Bridging the Gap Between Evidence and Practice: A Survey-Based Review of Physical Therapy Management for Diastasis Recti with Emphasis on Transverse Abdominis (TRA) Exercise in the Postpartum Period

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ABSTRACT

Introduction: Diastasis Recti Abdominis (DRA) is a common musculoskeletal condition affecting postpartum women, characterized by the separation of the rectus abdominis muscles. Despite its prevalence, there is a lack of standardized clinical guidelines for its evaluation and treatment, particularly regarding the role of transverse abdominis (TrA)-focused exercises in postpartum rehabilitation.

Objective: This review aims to evaluate current clinical practices in the assessment and management of DRA among physical therapists, with a specific focus on the integration and effectiveness of TrA-targeted interventions in postpartum care.

Methods: A systematic literature search was conducted across PubMed, EMBASE, and Web of Science databases up to 2021. The search included English-language studies on DRA that reported clinical outcomes related to exercise therapy, with or without adjunct modalities. Case series, observational studies, and clinical trials were included; abstracts, non-English articles, and unavailable full texts were excluded. A total of 28 studies met inclusion criteria. Data were extracted on study design, sample characteristics, DRA assessment methods, intervention protocols, and functional outcomes. Critical appraisal of clinical trials was conducted using the PEDro scale.

Results: The included studies comprised 14 clinical trials, 3 case series, and 11 observational studies. TrA-focused exercises—particularly those involving abdominal drawing-in maneuvers (ADIM)—were commonly used across interventions and associated with reduced inter-recti distance (IRD) and improved trunk stability. However, wide variation was found in diagnostic definitions, program designs, and outcome measures. A randomized controlled trial showed that a deep core stabilization program significantly decreased IRD and enhanced quality of life. Survey data indicated that while most physical therapists are aware of and routinely assess DRA postpartum, treatment approaches differ significantly due to the absence of standardized guidelines.

Conclusion: Targeted activation of the TrA shows promise in managing DRA and supporting postpartum recovery, but inconsistent evaluation methods and treatment strategies hinder clinical consensus. The findings highlight the urgent need for standardized protocols, enhanced clinician education, and further high-quality research to validate and unify evidence-based practices. Future studies should evaluate long-term functional outcomes of TrA-based interventions and assess the impact of adjunct modalities such as abdominal binding and electrotherapy.

Keywords: Inter-recti distance, abdominal drawing-in maneuvers, TrA-focused intervention, Physiotherapy Management

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INTRODUCTION

The purpose of this communication is to review our present understanding of Diastasis Recti with a brief historical summary of how we reached that understanding. This review emphasizes how Physical Therapy Management for Diastasis Recti which emphasis on transverse abdominis (TRA) exercise in the Postpartum Period is beneficial for women after delivery. Key questions that need competent research attention are highlighted by italics. [1]

Diastasis recti abdominis (DRA) or rectus diastasis is an acquired condition in which the rectus muscles are separated by an abnormal distance along their length, but with no fascia defect [1]. DRA occurs most frequently during pregnancy and regresses spontaneously after childbirth in most women. However, at 12 months postpartum, 33% of women still experience DRA [2]. DRA has been found in 39% of older, parous women undergoing abdominal hysterectomy [3], and in 52% of urogynecological menopausal patients [4], suggesting that DRA can even persist past childbearing years. Data from nonparturient women are rare. Diastasis is also frequently present in men, but data regarding these cases are scarce [1].

The condition is pathologic when it interferes with activities and quality of life. The condition is frequently assessed using the interrectus distance [7]. A thorough history and physical exam can diagnose most cases of diastasis recti. Classification schemes for diastasis recti have been created based on inter-rectus distance and location of the defect, which can help with management decisions. Imaging modalities such as ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI) can aid in the classification of diastasis recti and guide surgical planning [6].

Boissonnault and Blaschak noted DRA to be present in 66% of women who were in their third trimester of pregnancy while Hannaford and Tozer reported a 100% incidence of DRA in pregnant women. Nobel believes that most postpartum women have some degree of separation. Immediately postpartum, Bursch found all women had some degree of abdominal muscle separation with 85% presenting with at least a 2-finger width separation, the traditional determination for DRA [1].

