] demonstrated large effects for the posterior oblique sling kinesio taping (KT) technique versus sham taping (VAS MD = −15.1 mm; $d = 1.39$; Pelvic Girdle Questionnaire (PGQ) $p = 0.021$; Timed Up and Go (TUG) $p = 0.041$; all $p < 0.05$). Sabrina et al. [43] found KT and muscle energy technique (MET) equally effective for pain, disability, and pelvic asymmetry (all $p > 0.05$).

Technology-Based Interventions (n = 3 studies)

Liu et al. [36] found virtual reality (VR) did not reduce pain versus conventional therapy ($p > 0.05$) but improved fast-twitch PFM relaxation ($p < 0.05$) with 80.77% pain resolution at one year. Li et al. [38] reported significant benefit of whole-body vibration ($p < 0.05$). Bastiaenen et al. [45] found biopsychosocial physical therapy (PT) produced borderline significant disability reduction overall (MD = −2.0; $p = 0.05$) and significantly greater benefit in those with severe disability (MD = −4.3; $p = 0.003$).

Observational and Follow-up Studies (n = 2 studies)

Elden et al. [39] reported 99% PGP resolution at 12 weeks postpartum irrespective of treatment during pregnancy. Vesting et al. [40] demonstrated that PFM strength ≥ Grade 3 predicted lower PGQ scores at 12 months ($\beta = -3.13$; $p = 0.02$) and diastasis recti abdominis (DRA) ≥ 35 mm predicted worse outcomes ($\beta = 5.38$; $p = 0.01$).

DISCUSSION

This review synthesized evidence from 24 studies (n = 2,087) across six intervention categories. Specific stabilizing exercises, combined electrophysical modalities, lumbar orthotic support, and posterior oblique sling KT were each associated with reductions in pain and disability, whereas unsupervised home exercise showed no clear advantage over natural recovery.

The superior results of SSE are consistent with the biomechanical model of postpartum PGP, which necessitates targeted neuromuscular rehabilitation due to compromised force closure [1, 9]. A landmark trial by Stuge et al. [14] offers the most robust methodological evidence, resulting in substantial and long-lasting effect sizes. PFM training, when integrated, offers supplementary effects [29, 35], which are mechanistically plausible given the synergistic role of PFMs in modulating intra-abdominal pressure and sacroiliac joint stiffness [11]. The suggestion that unsupervised home-based programs may not outperform natural recovery derives mainly from a single trial [15] that was affected by substantial loss to follow-up, and it should therefore be regarded as preliminary; it nonetheless underscores the likely importance of supervision and adherence in shaping outcomes. A lumbar corset may have a greater advantage than a pelvic support because it engages the thoracolumbar fascia to address a wider area of lumbopelvic instability [33]. This inference, however, rests on a single trial reporting an unusually large effect size (d = 3.97); such a magnitude should be interpreted with caution, as it may partly reflect methodological or measurement factors rather than a true effect of that size, and it requires confirmation in further studies before firm clinical recommendations can be made. Each patient should have an orthotic prescription tailored to their individual pain patterns and functional constraints. A multimodal approach consistently demonstrates the superiority of combined electrophysical and exercise therapy. Extracorporeal shockwave therapy may influence pain pathways through neurogenic mechanisms [47], whereas low-level laser therapy has anti-inflammatory effects through photobiomodulation [48]. Combining these analgesic effects with exercise-induced neuromuscular adaptations may simultaneously address peripheral pain generators and motor control deficits. One of the largest impacts measured in this review is associated with the posterior oblique sling protocol [37]. The technique targets the multi-segmental muscle chain consisting of the gluteus maximus, thoracolumbar fascia, and contralateral latissimus dorsi muscles, which are implicated in sacroiliac force closure. Lu et al. [37] used a double-blind design, which is an uncommon methodological approach in KT research, unlike Sabrina et al. [43] who used a single-blind design comparing KT with muscle energy technique. Research indicates that virtual reality has a notable impact on the quick relaxation of the pelvic floor muscle, even though it does not surpass traditional pain relief methods in effectiveness, suggesting its potential as a supplementary treatment option for women experiencing overactive PFM, with approximately a 80.77% one-year resolution rate [36]. Research by Bastiaenen et al. [45] showed substantial advantages for women with severe disabilities, underscoring the need to address fear-avoidant beliefs, a recommendation also made by current pain management guidelines [49]. The reported 99% resolution rate at 12 weeks, regardless of treatment, as cited in reference [39], helps to contextualize the reviewed interventions, suggesting that reassurance and activity modification might be sufficient for treating acute PGP. Targeted supervised physical therapy assumes greater clinical importance for 10%-25% of patients with persistent symptoms [2, 4]. Routine assessment of pubococcygeus muscle strength may be warranted in women with PGP, given its predictive value for long-term outcomes [40].

