

Therapeutic Efficacy of Abdominal Exercise with Bracing in Reducing Diastasis Recti among Postpartum Women: A Literature Review

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Abstract

Diastasis Recti Abdominis (DRA) is a condition commonly found in postpartum women in which the rectus abdominis muscles are separated from each other. As a result of this separation, the abdominal muscles are weakened, and the trunk is rendered unstable. Exercises are the most common treatment for strengthening the abdominal muscles and minimizing the separation between the rectus abdominis muscles. Therefore, the aim of this literature review was to assess the effectiveness of abdominal exercises in combination with bracing in minimizing the separation between the rectus abdominis muscles in postpartum women. Eleven literature articles on the subject matter published between 2014 and 2025 were used in the review. All the articles cited in the literature review showed a significant reduction in the separation between the rectus abdominis muscles in postpartum women who used abdominal exercises in combination with bracing. The findings from the literature review show that abdominal exercises in combination with bracing are an effective treatment for minimizing the separation between the rectus abdominis muscles in postpartum women with DRA. More research is required on the subject matter.

Keywords

Diastasis Recti, Postpartum, Abdominal Exercises, Bracing, Inter-recti Distance

Introduction

Diastasis Recti Abdominis (DRA) is the separation of the rectus abdominis muscles along the linea alba, which is a band of connective tissue joining the two muscles. Separation of the rectus abdominis muscles along the linea alba is caused by thinning and stretching of the linea alba. As a result of this separation, the increased inter-recti distance (IRD) is widened (Skoura et al., 2024). The increased inter-recti distance may vary from 2-3 cm in width along the linea alba. In some cases, the increased inter-recti distance may extend along the linea alba, covering a considerable part of the abdominal wall (Thabet et al., 2019). The occurrence of DRA is initiated in the second trimester of pregnancy and progresses through pregnancy. The condition is at its peak in the

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immediate postpartum period (Weingerl et al., 2023). Epidemiological studies show that DRA occurs in 66-100% of women in the third trimester of pregnancy and in 53% of women in the immediate postpartum period (Thabet & Alshehri, 2019). The condition most frequently occurs at or above the level of umbilicus because this is the area of greatest stress during pregnancy.

Assessment of DRA is mainly done by assessing IRD through ultrasound imaging, palpation, or calipers, with ultrasound being the best option because of its high intra- and inter-rater reliability (Gluppe et al., 2021). While no specific diagnostic criteria exist, it is believed that when IRD is beyond normal ranges for the postpartum period, it may be an indicator of compromised integrity of the abdominal wall. DRA has been linked with weakened abdominal muscle strength, compromised trunk stability, changes in breathing patterns, and musculoskeletal problems that may include lower back pain and pelvic girdle instability. However, the strength of these relationships is debatable, and further study is needed to clearly establish causality (Gluppe et al., 2023; Skoura et al., 2024).

The abdominal wall is also important in the stabilization of the trunk, maintenance of posture, respiration, and the transmission of forces between the thorax and the pelvis (Benjamin et al., 2014). Any impairment in the structural and functional capacity of the abdominal wall may result in biomechanical inefficiency and musculoskeletal dysfunction. Various risk factors for abdominal wall dysfunction have been established, which include multiparity, increased maternal age, increased body mass index, pregnancy weight gain, laxity of connective tissue, and reduced level of physical activity (Weingerl et al., 2023).

Conservative management has been identified as the main treatment approach in the management of DRA, with physiotherapeutic interventions aiming at improving abdominal muscle function and reducing IRD (Skoura et al., 2024). Among the exercise-based rehabilitation approaches, exercises that target the deep core muscles have been found to be effective in improving abdominal muscle integrity. Among the exercises, abdominal bracing has been found to be an important approach that improves trunk stability by increasing intra-abdominal pressure and facilitating muscle activation. Despite the fact that many approaches have been identified, there is a lack of agreement on the effectiveness of exercises that target the abdomen, including bracing, in reducing IRD among postpartum women. Therefore, the current review aims to assess the efficacy of exercises that target the abdomen, including bracing, in the management of DRA among postpartum women and bridge the gap in the existing evidence on the effectiveness of exercises that target the abdomen, including bracing.