FIG 1: Diastasis Recti with abdominal protrusion

Causative factors for DRA appear to be either hormonally mediated or result from the mechanical effects of pregnancy on the abdominal musculature.[9] During pregnancy increased levels of relaxin, progesterone, and estrogen soften connective tissue, weakening the linea alba. Together with the mechanical strain placed on the anterior abdominal wall by the enlarging uterus, this weakening can result in a DRA. [10] As pregnancy advances, the rectus abdominis muscles become stretched and elongated around the enlarging uterus. [9,10] Gilleard and Brown noted a 115% increase in the length of the rectus abdominis during pregnancy and a change in the angle of insertion, reducing the muscle's ability to generate torque. Fast et al[9] found that pregnant women had significantly weaker abdominal musculature than nonpregnant women during a sit-up performance test and attributed this weakness to their over-stretched abdominal muscles. Multiparity, especially without recovery of abdominal tone between successive pregnancies, places a woman at risk for developing DRA due to repeated and prolonged stretch on the abdominal wall. [11] Multiple pregnancies closely related in time, place a woman at risk because there is insufficient time for the abdominal wall to recover function in between the pregnancies. [12]

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A focused physical examination can diagnose most cases of DR in patients with normal body habitus. When standing, most patients will not show clear signs of diastasis. However, pathognomonic for a severe DR is a rounded abdomen. In women, they may notice their abdomen is no longer flat. Some may complain that they look or feel pregnant. In men, they may have a rounded abdomen due to DR alone and not due to any obesity. The terms "beer-belly" and "potbelly" may be used to refer to this rounded abdomen, though typically these refer to obese abdomens due to intra-abdominal fat and are not specific for DR. [6]

The best manner to diagnose patients with DR is to place them supine and then have the patient engage their core. This can be done with a half sit-up or with a leg raise. In patients with DR, this will demonstrate a smooth bulging. The bulging in the upper midline tends to have a pyramidal shape to it. DR can extend from the subxiphoid to below the umbilicus in men and women. In some women who have DR due to pregnancy, the DR may be limited to the peri-umbilical region or to the lower abdomen. During a physical exam, it is important to recognize that patients may have both DR and associated abdominal wall hernias. [6]

FIG 2: Self-assessment for Diastasis Recti

DRA (defined as > 2 cm at 3 cm above the umbilicus) was present in 57% of the population. The 80th percentile of the interrectal distance was 10 mm at the xiphoid (median 3 mm, 95% confidence interval (CI) 0-19 mm), 27 mm halfway from xiphoid to umbilicus (median 17 mm, 95% CI 0-39 mm), 34 mm at 3 cm above the umbilicus (median 22 mm, 95% CI 0-50 mm), 32 mm at the umbilicus (median 25 mm, 95% CI 0-45 mm), 25 mm at 2 cm below the umbilicus (median 14 mm, 95% CI 0-39 mm), and 4 mm halfway from umbilicus to pubic symphysis (median 0 mm, 95% CI 0-19 mm). In the multivariate analysis, higher age ($p = 0.001$), increased body mass index ($p < 0.001$), and parity ($p < 0.037$) were independent risk factors for DRA, while split xiphoid, tobacco abuse, and umbilical hernia were not [5].

Imaging modalities such as ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI) can aid in the classification of diastasis recti and guide surgical planning [6]. The Rath classification submits that pathological DR changes with age, and thus the classification is age-dependent [7]. The Nahas classification categorizes DR based on the underlying cause of the myofascial deformity in order to help in surgical planning for its correction [8].

FIG 3: Measurement of infrasternal angle along with Diastasis Recti

In a recent study and according to the latest guidelines, DRA management should be primarily conservative, and physiotherapy is the gold standard approach. Surgical intervention, involving the reduction of the IRD through plication of the linea alba and anterior rectus sheath with or without a mesh, is typically reserved for severe cases where conservative treatment fails, no further reduction is achieved, or a concomitant symptomatic hernia is present. However, owing to surgical complications and the potential recurrence of DRA with subsequent pregnancies, a conservative approach is generally recommended for at least 6 months. However, although rehabilitation focusing on various exercises, including pelvic floor muscle (PFM) exercises, transversus abdominis (TrA) exercises, hypopressive abdominal training etc., is promising, most studies are of low methodological quality and present great heterogeneity regarding DRA severity, IRD measurement methods, cut-off points, etc., thus indicating no consensus on a standardized rehabilitation protocol. [16]