The limitations in question need to be acknowledged. A narrative synthesis was necessary because of clinical and statistical heterogeneity; consequently, statistical measures of heterogeneity (e.g. I^2, Tau^2) could not be computed, and quantitative assessment of reporting or publication bias through funnel plots or Egger's test was not feasible in the absence of a meta-analysis. The possibility of publication bias should nonetheless be considered, as most included trials reported positive findings; small-study effects and the selective publication of favourable results may therefore have influenced the overall direction of the evidence. Two databases (CINAHL and Embase) were not searched because of institutional subscription constraints, which may have reduced the comprehensiveness of the search and introduced a risk of selection bias; to partially mitigate this, the reference lists of all eligible articles were hand-searched, although some relevant records may still have been missed. Eligibility was restricted to peer-reviewed articles published in English, so language bias and the limited inclusion of grey literature (such as conference abstracts, dissertations, and unpublished trials) cannot be excluded. Because screening decisions were resolved by discussion rather than quantified, a formal inter-rater reliability statistic (e.g. Cohen's kappa) was not calculated. The included women spanned a wide postpartum window (from two weeks to twelve months), and this variation in timing may itself influence treatment response but could not be examined separately. In addition, a substantial proportion of the evidence originated from a small number of countries (with several trials conducted in Egypt, Iran, and Pakistan), which may limit the generalisability of the findings to populations that differ in healthcare context, body composition, and cultural practice. The study by Zheng et al. (2023) could not be retrieved: the full text was unavailable through our institutional access and an interlibrary request, and the corresponding author did not respond to our email. Short follow-up periods (≤12 weeks in most trials) restricted long-term conclusions, and performance bias was largely unavoidable in exercise-based trials because participants and therapists could not be blinded. The high risk of bias in one study and some concerns in 20 lower the overall confidence in the evidence to a moderate-to-low level.Several trials reported only p-values without effect sizes or 95% confidence intervals, which limits assessment of the precision and magnitude of effect. Because a meta-analysis was not feasible, subgroup and sensitivity analyses—including exclusion of the high-risk trial—could not be performed. None of the included studies systematically reported adverse events, and economic, adherence, and patient-satisfaction outcomes were seldom reported; optimal treatment dosing therefore could not be derived, and the per-study protocols in Table 1 should be consulted for intervention detail.

Conclusions

This study concluded that the first-line strategy of physical therapy intervention in postpartum women with PGP was SSE, individually supervised, and incorporating PFM training. Also, the combination of the electrophysical modalities (ESWT or LLLT) with exercises, lumbar orthotic support, and posterior oblique sling kinesio tape offers clinically significant benefits. The protocol of home program training without supervision may not challenge the body beyond its natural ability to recover.

Future research should prioritize adequately powered randomized controlled trials that adopt validated, standardized outcome measures-particularly the Pelvic Girdle Questionnaire and the active straight leg raise with a minimum follow-up of twelve months. Motor-control approaches such as Kinetic Control and NeuroKinetic Therapy warrant specific evaluation because they directly target the impaired lumbopelvic motor control implicated in postpartum PGP, and future trials should incorporate subgroup analyses by postpartum timing and symptom severity, together with systematic reporting of adverse events and adherence.

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AUTHOR CONTRIBUTIONS

Atef Mohamed Doweir: Conceptualization; Supervision; Methodology; Investigation; Data curation; Formal analysis; Writing-original draft; Writing-review and editing; Visualization; Project administration. Ayman Ayoub: Conceptualization; Methodology; Validation; Writing-review and editing.

STATEMENTS AND DECLARATIONS

Ethical Considerations: Not applicable. This is a systematic review of previously published studies.

Consent to Participate: Not applicable.

Consent for Publication: Not applicable.

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REFERENCES

1. Vleeming A, Albert HB, Ostgaard HC, et al. European guidelines for the diagnosis and treatment of pelvic girdle pain. Eur Spine J. 2008; 17(6):794-819.

2. Wuytack F, Daly D, Curtis E, et al. Prognostic factors for pregnancy-related pelvic girdle pain: a systematic review. Midwifery. 2018; 66:70-78.

3. Vermani E, Mittal R, Weeks A. Pelvic girdle pain and low back pain in pregnancy: a review. Pain Pract. 2010; 10(1):60-71.

4. Bergström C, Persson M, Nergård KA, et al. Prevalence and predictors of persistent pelvic girdle pain 12 years postpartum. BMC Musculoskelet Disord. 2017; 18(1):399.

5. Beales DJ, O'Sullivan PB, Briffa NK. The effects of manual pelvic compression on trunk motor control during an active straight leg raise in chronic pelvic girdle pain subjects. Man Ther. 2010; 15(2):190-199.

6. Vleeming A, Schuenke MD, Masi AT, et al. The sacroiliac joint: an overview of its anatomy, function and potential clinical implications. J Anat. 2012; 221(6):537-567.

7. Gutke A, Lundberg M, Östgaard HC, et al. Impact of postpartum lumbopelvic pain on disability, pain intensity, health-related quality of life, activity level, kinesiophobia, and depressive symptoms. Eur Spine J. 2011; 20(3):440-448.

