

# Effect of Core Stability Exercise on Lumbopelvic Pain Among Postnatal Women: An Evidence Based Study

Dimpal Manilal Paija<sup>1</sup>, Dr. Yagna Unmesh Shukla<sup>2</sup>, Dr. Jayshree M. Sutariya<sup>3</sup>

<sup>1</sup> M.P.T. (Cardiorespiratory Disorders), Assistant Professor at Ashok & Rita Patel Institute of Physiotherapy College, CHARUSAT University, Changa, Gujarat.

<sup>2</sup> M.P.T.(Musculoskeletal), Ph.D., Chairperson of National of Commission for Allied and Healthcare Profession, Delhi, India,

<sup>3</sup> M.P.T.(Neuroscience), Ph.D., I/C Principal & Senior lecturer Government Spine Institute and Government Physiotherapy College, Civil Hospital, Asarwa, Ahmedabad.

Corresponding Author: Dimpal Manilal Paija

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## ABSTRACT

Lumbopelvic pain is a common concern among postnatal women, significantly impacting their quality of life and daily functioning. This evidence-based study aimed to determine the scientific effectiveness of core stability exercises in alleviating lumbopelvic pain in this population. The study involved a systematic review of literature sourced from databases such as Google Scholar, PubMed, Wiley Online Library, TRIP, and CINAHL. Out of 70 initially identified records, eight studies met the eligibility criteria and were included in the final analysis. The findings consistently demonstrated that core stability exercises are highly effective in reducing lumbopelvic pain and improving functional outcomes in postnatal women. These exercises target the deep core muscles, enhancing muscular support and stability in the lumbopelvic region. This review underscores the importance of incorporating core stability exercises into postnatal rehabilitation programs to manage lumbopelvic pain effectively. Further research is recommended to explore long-term benefits and refine exercise protocols for diverse postnatal populations.

**Keywords:** core stability exercise, low back pain, pelvic pain, postpartum lumbopelvic pain

## INTRODUCTION

Lumbopelvic pain (LPP) is a common and disabling condition that affects a significant number of women in the postnatal period. Pregnant and postpartum women often report experiencing LPP, which refers to pain in the lower back and pelvic regions<sup>(4)</sup>. LPP is typically characterized by discomfort in the lower back, anterior pelvis, posterior pelvis, or a combination of these areas<sup>(1,2)</sup>. Studies show that the prevalence of LPP during pregnancy varies, with reports ranging from 3.9% to 89.9%<sup>(3)</sup>. Postpartum

women also frequently experience this condition, with a systematic review finding that 25% of women report low back and/or pelvic pain after childbirth. Follow-up studies indicate that 8–20% of these women continue to suffer from persistent, non-specific LPP for up to 2–3 years postpartum<sup>(3,5)</sup>.

LPP often persists beyond the postpartum period, affecting daily activities, maternal responsibilities, and quality of life<sup>(2,4)</sup>. Despite its widespread occurrence, managing LPP remains a significant

challenge in postnatal care. The combination of physiological, biomechanical, and hormonal changes during pregnancy and the postpartum period contribute to the onset and persistence of LPP. However, the condition is often underdiagnosed, undertreated, and inadequately managed, leading many women to experience long-term pain and functional impairments<sup>(6, 7)</sup>. Some healthcare providers view severe pain and disability associated with LPP during pregnancy as rare, dismissing reports of high incidence as exaggerated or attributed to “hysteria and quackery”<sup>(2)</sup>.

The causes of this study arise from the pressing need to address gaps in knowledge and practice concerning the management of lumbopelvic pain (LPP) among postnatal women. Pregnancy causes significant physiological changes, such as weight gain, altered posture, and a shift in the center of gravity, which increases strain on the lumbopelvic region. Hormonal shifts, particularly the rise in relaxin levels, lead to ligament laxity and joint instability, especially in the pelvic area, thus exacerbating the risk of LPP.<sup>(8-10)</sup> These factors, combined with weakened core and pelvic floor muscles and the physical demands of childbirth, place considerable stress on the musculoskeletal system.<sup>(8)</sup> Postpartum recovery is further complicated by the high physical demands of infant care, which often require women to resume daily activities despite pain or physical limitations. This highlights the urgent need for effective and accessible interventions to alleviate LPP and promote functional recovery.