Methodology

Study Design

The study was designed as a systematic review of the literature to assess the effectiveness of abdominal exercises with bracing in reducing inter-Recti distance (IRD) in postpartum women with Diastasis Recti Abdominis (DRA).

Search Strategy

An electronic literature search was done to obtain literature published from January 2014 to January 2025. The databases searched for the literature were PubMed and Google Scholar. The keywords for the literature search included Diastasis Recti, postpartum, abdominal exercises, abdominal bracing, pregnancy, inter-Recti distance, and core stabilization. Boolean search terms like “AND” and “OR” were utilized to obtain the literature relevant to the study objectives.

Databases Searched

PubMed and Google Scholar were the electronic databases searched for the literature.

Inclusion Criteria

Studies were included in the review if they met the following criteria: publications written in English between 2014 and 2025; studies involving postpartum or pregnant women aged 18 years and above diagnosed with Diastasis Recti Abdominis; studies that included abdominal exercises with or without bracing techniques as the intervention; and study designs such as randomized controlled trials, quasi-experimental studies, systematic reviews, meta-analyses, or cross-sectional studies. Additionally, studies were included if they reported outcomes related to inter-recti distance, abdominal muscle strength, or core stability.

Exclusion Criteria

Studies were excluded if the full text was not available, if they were published in languages other than English, or if they were duplicate records identified during the search process. Studies that did not meet the inclusion criteria were also excluded. Furthermore, studies involving only surgical interventions or those not related to exercise-based management of Diastasis Recti Abdominis were excluded from the review.

Study Selection Procedure

The initial search of the database resulted in the retrieval of several potentially relevant articles. The initial screening of the articles was carried out based on the titles and abstracts to evaluate the relevance of the articles to the review topic. During this process, the duplicate articles were removed. After the initial screening, the articles were selected for the full-text review based on the inclusion and exclusion criteria. In the full-text review process, filters were used to restrict the search results to English language publications with full-text availability. After the screening and selection criteria process, the total number of studies that qualified for the final review is 11. The study selection procedure is represented in the following figure.

Data Extraction and Quality Appraisal

The data was extracted from the included studies by employing a structured approach. The data extracted included characteristics of participants, study designs, characteristics of interventions, duration and frequency of exercise programs, outcome measures, and findings from each study.

The quality of included studies was assessed by employing appropriate tools for critical appraisal. The Critical Appraisal Skills Programme checklist was employed for systematic review and qualitative study designs, whereas Joanna Briggs Institute critical appraisal tools were employed for quantitative study designs. All references and citations were organized by employing reference management software for accurate documentation, organization, and review of included studies.