8. Bergström C, Persson M, Mogren I. Sick leave and healthcare utilisation in women reporting pregnancy-related low back pain and/or pelvic girdle pain at 14 months postpartum. Chiropr Man Therap. 2016; 24(1):7.

9. Snijders CJ, Vleeming A, Stoeckart R. Transfer of lumbosacral load to iliac bones and legs: biomechanics of self-bracing of the sacroiliac joints. Clin Biomech. 1993; 8(6):285-294.

10. Hodges PW, Richardson CA. Inefficient muscular stabilization of the lumbar spine associated with low back pain: a motor control evaluation of transversus abdominis. Spine. 1996; 21(22):2640-2650.

11. Hodges PW, Sapsford R, Pengel LHM. Postural and respiratory functions of the pelvic floor muscles. Neurourol Urodyn. 2007; 26(3):362-371.

12. Stuge B. Evidence of stabilizing exercises for low back- and pelvic girdle pain: a critical review. Braz J Phys Ther. 2019; 23(2):181-186.

13. Simonds AH, Abraham K, Spitznagle T. Clinical practice guidelines for pelvic girdle pain in the postpartum population. J Womens Health Phys Therap. 2022; 46(1):E1-E38.

14. Stuge B, Lærum E, Kirkesola G, et al. The efficacy of a treatment program focusing on specific stabilizing exercises for pelvic girdle pain after pregnancy: a randomized controlled trial. Spine. 2004; 29(4):351-359.

15. Gutke A, Sjödahl J, Öberg B. Specific muscle stabilizing as home exercises for persistent pelvic girdle pain after pregnancy: a randomized, controlled clinical trial. J Rehabil Med. 2010; 42(10):929-935.

16. Richards E, Van Kessel G, Virgara R, et al. Does antenatal physical therapy for pregnant women with low back pain or pelvic pain improve functional outcomes? A systematic review. Acta Obstet Gynecol Scand. 2012; 91(9):1038-1045.

17. Wuytack F, O'Donovan M. Outcomes and outcome measurements used in intervention studies of pelvic girdle pain and lumbopelvic pain: a systematic review. Chiropr Man Therap. 2019; 27(1):62.

18. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021; 372:n71.

19. Ouzzani M, Hammady H, Fedorowicz Z, et al. Rayyan—a web and mobile app for systematic reviews. Syst Rev. 2016; 5(1):210.

20. Sterne JAC, Savović J, Page MJ, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. BMJ. 2019; 366:l4898.

21. Wells GA, Shea B, O'Connell D, et al. The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses. Ottawa Hospital Research Institute; 2013.

22. Campbell M, McKenzie JE, Sowden A, et al. Synthesis without meta-analysis (SWiM) in systematic reviews: reporting guideline. BMJ. 2020; 368:l6890.

23. Higgins JPT, Thomas J, Chandler J, et al. Cochrane Handbook for Systematic Reviews of Interventions. Version 6.4. London: Cochrane; 2023.

24. Cohen J. Statistical Power Analysis for the Behavioral Sciences. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.

25. Saleh MSM, Botla AMM, Elbehary NAM. Effect of core stability exercises on postpartum lumbopelvic pain: a randomized controlled trial. J Back Musculoskelet Rehabil. 2019; 32(5):٢٠٥-٢١٣.

26. Elhosary EM, et al. Effect of extracorporeal shock wave therapy combined with exercises on postpartum sacroiliac joint pain: a randomized controlled trial. Bull Fac Phys Ther. 2021; 26(1):4.

27. El-Shafei AM, et al. Low-level laser therapy versus posture correction exercises on postpartum sacroiliac joint pain: a randomized controlled trial. Phys Ther Rehabil. 2024; 11(2):45-53.

28. Shehata HS, et al. Effect of low-level laser therapy combined with stabilization exercises on postpartum pelvic girdle pain. Egypt J Phys Ther. 2021; 14(1):31-39.

29. ElDeeb AM, Abd-Ghafar KS, Ayad WA, et al. Effect of segmental stabilizing exercises augmented by pelvic floor muscles training on women with postpartum pelvic girdle pain. J Back Musculoskelet Rehabil. 2019; 32(5):693-700.

30. Ehsani F, Sahebi N, Shanbehzadeh S, et al. Stabilization exercise affects function of transverse abdominis and pelvic floor muscles in women with postpartum lumbo-pelvic pain: a double-blinded randomized clinical trial. Int Urogynecol J. 2020; 31(1):197-204.

31. Teymuri Z, Hosseinifar M, Sirousi M. The effect of stabilization exercises on pain, disability, and pelvic floor muscle function in postpartum lumbopelvic pain: a randomized controlled trial. Am J Phys Med Rehabil. 2018; 97(12):885-891.

32. Khorasani MN, et al. Effects of home-based pelvic floor stabilization exercises on urinary incontinence and low back pain in postnatal women. Iran J Nurs Midwifery Res. 2020; 25(3):211-217.