Exercise plays a crucial role in postnatal rehabilitation. The core, as defined by Akuthota et al.,<sup>(13)</sup> functions as a muscular box, incorporating the abdominals in the front, paraspinals and gluteus at the back, the diaphragm at the top, and the pelvic floor and hip girdle musculature at the bottom. These core structures stabilize the hip, pelvis, and spine, providing proximal stability essential for distal limb mobility.

Core strengthening focuses on stabilizing the abdominal, paraspinal, and gluteal muscles, with neuromuscular reeducation being vital in restoring spinal stability and minimizing pain associated with instability. While a variety of interventions, such as exercise, acupuncture, pharmacological treatments, and physical therapies like heat/cold application, ultrasound, and massage, have been used to address LPP, core stability exercises are gaining prominence in physical therapy for managing low back pain (LBP) and related disorders. These exercises specifically target the transversus abdominis, multifidus, and pelvic floor muscles, which are crucial for maintaining spinal and pelvic stability. Despite the demonstrated potential of core stability exercises to improve muscular strength, stability, and pain relief, the evidence supporting their effectiveness in managing LPP remains inconclusive, indicating the need for further research.<sup>(11-14)</sup>

This study systematically reviews the evidence to underscore the therapeutic benefits of core stability exercises while highlighting the importance of individualized, professionally guided interventions. By addressing these considerations, the research aims to bridge the gap between clinical practice and academic findings, paving the way for the integration of core stability exercises into routine postnatal care.

Lumbopelvic pain (LPP) extends beyond being a physical condition, as it carries significant psychological, social, and economic implications. Persistent lumbopelvic pain (LPP) can significantly impair a woman’s ability to carry out daily tasks and diminish her overall quality of life.<sup>(2,11)</sup> Economically, LPP contributes to increased healthcare costs and reduced productivity, as chronic pain and disability limit functional capacity. Given its far-reaching impact on individuals, families, and society, addressing LPP is a public health priority that necessitates effective and accessible interventions.

The primary aim of this study is to determine the scientific evidence supporting the effectiveness of core stability exercises in managing lumbopelvic pain among postnatal women. The study seeks to evaluate the role of these exercises in reducing pain, enhancing functional recovery, and improving the overall well-being of postnatal women. The study focuses on core stability exercises as a primary intervention for LPP, evaluating their effectiveness through a review of existing literature. It includes studies that examine various aspects of core stability training, such as exercise intensity, duration, frequency, and delivery methods. The review encompasses a range of outcomes, including pain reduction, functional improvement, and overall well-being.

The specific objectives of this study are:

1. To systematically review and analyze existing research on the impact of core stability exercises on lumbopelvic pain in postnatal women
2. To provide evidence-based recommendations for the implementation of core stability exercises in postnatal care programs.

## **MATERIALS & METHODS**

### **• Study Design**

This study was conducted as a systematic review, focusing on evidence-based literature to evaluate the effectiveness of core stability exercises in managing lumbopelvic pain (LPP) among postnatal women. The review followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency and methodological rigor.

### **• Search Strategy**

A comprehensive search was performed across multiple databases, including Google Scholar, PubMed, Wiley Online Library, TRIP, and CINAHL. The search strategy included a combination of keywords and Medical Subject Headings (MeSH) terms such as

“postnatal women,” “lumbopelvic pain,” “low back pain,” “core stability exercises,” and “postpartum rehabilitation.” Boolean operators (“AND,” “OR”) were used to refine the search. Articles published in English, with no restrictions on publication dates, were included to ensure a broad scope.

### **• Selection criteria:**

#### **➤ Inclusion Criteria:**

1. Studies focusing on postnatal women experiencing LPP and evaluating the effectiveness of core stability exercises.
2. Randomized controlled trials (RCTs), cohort studies, and systematic reviews.
3. Full text is available.
4. Studies reporting outcomes related to pain reduction, muscle strength, and functional improvement.
5. Articles were selected from last 12 years (2010-2022).