Research Question

The scoping review was aimed at addressing the following research questions:

1. What extent do current clinical practices used by health physical therapists for treating diastasis recti abdominis (DRA) in postpartum women align with evidence-based recommendations?
2. How frequently are transverse abdominis (TrA)-focused exercises used in clinical practice, and how do therapists apply them in treatment protocols?
3. Do therapists perceive their interventions as effective in reducing DRA and improving functional outcomes in postpartum clients?
4. What are the perceived barriers that prevent physical therapists from implementing evidence-based interventions for DRA in postpartum care?

SEARCH STRATEGY AND METHODOLOGY

An extensive literature search was conducted to identify all English-written published articles on diastasis recti abdominis (DRA). PubMed, EMBASE, and Web of Science databases were consulted using the terms “DIASTASIS” and “RECTI” and “ABDOMINI” and “INTRA-RECTUS” and “TRANS ABDOMINIS” until 2021. The search was completed by consulting the listed references of each article. [9]

All the articles, case reports, and case series were included in this narrative review, while abstracts were excluded. [10] Data extracted included study characteristics (first author name, year, and journal of publication), along with a number of patients included in the series, clinical and demographic characteristics of patient’s population, DRA evaluation, DRA definition, DRA prevalence and risk factors. Articles in non-English languages and those without a full available text were excluded.

Eligibility criteria included experimental studies (randomized controlled trials [RCTs], controlled clinical trials [CCTs], case series) or observational/descriptive studies (cohorts, case–control, cross-sectional, longitudinal, prospective studies) containing the above terms, articles published in English and in full-text, without any limitations regarding publication date. Exclusion criteria were single case studies and clinical commentaries, studies in which none of the study groups entailed exercise interventions, observational studies restricted solely to healthy nulliparous subjects, and studies proposing finger-widths or tape measures as IRD outcomes. Results were scanned manually, and articles not complying with the above criteria were excluded.

Selection criteria included studies investigating exercise therapy interventions both with and without adjunct modalities for postpartum DRA. Sample characteristics, diagnostic criteria, program design, and outcome measures were recorded. Critical appraisal of clinical trials was performed using PEDro classification. Informed consent was not necessary for the literature review. No restrictions on publication status were imposed.

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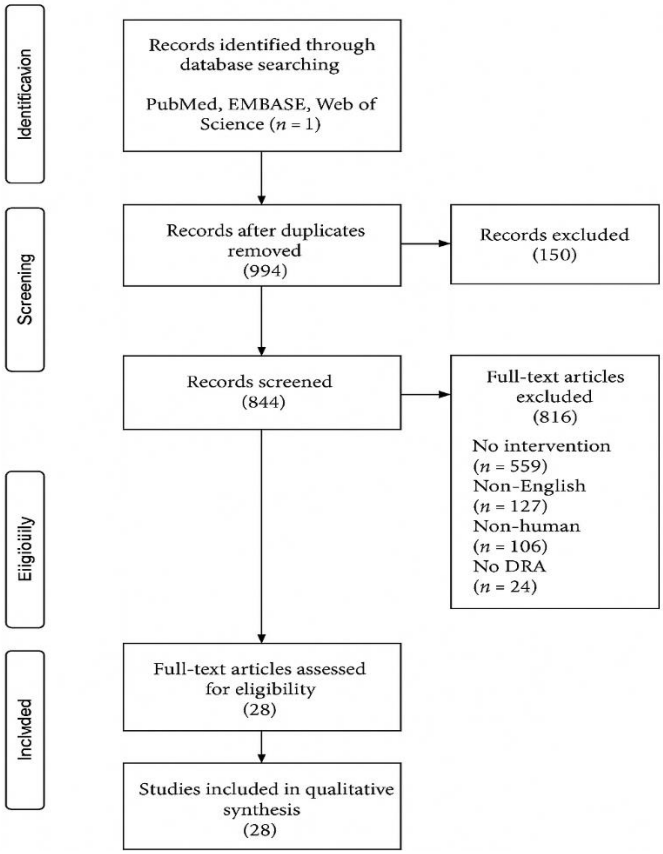

Fig 4 : PRISMA diagram of the study

1. What extent do current clinical practices used by health physical therapists for treating diastasis recti abdominis (DRA) in postpartum women align with evidence-based recommendations?