33. Jafarian FS, Jafari-Harandi M, Yeowell G, et al. Efficacy of lumbar versus pelvic support in postpartum pelvic girdle pain: a randomized controlled trial. Clin Rehabil. 2025; 39(3):312-321.

34. Tan Y, et al. Focused extracorporeal shock wave therapy versus manual therapy for postpartum sacroiliac joint dysfunction: a three-armed clinical trial. J Rehabil Med. 2024; 56:564.

35. Yang K, Hu J, Wang J, et al. Functional training versus conventional physiotherapy for postpartum pelvic girdle pain: a randomized controlled trial. Sci Rep. 2026; 16:11803.

36. Liu X, et al. Virtual reality combined with pelvic floor rehabilitation for postpartum myofascial pelvic pain syndrome: a randomized controlled trial. Int Urogynecol J. 2026; 37(4):789-798.

37. Lu J, et al. Novel kinesio taping targeting the posterior oblique sling for postpartum pelvic girdle pain: a double-blind randomized controlled trial. Physiotherapy. 2026; 122:45-54.

38. Li Y, et al. Whole-body vibration therapy for postpartum pelvic girdle pain: a randomized controlled trial. J Clin Med. 2026; 15(4):1123.

39. Elden H, Gutke A, Kjellby-Wendt G, et al. Predictors and consequences of long-term pregnancy-related pelvic girdle pain: a longitudinal follow-up study. BMC Musculoskelet Disord. 2008; 9:67.

40. Vesting S, Gutke A, Ekblom MM, et al. Pelvic floor muscle function and diastasis recti abdominis as predictors of pelvic girdle pain after pregnancy: a prospective cohort study. Eur J Obstet Gynecol Reprod Biol. 2022; 275:48-54.

41. Chaudhry H, et al. Trunk stabilisation versus activation exercises for postpartum lumbopelvic pain: a randomized controlled trial. Pak J Med Sci. 2024; 40(4):678-683.

42. Shafique MN, Asghar M, Akhtar H, et al. Effects of pelvic strengthening exercises with and without lumbopelvic belt on postpartum females with pelvic girdle pain. J Xi'an Shiyou Univ Nat Sci Ed. 2022; 19(1):1184-1188.

43. Sabrina N, et al. Kinesio taping versus muscle energy technique for postpartum sacroiliac joint dysfunction: a single-blind randomized controlled trial. J Pak Med Assoc. 2022; 72(4):678-683.

44. Halliday B, Chatfield S, Cameron L, et al. Evaluating the management of chronic pelvic girdle pain following pregnancy (EMaPP): a randomised controlled feasibility trial. Pilot Feasibility Stud. 2025; 11(1):54.

45. Bastiaenen CHG, de Bie RA, Wolters PMJC, et al. Effectiveness of a tailor-made intervention for pregnancy-related pelvic girdle and/or low back pain after delivery. BMC Musculoskelet Disord. 2006; 7:19.

46. Sakamoto A, Nakagawa H, Nakagawa H, Gamada K. Effects of exercises with a pelvic realignment device on low-back and pelvic girdle pain after childbirth: a randomized control study. J Rehabil Med. 2018; 50(10):914-919.

47. Maier M, Schmitz C, Milz S, et al. Molecular mechanisms of the analgesic effect of extracorporeal shock wave therapy. Z Orthop Unfall. 2009; 147(4):420-426.

48. Chung H, Dai T, Sharma SK, et al. The nuts and bolts of low-level laser (light) therapy. Ann Biomed Eng. 2012; 40(2):516-533.

49. Nicholas MK, Linton SJ, Watson PJ, et al. Early identification and management of psychological risk factors in patients with low back pain. Phys Ther. 2011; 91(5):737-753.

Table 1. Characteristics of Included Studies (n = 24)