#### **➤ Exclusion Criteria:**

1. Studies on non-postnatal populations.
2. Any other language than English.
3. Any study conducted prior to 2010.
4. Articles without measurable outcomes or lacking methodological quality.
5. Non-exercise interventions such as pharmacological or surgical treatments.

### **• Screening and data extraction**

#### **Data Assessment and Analysis**

The included studies were analyzed based on the PEDro scale, sample size, journal impact factor, and the level of evidence using the Modified Sackett Version 4.0. This study comprises one systematic review, six randomized controlled trials (RCTs), and one quasi-experimental study. The quality of the selected studies was assessed using the Cochrane Risk of Bias tool, classifying them as low, moderate, or high quality based on criteria such as randomization, blinding, and outcome reporting. Due to variations in study designs, interventions, and reported outcomes, a narrative synthesis was conducted. Quantitative data, including pain scores and functional assessments,

were compared where possible, and the results were thematically organized to emphasize the role of core stability

exercises in managing lumbopelvic pain (LPP) among postnatal women.

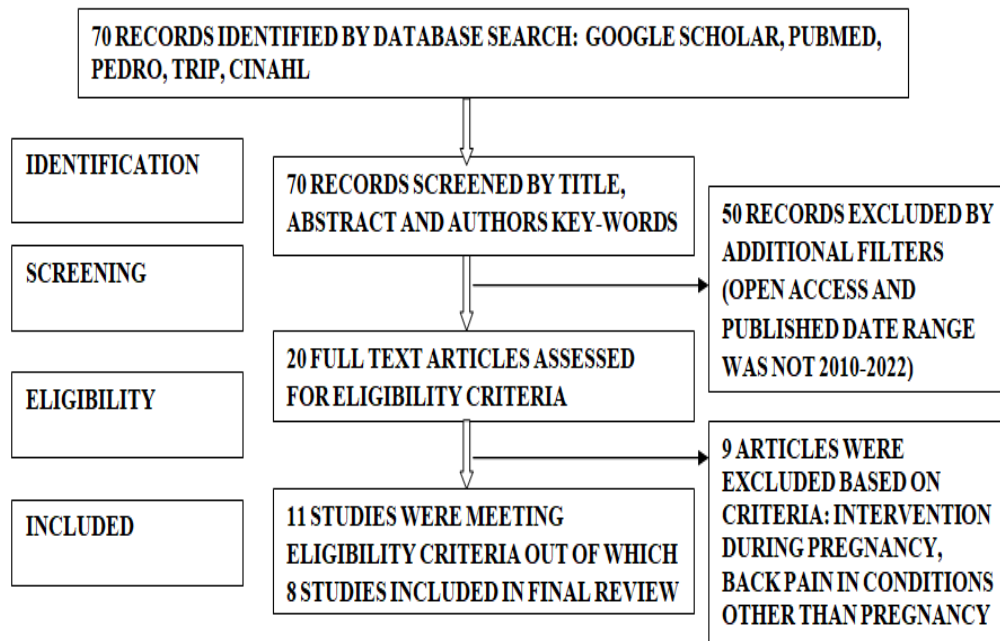


Figure 1: process of screening and selection of articles

## RESULT

Table 1 provides an overview of the eight articles analyzed in this study. It outlines key details, including the authors and type of study, its purpose, and the population studied, grouping and intervention

strategies, the variables measured, and the main findings.

This comprehensive analysis highlights the core components of each study, offering valuable insights into their methodologies and outcomes.

TABLE: 1 SUMMARY CHARACTERISTICS OF THE REVIEWED STUDIES (N=2)

Authors (year)	objectives	Design, sample size	intervention	Outcome measure	conclusion
Pei-Ching Tseng et. Al (2015) (15)	to synthesise findings from randomised controlled trials on the effectiveness of exercise on LPP among postnatal women to inform policy, practice and future research in the area.	Systematic Review N=251	Core stabilization exercise, specific contraction of the transverse abdominal muscles, postural correction techniques in different positions such as supine, crook lying, half sitting and prone frequency of the exercise ranged from $\geq$ 2Times/day to 3 days/week for 20 weeks.	Pain Intensity Visual Analogue Scale (VAS), Oswestry Lower Back Pain Disability Questionnaire (ODI) and Disability Rating Index (DRI)	Postnatal exercise shows potential for managing lumbopelvic pain (LPP), but evidence is limited. Tailored stabilizing exercises under expert guidance have proven effective. High-quality trials are needed to identify optimal strategies for improving maternal health and well-being.