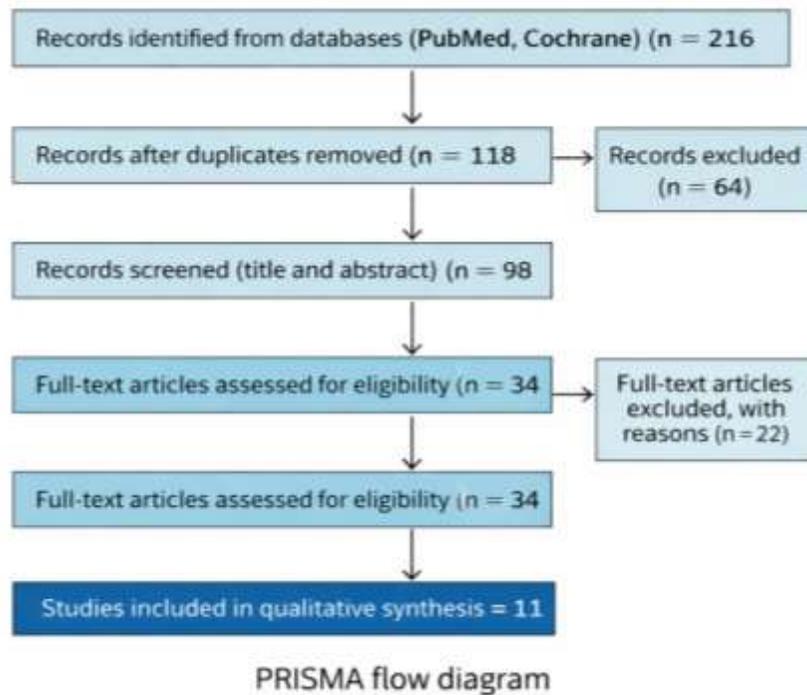


Figure 1. PRISMA Flow Diagram demonstrating Inclusion of studies

Table 1. Example of the caption for the table

Study	Objective	Study Design and Sample	Key Findings	Critical Review
Soto-Gonzalez et al. (2024)	To analyze the immediate and long-term effects of abdominal exercises on inter-recti distance in postpartum women.	Randomized Controlled Trial (RCT), 28 postpartum women	Both hypopressive and conventional abdominal exercises significantly reduced inter-recti distance. Hypopressive exercises improved contraction IRD, while conventional exercises improved resting IRD.	Moderate-quality evidence. Limited by small sample size and short follow-up duration.
Gluppe et al. (2023)	To assess the effectiveness of curl-up exercises on abdominal strength and inter-recti distance postpartum.	Systematic Review and Meta-analysis, 7 studies included	Curl-up exercises improved abdominal strength without worsening inter-recti distance, indicating safety and effectiveness.	High-level evidence. Limited by heterogeneity and lack of long-term follow-up.

Kaya et al. (2023)	To evaluate effectiveness of core stabilization exercises, abdominal corset, and combination therapy for DRA.	Randomized Controlled Trial (RCT), 45 postpartum women	Core stabilization exercises were more effective than corset intervention alone in reducing diastasis recti and improving trunk muscle strength.	Strong design but limited by relatively small sample size and short intervention period.
Skoura et al. (2023)	To examine current rehabilitation approaches for postpartum diastasis recti.	Scoping Review, 28 studies included	Exercise-based interventions are commonly used, but there is a lack of standardized rehabilitation protocols.	Comprehensive review but limited by variability in included study designs and lack of quantitative synthesis.
Weingerl et al. (2022)	To evaluate effectiveness of conservative treatments for postpartum diastasis recti.	Systematic Review and Meta-analysis, 14 studies included	Conservative exercise interventions showed moderate effectiveness in reducing inter-recti distance postpartum.	High-level evidence but limited by heterogeneity of intervention protocols.
Kazmi et al. (2023)	To evaluate effectiveness of abdominal physiotherapy in reducing IRD postpartum.	Quasi-experimental study, 40 postpartum women	Abdominal physiotherapy significantly reduced inter-recti distance after intervention.	Moderate evidence. Limited by absence of control group and randomization.
Keshwani et al. (2021)	To examine effects of exercise therapy and abdominal binding on postpartum DRA.	Pilot Randomized Controlled Trial (RCT), 32 postpartum women	Combined exercise and abdominal binding reduced inter-recti distance and improved trunk strength.	Promising findings but limited by pilot sample size and short follow-up.
Thabet & Alshehri (2019)	To evaluate effectiveness of deep core stabilization exercises in reducing diastasis recti.	Randomized Controlled Trial (RCT), 40 postpartum women	Deep core stabilization exercises significantly reduced inter-recti distance and improved quality of life.	Strong evidence but limited generalizability due to small and homogeneous sample.
Khandale et al. (2016)	To evaluate effectiveness of abdominal exercises in reducing diastasis recti postpartum.	Randomized Controlled Trial (RCT), 30 postpartum women	Structured abdominal exercises significantly reduced diastasis recti in postnatal women.	Moderate-quality evidence but limited by short intervention duration.
Acharry et al. (2015)	To evaluate effectiveness of abdominal exercises	Cross-sectional study, 30	Abdominal exercises with bracing were associated with reduced inter-recti	Low-level evidence due to observational

	with bracing in postpartum DRA.	postpartum women	distance and improved muscle function.	design and lack of intervention control.
Benjamin et al. (2014)	To determine effectiveness of exercise interventions for preventing and reducing DRA.	Systematic Review, 336 participants across included studies	Exercise interventions appear beneficial in reducing incidence and severity of diastasis recti.	High-level evidence but limited by insufficient number of high-quality randomized trials.

Results and Discussion

216 articles were identified through database searching, of which eleven studies were selected for analysis based on the inclusion criteria (Table 1). The selected studies consisted of five randomized controlled trials, three systematic reviews with meta-analyses, a systematic review, a scoping review, a quasi-experimental study, and a cross-sectional study. Systematic reviews and randomized controlled trials were at the top of the hierarchy of evidence, followed by quasi-experimental and observational studies.