Author / Year	Country	Study Design	N	Intervention	Comparator	Duration	Outcome Measures
GROUP 1: Exercise & Stabilization Therapy (n = 9 studies)							
Stuge et al., 2004	Norway	Single-blind RCT	81	Specific stabilizing exercises (TrA , multifidus , gluteus max, latissimus dorsi , obliques) + ergonomics; 3×/week, 20 weeks	Individualized PT without specific stabilizing exercises (~every 2 weeks, 20 weeks)	20 weeks + 1-year postpartum follow-up	VAS morning/evening, ODI, SF-36, ASLR, Hip strength, Sørensen test
Gutke et al., 2010	Sweden	Prospective RCT	88	Home-based specific stabilizing exercises (TrA , multifidus , PFM) ≥2×/day + PT review every 2 weeks	Single telephone contact with physiotherapist + advice to resume normal activities	3–6 months follow-up	ODI (primary), VAS, EQ-5D, Symptom satisfaction, Muscle function
ElDeeb et al., 2019	Egypt	Double-blind RCT	40	Stabilizing exercises (TrA + multifidus) + PFM training; 3×/week, 12 weeks	Stabilizing exercises only (TrA + multifidus); 3×/week, 12 weeks	12 weeks	VAS, ODI, Trunk ROM (Schober), IVP (PFM strength)
Ehsani et al., 2020	Iran	Double-blind RCT	68	Supervised progressive stabilization exercises (TrA focus); 3×/week, 8 weeks	General exercises (trunk curl-up, pelvic tilt, side bridging); 3×/week, 8 weeks	8 weeks	VAS, TrA thickness (ultrasound AH), Bladder base displacement (PFM – US)
Teymuri et al., 2018	Iran	Single-blind RCT	36	Specific stabilizing exercises (PFM + TrA co-contraction, 3-stage progression) + electrotherapy (TENS + US + hot pack); 3×/week, 6 weeks	Electrotherapy only (TENS + US + hot pack); 3×/week, 6 weeks	6 weeks	VAS, ODI, Bladder base displacement – contraction & rest (transabdominal US)
Saleh et al., 2019	Egypt	RCT	34	Core stability exercises (abdominal hollowing, bilateral knee raise, supine bridge, SLR prone, prone bridge) + IR + US; 3×/week, 6 weeks	IR radiation + continuous ultrasound (lumbosacral region) only; 3×/week, 6 weeks	6 weeks	PPT – Pain Pressure Threshold (primary), VAS, ODI
Chaudhry et al., 2024	Pakistan	RCT	28	Trunk stabilisation exercises (isometric back, gluteus, pelvic bridging, abdominal bracing, SLR); 3×/week, 8 weeks	Trunk activation exercises (rectus abdominis , obliques , erector spinae); 3×/week, 8 weeks	8 weeks	VAS (pain), ODI (disability)

Author / Year	Country	Study Design	N	Intervention	Comparator	Duration	Outcome Measures
Yang et al., 2026	China	Assessor-blind RCT	40	Standard PFM PT (education + Kegel + manual therapy) + Functional training (thoracolumbar mobility, bridges, clamshell); 3×/week, 4 weeks	Standard pelvic floor PT only (education + Kegel + manual therapy); 3×/week, 4 weeks	4 weeks	VAS, PGQ, Glazer sEMG (5 phases), ASLR angle
Khorasani et al., 2020	Iran	Two-arm RCT	80	Home-based stabilization exercises focusing on PFM; 3×/week, 12 weeks, 3 sets/day	No treatment (control)	12 weeks	ICIQ-UI-SF, ODI, VAS, PFM strength & endurance, TrA strength (manometric biofeedback)
GROUP 2: Orthotic & Supportive Devices (n = 4 studies)							
Jafarian et al., 2025	Iran	3-armed RCT	84	Group A: Pelvic support belt (≤ASIS) / Group B: Lumbar support corset (xiphoid to gluteal fold)	Group C: Patient education leaflet only	4 weeks intervention + 1 week washout	VAS, ODI, ASLR effort, Hip flexion force, Trunk rotation force, JPR hip abduction
Halliday et al., 2025	UK	RCT Feasibility	24	DEFO orthosis + standardised advice + exercises (2 remote PT sessions via videoconference)	Standardised advice + exercises only (2 remote PT sessions)	24 weeks	NPRS, PGQ, EQ-5D-5L, SF-36, EPDS, ICIQ-UI-SF, TSK
Sakamoto et al., 2018	Japan	3-armed RCT	75	Group R: Pelvic realignment device (ReaLine CORE) + standing exercises 2×/day, 4 weeks / Group E: Pelvic stabilization exercises 2×/day, 4 weeks	Group C: No intervention (natural recovery)	4 weeks intervention + 9 weeks follow-up (13 weeks total)	VAS, PGQ (Pelvic Girdle Questionnaire)
Shafique et al., 2022	Pakistan	RCT	16	Pelvic strengthening exercises (bird dog, dead bug, bridges, foam rolls) + lumbopelvic belt (12 hrs /day) + US; 4 weeks	Pelvic strengthening exercises only (same exercises without belt) + US; 4 weeks	4 weeks	VAS (pain), ODI (disability)
GROUP 3: Electrophysical Modalities (n = 4 studies)							
Elhosary et al., 2021	Egypt	RCT	40	ESWT + postural correction exercises + posterior pelvic tilting exercises; 2 sessions/week, 4 weeks	Postural correction + posterior pelvic tilting exercises only; 2 sessions/week, 4 weeks	4 weeks	VAS (pain), BPFS (Back Pain Functional Scale)