Marwa Shafiek Mustafa Saleha et. al (2019) <sup>(4)</sup>	The purpose of this randomized controlled study was to evaluate the effect of core stability exercises in treating 83 postpartum LPP.	RCT N=34 N=17 in study group and N=17 in control group	The study group (n = 17) received core stability exercises in addition to infrared radiation (15 min 50-75 cm distance) and continuous ultrasound on L <sub>5</sub> -S <sub>1</sub> (1.5 W/cm <sup>2</sup> for 8 min) 3 sessions per week for 6 weeks	Pain Pressure Threshold (PPT), Visual Analogue Scale (VAS) and Oswestry Disability Index (ODI)	Core stability exercises in addition to traditional treatment significantly decreased pain and improved function for women with postpartum LPP.
Abeer M. ElDeeb et. al (2019) <sup>(16)</sup>	This study aimed to investigate the effect of segmental stabilizing exercise with or without PFM training on pain intensity, functional disability, trunk range of motion (ROM), and PFM strength in women with persistent postpartum PGP.	RCT N=40 N=20 in Study group and N=20 in control group	stabilizing exercises and PFM training, 3 sessions/week for 12 weeks	Pain (VAS scale), Oswestry Disability Index (ODI), Trunk range of motion (ROM), intravaginal pressure by periniometer	PFM training should be an essential part in rehabilitation programs of PGP postpartum.
Fatemeh Ehsani et. Al (2019) <sup>(17)</sup>	The purpose of this study was to compare the effect of stabilization exercise (SE) and general exercise (GE) on TrA and PFM muscle activity and pain intensity in women with postpartum LPP	RCT N= 68	stabilization exercise (SE) and general exercise (GE) 3 times / week for 8 weeks	Pain (VAS) US imaging	SE improved both PFM and TrA muscle function more than GE in women with postpartum LPP. However, the clinical outcome of pain relief was not greater in the SE group.
Teymuri et. al (Dec. 2018) <sup>(18)</sup>	To check the effect of stabilization exercises on pain, disability, and pelvic floor muscle function in postpartum lumbopelvic pain.	RCT N=36 N =18 in treatment group and N =18 in control group	electrotherapy modalities and core stabilizing exercises + Pelvic floor Strengthening exercise 3 session/weeks for 6 weeks	Pain (visual analog scale,)) Oswestry Disability Index questionnaires	the stabilizing exercises can remarkably improve pain, disability, and pelvic floor muscles function in postpartum lumbopelvic pain
Hui WANG et. Al (2021) <sup>(19)</sup>	To evaluate the effects of a rehabilitation programme for lumbopelvic pain	RCT N= 96	Pelvic floor muscle training combined with neuromuscular electrical	Triple Numerical Pain Rating Scale (NPRS), Modified	A postpartum programme for women with lumbopelvic pain is feasible and

	after childbirth.		stimulation of the Para spinal muscles for 12 weeks,	Oswestry Disability Questionnaire (MODQ) and Short-Form Health Survey-36 (SF-36).	improves the physical domain of quality of life.
Sana Chaudry et.al(2013) <sup>(20)</sup>	To determine the effect of postural correction along with core stabilization exercise in post partum back pain	RCT N=40 N=20 in Study group and N=20 in control group	core stabilization exercises along with postural correction (supine, crook lying and half sitting position & prone position) 30 min /session 2 session /day for 3days (hospital stay Duration) and then follow up treatment in OPD	VAS, Activity of Daily Livings, Muscle Power	Core stabilization exercises along with postural correction are effective technique in the management of post partum back pain.
Ashwini A Kale et. al (April-June 2019) <sup>(21)</sup>	to investigate the effect of core stability exercises on postpartum LPP.	A Quasi experimental study N=30	Core stabilization exercises with week wise progression till 4 weeks. 1)Static back and gluteus ex Abdominal bracing 2) Bridging, Yoga, Crunches 3) Plank, Single leg Bridging SLR holding at 30 °and 45° (4) side Plank, Bird Dog	The outcome of interest included numerical pain rating scale (NPRS), and core muscle strength via pressure biofeedback unit, which were recorded at week 1 and week 4.	Core stability exercises in addition to traditional treatment significantly decreased pain and improved function for women with postpartum LPP.