The table for the literature review (Table 1) shows the objectives, study design, findings, and critical appraisal of the selected studies. All the selected studies provided evidence of the effectiveness of abdominal exercises, including those involving the activation of the abdominal brace and core stabilization, to decrease the inter-recti distance and improve the function of the abdominal muscles in postpartum women.

The systematic reviews and meta-analyses are considered to be of the highest level of evidence regarding the effectiveness of conservative exercise interventions. Gluppe et al. (2023) found in their systematic review and meta-analysis study that curl-up exercises can improve abdominal muscle strength without increasing inter-recti distance, thus proving the effectiveness and safety of exercises in postpartum rehabilitation. Similarly, Weingerl et al. (2023) found moderate evidence supporting conservative interventions, including abdominal exercises and core stabilization, in reducing diastasis recti in postpartum women. Benjamin et al. (2014) found that exercise interventions in antenatal and postnatal periods can contribute to reducing the severity and incidence of diastasis recti, although the need to perform more trials has been emphasized in the study. Skoura et al. (2024) found in their scoping review study that exercise-based rehabilitation is widely applied, although clinical protocols vary, and standardized treatment guidelines are lacking.

Randomized controlled trials were found to be a good source of clinical evidence for the interventions involving abdominal exercises. In a study conducted by Soto-Gonzalez et al. (2024) on the effect of hypopressive and conventional exercises, the results showed that hypopressive exercises improved contraction-related IRD, while conventional exercises improved resting IRD. Kaya et al. (2023) found that core stabilization exercises were more effective than the use of abdominal corsets for the treatment of diastasis recti. In another study, Thabet et al. (2018) found that deep core stabilization exercises were effective for the treatment of diastasis recti, resulting in

improved quality of life for postpartum women. Keshwani et al. (2019) conducted a pilot study on the effect of exercise therapy with the use of abdominal binding, which resulted in improved IRD and increased trunk strength compared with no intervention. Khandale et al. (2016) have also proven the efficacy of structured abdominal exercise programs in reducing inter-recti distances in postnatal women.

In addition, quasi-experimental and observational studies have provided moderate levels of evidence supporting the results. Kazmi et al. (2023) carried out a quasi-experimental study in which the results indicated significant reductions in inter-recti distances following abdominal physiotherapy interventions. Although the results are not based on randomized interventions, they emphasize the benefits of exercise-based interventions. Acharry et al. (2015) carried out a cross-sectional study in which the results indicated abdominal exercises involving bracing techniques are effective in reducing diastasis recti and abdominal muscle functions in postpartum women. The results emphasize the benefits of abdominal bracing techniques in facilitating abdominal functions.

From the findings, it was evident that the therapeutic factor that was common across all the studies was the use of abdominal bracing. Abdominal bracing has been shown to increase the co-contraction of the deep core muscle groups, which include the transversus abdominis, the internal oblique, and the multifidus, that assist with the stabilization of the trunk and the closure of the inter-recti distance. This improves the muscular stabilization of the abdominal wall, the approximation of the tissues, and the overall rehabilitation.

From the hierarchy of evidence, it was evident that the results from the systematic review and the RCT supported the effectiveness of abdominal exercises, which included the use of bracing, for the treatment and alleviation of diastasis recti, especially for postpartum women. From the quasi-experimental and observational studies, it was evident that the results supported the effectiveness of the exercises, although limitations were identified, including the sample size, lack of control groups, and the duration of the studies.

Overall, the results obtained from the review provide strong evidence for the effectiveness of the abdominal exercise with bracing for the conservative treatment of diastasis recti. However, the diversity in the exercise protocol, the duration of the intervention, and the outcome measures underscore the need for conducting more high-quality randomized controlled trials.

Conclusion

In postpartum women, abdominal exercise with bracing is noted to be effective for the treatment of Diastasis Recti Abdominis (DRA). Given the high prevalence of DRA, further studies should assess other potentially effective treatment modalities. Abdominal exercises with bracing have been cited as one of the major factors in the reduction of inter-recti distance (IRD), according to existing literature. Screening techniques for detection of DRA and to evaluate the structural status of the linea alba should also be integrated into the postpartum care of women, since DRA has greater effects on postpartum women's quality of life. Timely and suitable treatment or referral for women can be ensured with early detection.

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