Author / Year	Country	Study Design	N	Intervention	Comparator	Duration	Outcome Measures
El- Shafei et al., 2024	Egypt	3-armed Single-blind RCT	60	Group A: LLLT only / Group B: Posture correction exercises only / Group C: LLLT + Posture correction exercises; 2 sessions/week, 6 weeks	Each group compared against the others	6 weeks	VAS, Pain pressure threshold (PPT/algometry), ODI
Shehata et al., 2021	Egypt	RCT	90	LLLT alone / Pelvic stabilization exercises alone / Combined LLLT + stabilization exercises	Each intervention group compared separately	12 sessions / 6 weeks	VAS, PGQ, Cortisol, FABER test, P4 test
Tan et al., 2024	China	3-armed Clinical Trial	90	Group 1: Focused ESWT (0.0298 mJ /mm², 4000 shocks, every 2 days) / Group 3: Combined FESWT + Manual therapy	Group 2: Manual therapy (massage + mobilization, 5 sessions)	2 weeks + 2 months follow-up	VAS, ODI, Clinical efficacy (invalid/improved/cured)
GROUP 4: Kinesio Taping & Muscle Energy Technique (n = 2 studies)							
Lu et al., 2026	China	Double-blind RCT	33	Novel KT targeting posterior oblique sling (gluteus max + thoracolumbar fascia + latissimus dorsi) + SIJ cross strips; 4 sessions over 2 weeks	Sham taping: single horizontal strip over SIJ without tension; 4 sessions	2 weeks	VAS, PGQ, PSFS, SF-36, TUG, 10MBW, ASLRF, PFM (MOS + perineometer)
Sabrina et al., 2022	Pakistan	Single-blind RCT	52	Kinesio -Taping (KT) over SIJ region with 80% tension; 3×/week, 4 weeks + hot pack	Muscle Energy Technique (MET) for erector spinae , 10 repetitions/session; 3×/week, 4 weeks + hot pack	4 weeks (12 sessions)	NRPS (pain), RMDQ (disability), PALM Pelvic Inclinometer (pelvic asymmetry)
GROUP 5: Technology-Based Interventions (n = 3 studies)							
Liu et al., 2026	China	RCT	57	VR relaxation training (Pico 4K glasses, ocean/swing scenarios) + conventional PFM rehab (electrical stimulation + biofeedback + breathing); 10 sessions	Conventional PFM rehab only (electrical stimulation + biofeedback + breathing); 10 sessions	10 sessions + 1-year follow-up	VAS, Glazer sEMG (5 phases), PFM thickness (ultrasound), Young's modulus
Li et al., 2026	China	RCT	NR	Whole-body vibration (WBV) training	Control group	NR	Pain, Functional outcomes
Bastiaenen et al., 2006	Netherlands	Double-blind RCT	126	Tailor-made biopsychosocial PT program: 7–9 sessions/30 min/week (self-management + fear-avoidance + time-contingent approach)	Usual care: pain-contingent physiotherapy, GP guidance, or no treatment	12 weeks after delivery	RDQ (primary), GPE, Main Complaint VAS, Pain VAS, TSK, SF-36, IPA

Author / Year	Country	Study Design	N	Intervention	Comparator	Duration	Outcome Measures
GROUP 6: Observational / Follow-up Studies (n = 2 studies)							
Elden et al., 2008	Sweden	RCT Follow-up	386	Group A: Standard treatment + Specific stabilizing exercises / Group B: Standard treatment + Acupuncture	Standard treatment alone (pelvic belt + home exercises + education)	12 weeks postpartum follow-up	VAS (morning/evening), Physical examination (provocation tests, pain drawings)
Vesting et al., 2022	Sweden	Prospective Cohort	504	Clinical assessment only: PFM (vaginal palpation, Modified Oxford Scale) + DRA (caliper)	Women with vs without PGP (observational comparison)	12 months follow-up (2–3, 6, 9, 12 months)	PGQ score (Pelvic Girdle Questionnaire)

Abbreviations: AH = abdominal hollowing; ASIS = anterior superior iliac spine; ASLR = active straight leg raise; ASLRF = active straight leg raise force; BPFS = Back Pain Functional Scale; DEFO = dynamic elastomeric fabric orthosis; DRA = diastasis recti abdominis; EPDS = Edinburgh Postnatal Depression Scale; EQ-5D = EuroQol 5-Dimension; ESWT = extracorporeal shock wave therapy; FABER = flexion abduction external rotation test; FESWT = focused extracorporeal shock wave therapy; GPE = Global Perceived Effect; ICIQ-UI-SF = International Consultation on Incontinence Questionnaire–Urinary Incontinence Short Form; IPA = Impact on Participation and Autonomy; IR = infrared; IVP = intravaginal pressure; JPR = joint position reproduction; KT = kinesio taping; LLLT = low-level laser therapy; MET = muscle energy technique; MOS = Modified Oxford Scale; NPRS/NRPS = Numeric Pain Rating Scale; NR = not reported; ODI = Oswestry Disability Index; PALM = Palpation Meter; PFM = pelvic floor muscle; PGP = pelvic girdle pain; PGQ = Pelvic Girdle Questionnaire; PPT = pain pressure threshold; PSFS = Patient-Specific Functional Scale; PT = physical therapy; RDQ = Roland-Morris Disability Questionnaire; RMDQ = Roland-Morris Disability Questionnaire; ROM = range of motion; SF-36 = Short Form-36; SIJ = sacroiliac joint; SLR = straight leg raise; TENS = transcutaneous electrical nerve stimulation; TSK = Tampa Scale of Kinesiophobia; TUG = Timed Up and Go; UI = urinary incontinence; US = ultrasound; VAS = visual analogue scale; VR = virtual reality; WBV = whole-body vibration.