## DISCUSSION

This study demonstrates that postnatal women who engaged in core stability exercises, whether as a standalone intervention or in combination with conventional treatments such as heat therapy or ultrasound, experienced significant improvements in pain reduction and functional mobility. The results indicated a marked decrease in pain intensity, along with enhanced muscle strength and physical function, as evidenced by improvements in pain pressure thresholds (PPT) and the Oswestry Disability Index (ODI). These findings underscore the potential of core stability

exercises to provide substantial benefits over traditional treatments alone, making them an effective strategy for managing lumbopelvic pain (LPP) in postnatal women.

Our review evaluated the effectiveness of core exercises in addressing LPP among postnatal women, incorporating 1 systematic review, 6 randomized controlled trials, and 1 quasi-experimental study involving a total of 595 participants. Among these studies, three were rated as having ‘good’ methodological quality, scoring between 6 and 8 on a 10-point assessment scale, reflecting robust methodological rigor.

Core stability exercises, particularly when combined with therapies like infrared radiation and continuous ultrasound, demonstrated significant reductions in pain intensity and improvements in functional outcomes. These findings highlight a synergistic effect, where core stabilization enhances the efficacy of traditional physiotherapy methods. Furthermore, the integration of postural correction with core stability exercises proved beneficial, emphasizing the importance of biomechanical factors in postpartum rehabilitation. <sup>(15-21)</sup> Pelvic floor muscle (PFM) training also emerged as a critical component, especially for women with pelvic girdle pain (PGP). The interplay between PFM and core stabilization exercises highlights their role in stabilizing the pelvis and spine. However, while stabilizing exercises improved PFM and transverse abdominis (TrA) muscle function, their impact on pain relief was not consistently superior to general exercises, underscoring the need for tailored, individualized approaches. <sup>(16, 18, 19, 22)</sup>

Chronic pain conditions like LPP are often driven by central neuroplastic changes, leading to altered pain processing. These changes, caused by continuous stimulation rather than peripheral inflammation or damage, result in heightened sensitivity to normal pain stimuli. The biomechanical model suggests that weakened muscles can cause mechanical irritation in the lumbar spine, triggering pain by stimulating sensitive structures. <sup>(24, 25)</sup> Core stability exercises, as reported by Kumar et al. <sup>(26)</sup>, effectively strengthen trunk muscles to stabilize the spine while remaining within safe thresholds for compressive and shear loading. These exercises also restore muscle function and enhance the spine and pelvis's support and control, alleviating mechanical irritation and reducing pain.

The observed reduction in pain intensity in the core stability group may also be attributed to enhanced tissue blood flow to the affected area, delivering oxygen and nutrients while removing irritants and waste

products. This explanation aligns with Paungmali et al. <sup>(23)</sup>, who reported improved tissue blood flow and stability with lumbopelvic core stabilization training in chronic non-specific low back pain (LBP). <sup>(23, 4)</sup>

Improved functional performance was another notable outcome in patients undergoing core stability exercises. The findings align with Abeer M. El Deeb et al. (2019) <sup>(16)</sup>, who demonstrated that segmental stabilization exercises significantly reduced pain and functional disability in chronic LBP patients. Similarly, Fatemeh Ehsani et al. <sup>(17)</sup> reported that specific stabilizing exercises were more effective in enhancing functional status and quality of life compared to interventions without stabilization exercises.

Beyond physical outcomes, several studies highlighted improvements in the quality of life, particularly in physical and functional domains. <sup>(17-19)</sup> Structured postpartum rehabilitation programs were shown to be both feasible and beneficial, addressing pain and enhancing overall well-being. However, variability in intervention protocols, sample sizes, and follow-up durations among studies limits the generalizability of these findings, calling for further research to standardize and refine these interventions.

The psychosocial dimensions of LPP, such as its effects on emotional health, caregiving abilities, and maternal-infant bonding, remain underexplored but critical for future investigations. Moreover, the economic burden of LPP underscores the need for cost-effective and accessible interventions, such as core stability exercises, that can be seamlessly integrated into postnatal care routines.

The review highlights the significant potential of core stability exercises, either alone or in combination with traditional treatments, for reducing pain, improving muscle function, or enhancing quality of life in postnatal women with LPP. Future research should focus on refining these interventions, exploring their psychosocial impact, and ensuring their broad

applicability and accessibility in clinical practice. This comprehensive approach would address not only the physical but also the psychological and economic challenges associated with LPP, ultimately improving maternal health and well-being.

## CONCLUSION

Core stability exercises are effective in reducing lumbopelvic pain (LPP), improving functional mobility, and enhancing quality of life in postnatal women. When combined with traditional therapies like infrared radiation and ultrasound, these exercises demonstrate synergistic benefits, addressing both physical and biomechanical factors. Incorporating pelvic floor muscle training and tailored interventions into postpartum care can significantly aid recovery. However, further high-quality research is needed to standardize protocols and assess long-term efficacy. Integrating these exercises into routine postnatal care offers a holistic and accessible approach to improving maternal health and well-being.

### Declaration by Authors

**Ethical Approval:** This study involved the synthesis of existing data; ethical approval was not required.

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## REFERENCES

1. Vøllestad, Nina K. and Britt Stuge, "Prognostic factors for recovery from postpartum pelvic girdle pain," *European Spine Journal*, 18 (2009): 718-726.
2. Mens, Jan MA, Yvonne H. Huis and Annelies Pool-Goudzwaard, "Severity of signs and symptoms in lumbopelvic pain during pregnancy," *Manual Therapy*, 17.2 (2012): 175-179.
3. Wu, Wen-Hua, et al., "Pregnancy-related pelvic girdle pain (PPP), I: Terminology, clinical presentation, and prevalence," *European Spine Journal*, 13 (2004): 575-589.
4. Saleh, Marwa Shafiek Mustafa, Afaf Mohamed Mahmoud Botla and Noran Ahmed Mohammed Elbehary, "Effect of core stability exercises on postpartum lumbopelvic pain: A randomized controlled trial," *Journal of Back and Musculoskeletal Rehabilitation*, 32.2 (2019): 205-213.
5. Gutke, A., Lundberg, M., Östgaard, HC and Öberg, B., "Impact of postpartum lumbopelvic pain on disability, pain intensity, health-related quality of life, activity level, kinesiophobia, and depressive symptoms," *European Spine Journal*, 20.3 (2011): 440-448, doi: 10.1007/s00586-010-1487-6.
6. Shamsi, Mohammad Bagher, et al., "Does core stability exercise improve lumbopelvic stability (through endurance tests) more than general exercise in chronic low back pain? A quasi-randomized controlled trial," *Physiotherapy Theory and Practice*, 32.3 (2016): 171-178.
7. Shamsi, Mohammad Bagher, Javad Sarrafzadeh and Aliashraf Jamshidi, "Comparing core stability and traditional trunk exercise on chronic low back pain patients using three functional lumbopelvic stability tests," *Physiotherapy Theory and Practice*, 31.2 (2015): 89-98.
8. Mamipour, Hamed, et al., "Effect of core stabilization exercises on pain, functional disability, and quality of life in pregnant women with lumbar and pelvic girdle pain: A randomized controlled trial," *Journal of Manipulative and Physiological Therapeutics*, 46.1 (2023): 27-36.
9. Hu, Xiang, et al., "Effects of exercise therapy for pregnancy-related low back pain and pelvic pain: A protocol for systematic review and meta-analysis," *Medicine*, 99.3 (2020): e17318.
10. Belogolovsky, Inna, et al., "The effectiveness of exercise in treatment of pregnancy-related lumbar and pelvic girdle pain: A meta-analysis and evidence-based review," *The Journal of Women's & Pelvic Health Physical Therapy*, 39.2 (2015): 53-64.