Table 2. Summary of Results of Included Studies (n = 24)

Author / Year	N	Intervention vs Control	Pain MD (95%CI)	Pain p	Disability p	Effect size (d)	Favors
GROUP 1: Exercise & Stabilization Therapy (n = 9 studies)							
Stuge et al., 2004	81	Specific stabilizing ex. vs General PT	-30mm evening	<0.001	<0.001	1.49	**Intervention**
Gutke et al., 2010	88	Home stabilizing ex. vs Telephone contact	NS	0.358	0.205	–	**No difference**
ElDeeb et al., 2019	40	Stabilizing + PFM vs Stabilizing only	-2.30	0.001	0.001	0.96	**Intervention**
Ehsani et al., 2020	68	Stabilization ex. vs General ex.	NS	>0.05	>0.05	–	**Intervention (PFM/ TrA)**
Teymuri et al., 2018	36	Stabilizing + Electrotherapy vs Electrotherapy only	-63.1	0.001	0.001	–	**Intervention**
Saleh et al., 2019	34	Core stability + Conventional vs Conventional only	-13.5	0.001	0.009	–	**Intervention**
Chaudhry et al., 2024	28	Trunk stabilisation vs Trunk activation	-2.07	0.004	0.001	–	**Intervention**
Yang et al., 2026	40	Functional training + PFM PT vs PFM PT only	-1 (100% MCID)	<0.001	<0.001	–	**Intervention**
Khorasani et al., 2020	80	Home PFM stabilization vs No treatment	NS	>0.05	<0.05	–	**Intervention (function)**
GROUP 2: Orthotic & Supportive Devices (n = 4 studies)							
Jafarian et al., 2025	84	Lumbar support vs Pelvic support vs Education	LS d=3.97 (large)	<0.001	<0.001	3.97	**Lumbar support**
Halliday et al., 2025	24	DEFO + exercises vs Exercises only	-1.63 night pain	NS	NS	–	**No difference**
Sakamoto et al., 2018	75	RLC device + ex. vs Stabilization ex. vs Control	NS at 13 wks	>0.05	>0.05	–	**Exercise > Control**
Shafique et al., 2022	16	Strengthening + Belt vs Strengthening only	-2.13	0.00	0.00	–	**Intervention**
GROUP 3: Electrophysical Modalities (n = 4 studies)							
Elhosary et al., 2021	40	ESWT + exercises vs Exercises only	Sig. diff.	<0.05	<0.05	–	**Intervention**
El- Shafei et al., 2024	60	LLLT vs Exercises vs Combined	Combined best	<0.05	<0.05	–	**Combined therapy**

Author / Year	N	Intervention vs Control	Pain MD (95%CI)	Pain p	Disability p	Effect size (d)	Favors
Shehata et al., 2021	90	LLLT vs Stabilization vs Combined	Combined best	0.001	0.001	–	**Combined therapy**
Tan et al., 2024	90	FESWT vs Manual therapy vs Combined	CT best at 2wk	0.001	<0.001	–	**Combined therapy**
GROUP 4: Kinesio Taping & MET (n = 2 studies)							
Lu et al., 2026	33	Novel KT (posterior oblique sling) vs Sham taping	-15.1 (d=1.39)	<0.001	0.021	1.39	**Intervention**
Sabrina et al., 2022	52	Kinesio Taping vs MET	NS	>0.05	>0.05	–	**No difference**
GROUP 5: Other & Technology-Based (n = 3 studies)							
Liu et al., 2026	57	VR + PFM rehab vs PFM rehab only	NS	>0.05	>0.05	–	**Intervention (relaxation)**
Li et al., 2026	NR	Whole-body vibration vs Control	Improved	<0.05	<0.05	–	**Intervention**
Bastiaenen et al., 2006	126	Biopsychosocial PT vs Usual care	NS	>0.05	0.05	–	**Intervention (severe)**
GROUP 6: Observational / Follow-up Studies (n = 2 studies)							
Elden et al., 2008	386	Post-pregnancy follow-up (3 groups) vs Standard	NS	>0.05	>0.05	–	**Natural recovery**
Vesting et al., 2022	504	PFM assessment (observational cohort)	N/A	N/A	N/A	–	**Observational**

MD = mean difference; VAS = visual analogue scale; ODI = Oswestry Disability Index; PGQ = Pelvic Girdle Questionnaire; NR = not reported; NS = not significant; CI = confidence interval; CT = combined therapy; DEFO = dynamic elastomeric fabric orthosis; ESWT = extracorporeal shock wave therapy; FESWT = focused extracorporeal shock wave therapy; KT = kinesio taping; LLLT = low-level laser therapy; LS = lumbar support; MCID = minimal clinically important difference; MD = mean difference; MET = muscle energy technique; NR = not reported; NS = not significant; PFM = pelvic floor muscle; PT = physical therapy; RLC = ReaLine CORE; VR = virtual reality.