11. Hodges, Paul W., "Core stability exercise in chronic low back pain," *Orthopedic Clinics*, 34.2 (2003): 245-254.
12. Liddle, SD., Baxter, GD. and Gracey, JH., "Exercise and chronic low back pain: what works?" *Pain*, 107.1-2 (2004): 176-190, doi: 10.1016/j.pain.2003.10.017.
13. Akuthota, V., Ferreiro, A., Moore, T., and Fredericson, M., "Core Stability Exercise Principles," *Current Sports Medicine Reports*, 7 (2008): 39-44.
14. Kibler, WB., Press, J. and Sciascia, A., "The role of core stability in athletic function," *Sports Medicine*, 36 (2006): 189-198.
15. Tseng, PC., Puthussery, S., Pappas, Y. and Gau, ML., "A systematic review of randomised controlled trials on the effectiveness of exercise programs on Lumbo Pelvic Pain among postnatal women," *BMC Pregnancy and Childbirth*, 15 (2015): 316, doi: 10.1186/s12884-015-0736-4.
16. ElDeeb, AM., Abd-Ghafar, KS., Ayad, WA. and Sabbour, AA., "Effect of segmental stabilizing exercises augmented by pelvic floor muscles training on women with postpartum pelvic girdle pain: A randomized controlled trial," *Journal of Back and Musculoskeletal Rehabilitation*, 32.5 (2019): 693-700, doi: 10.3233/BMR-181258.
17. Ehsani, F., Sahebi, N., Shanbehzadeh, S., Arab, AM. and ShahAli, S., "Stabilization exercise affects function of transverse abdominis and pelvic floor muscles in women with postpartum lumbo-pelvic pain: a double-blinded randomized clinical trial study," *International Urogynecology Journal*, 31.1 (2020): 197-204, doi: 10.1007/s00192-019-03877-1.
18. Teymuri, Z., Hosseinifar, M., and Sirousi, M., "The Effect of Stabilization Exercises on Pain, Disability, and Pelvic Floor Muscle Function in Postpartum Lumbopelvic Pain: A Randomized Controlled Trial," *American Journal of Physical Medicine and Rehabilitation*, 97.12 (2018): 885-891, doi: 10.1097/PHM.0000000000000993.
19. Wang, H., Feng, X., Liu, Z., Liu, Y. and Xiong, R., "A rehabilitation programme focussing on pelvic floor muscle training for persistent lumbopelvic pain after childbirth: A randomized controlled trial," *Journal of Rehabilitation Medicine*, 53.4 (2021): jrm00180, doi: 10.2340/16501977-2812.
20. Chaudry, Sana, Farah Rashid and Syed Imtiaz Hussain Shah, "Effectiveness of core stabilization exercises along with postural correction in postpartum back pain," *Rawal Medical Journal*, 38.3 (2013): 256-259.
21. Kale, Ashwini A. and Nawaj M. Pathan, "Effect of Core Stabilisation Exercises in Postnatal Women with Lumbo-Pelvic Instability," *Indian Journal of Physiotherapy and Occupational Therapy*, 13.2 (2019): 19-22.
22. Stuge, Britt, 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): 351-359.
23. Paungmali, Aatit, et al., "Lumbopelvic core stabilization exercise and pain modulation among individuals with chronic nonspecific low back pain," *Pain Practice*, 17.8 (2017): 1008-1014.
24. Panjabi, MM., "The stabilizing system of the spine. Part I. Function, dysfunction, adaptation, and enhancement," *Journal of Spinal Disorders*, 5.4 (1992): 383-389, doi: 10.1097/00002517-199212000-00001.
25. Woolf, CJ., "Central sensitization: implications for the diagnosis and treatment of pain," *Pain*, 152.3 (2011): S2-S15, doi: 10.1016/j.pain.2010.09.030.
26. Kumar, Chandan, Sobika Rao and Priyanka Thakur, "Effectiveness of core stability exercise program on abdominal and back strength in school-going children: A randomized controlled trial," *International Journal of Nursing Didactics*, 5.7 (2015): 07-13.

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