Table 3. Risk of Bias Assessment of Included Studies (n = 24)

Author / Year	D1	D2	D3	D4	D5	Overall	Key basis for judgment
GROUP 1: Exercise & Stabilization Therapy (n = 9 studies)							
Stuge et al., 2004	Low	Some	Low	Low	Low	**Some**	D2: Patients not blinded, but expectation bias minimized; treated by different therapists at separate clinics.
Gutke et al., 2010	Low	Some	Some	Low	Low	**Some**	D2: Participants and treating PTs not blinded; research PTs conducting follow-ups were blinded.
ElDeeb et al., 2019	Low	Some	Low	Low	Low	**Some**	D2: Participants and therapists not blinded; only examiner blinded.
Ehsani et al., 2020	Low	Low	Low	Low	Low	**Low**	D2: DOUBLE-BLIND — patients and US operator blinded to group assignment; treating PT not blinded.
Teymuri et al., 2018	Low	Low	Some	Low	Low	**Some**	D2: SINGLE-BLIND — participants and US operator blinded; treating PT not blinded.
Saleh et al., 2019	Low	Some	Low	Some	Low	**Some**	D2: Treating PT not blinded; participants not blinded.
Chaudhry et al., 2024	Low	Some	Low	Some	Low	**Some**	D2: Participants and treating therapist not blinded.
Yang et al., 2026	Low	Some	Low	Low	Low	**Some**	D2: Participants and treating therapists not blinded (exercise nature).
Khorasani et al., 2020	Low	Some	Low	Some	Low	**Some**	D2: Participants not blinded (home exercise intervention).
GROUP 2: Orthotic & Supportive Devices (n = 4 studies)							
Jafarian et al., 2025	Low	Some	Low	Low	Low	**Some**	D2: Participants blinded to group at allocation but aware of treatment received.
Halliday et al., 2025	Low	Some	Low	Low	Low	**Some**	D2: Participants not blinded (sham not feasible for orthosis); therapists not blinded; assessor blinded for 2PE only.
Sakamoto et al., 2018	Low	Some	Low	Some	Low	**Some**	D2: Participants and therapist not blinded to group assignment.
Shafique et al., 2022	Some	Some	Low	Some	Low	**High**	D2: Participants and therapists not blinded.
GROUP 3: Electrophysical Modalities (n = 4 studies)							
Elhosary et al., 2021	Low	Some	Low	Some	Low	**Some**	D2: Participants and therapists not blinded.
El- Shafei et al., 2024	Low	Some	Low	Some	Low	**Some**	D2: Single-blind — external researcher blinded; treating therapists and participants not blinded.

Author / Year	D1	D2	D3	D4	D5	Overall	Key basis for judgment
Shehata et al., 2021	Some	Some	Low	Some	Low	**Some**	D2: Participants and therapists not blinded (exercise and LLLT nature).
Tan et al., 2024	Low	Some	Low	Some	Low	**Some**	D2: Patients aware of treatment; outcome assessors not blinded.
GROUP 4: Kinesio Taping & Muscle Energy Technique (n = 2 studies)							
Lu et al., 2026	Low	Low	Low	Low	Low	**Low**	D2: DOUBLE-BLIND — participants blinded to KT vs sham; outcome assessor blinded throughout.
Sabrina et al., 2022	Low	Some	Low	Some	Low	**Some**	D2: Single-blind — outcome assessors blind; participants and therapists not blinded.
GROUP 5: Technology-Based Interventions (n = 3 studies)							
Liu et al., 2026	Low	Some	Some	Some	Low	**Some**	D2: Group assignments disclosed to participants at first session; therapists aware.
Li et al., 2026	Some	Some	Low	Some	Low	**Some**	D2: Participants and therapists not blinded.
Bastiaenen et al., 2006	Low	Some	Low	Low	Low	**Some**	D2: Therapists not blinded (educational program required); patients partially blinded.
GROUP 6: Observational / Follow-up Studies (n = 2 studies)							
Elden et al., 2008	Low	Some	Some	Low	Low	**Some**	D2: Participants not blinded; treated in same clinic.
Vesting et al., 2022	NOS	NOS	NOS	NOS	NOS	**Low**	COHORT STUDY — Newcastle-Ottawa Scale (*): Selection: Prospective design; standardized PFM assessment; validated PGQ outcome — adequate. Comparability: Adjusted for age, BMI, mode of delivery, parity, birth weight — adequate. Outcome: 84–94% follow-up at 12 months; mixed-effect models — adequate. OVERALL LOW RISK for cohort study. Limitation: Convenience sample; highly educated population.

RoB-2 domains: D1 Randomization; D2 Deviations; D3 Missing data; D4 Outcome measurement; D5 Selection of reported result. Newcastle-Ottawa Scale used for the cohort study (Vesting et al., 2022). KT = kinesio taping; LLLT = low-level laser therapy; NOS = Newcastle-Ottawa Scale; PFM = pelvic floor muscle; PGQ = Pelvic Girdle Questionnaire; PT = physical therapy; US = ultrasound.