Current Health PT practice largely aligns partially with evidence-based recommendations where clinicians commonly use transversus abdominis (TrA)–focused exercises and palpation-based assessment but there is limited evidence that these approaches reliably reduce inter-recti distance (IRD), diagnostic methods are inconsistent (palpation vs imaging), and treatment should emphasize on functional outcomes besides just closing the gap. Physiotherapists frequently assess DRA by palpation and calipers and commonly prescribe TrA-focused/core re-education exercises. Several reviews and clinical summaries recommend TrA activation and progressive abdominal rehabilitation as the core approach also for treatment of diastasis recti. Most PTs already follow evidence-supported principles—assessment of IRD, TrA/core activation, progressive functional retraining, and attention to lumbopelvic function. Many studies nowadays also says that **palpation alone and expecting consistent IRD closure** from TrA exercises is not strongly supported by higher-quality trials. Use of objective imaging (ultrasound) is underused but provides better measurement consistency when available. Evidence-based clinical approach includes assess IRD with a reproducible method, prioritize progressive, functional core retraining rather than targeting IRD reduction as the sole outcome, Tailor program to the individual, considering anatomical variation and risk factors, and Track both functional outcomes (pain, activity, strength, activity of daily living) and IRD, and counsel patients honestly about expected changes in gap width.

2. *How frequently are transverse abdominis (TrA)-focused exercises used in clinical practice, and how do therapists apply them in treatment protocols?*

It is found that the majority of therapists frequently use TrA-focused exercises as the ***primary intervention*** for diastasis recti abdominis (DRA). Therapists reported TrA activation training as the "best practice" for DRA management. Studies also proven the importance of TrA and deep core retraining in postpartum rehabilitation of women. The consistent use of TrA-based exercise protocols in postpartum women with DRA, showing positive clinical outcomes in case series and reviews. The use of TrA-focused exercise program as the

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intervention group, confirming that such exercises are frequently implemented in research and practice, even though the study found **no significant reduction in DRA width** compared to control. Across surveys, reviews, and clinical reports, TrA-focused training is among the most frequently used therapeutic interventions for DRA in postpartum women.

3. ***Do therapists perceive their interventions as effective in reducing DRA and improving functional outcomes in postpartum clients?***

Physical therapists report DRA frequently and commonly use TrA-focused intervention proving it as one of the best practices. This shows a strong clinician belief that their interventions are appropriate and effective. Therapists generally perceive their interventions especially transversus abdominis–focused exercise as helpful mainly for improving postpartum functional outcomes but higher-quality evidence results shows mixed results for actually reducing diastasis recti abdominis (DRA) width. Some studies like Gluppe et al. (RCT, 175 primiparous women) also said that exercise program alone did not produce a significant reduction in measured DRA width but there were some functional improvements. Physical therapists recommend TrA-focused training and report improvements in postpartum fitness/function. These sources reflect clinical experience and are consistent with therapists' positive views but are lower-level evidence. Studies also proved that other anatomical or imaging studies provide background on anatomical variation, measurement definitions and biomechanics, muscle changes noted in early postpartum because measurement method and natural variation affect whether an intervention appears to **"reduce" DRA** and it varies from women to women with DRA evaluation.

4. ***What are the perceived barriers that prevent physical therapists from implementing evidence-based interventions for DRA in postpartum care?***

The perceived barriers preventing physical therapists from implementing evidence-based interventions for diastasis recti abdominis (DRA) in postpartum care stem mainly from inconsistencies in diagnosis, limited high-quality research, and gaps in clinical knowledge. Several studies highlight the **lack of standardized diagnostic methods** with wide variations in measurement techniques such as palpation, calipers, and ultrasound making it difficult to establish consistent clinical criteria. Evidence regarding effective rehabilitation is also inconclusive. Many studies have proven and recommended transversus abdominis (TrA)–focused exercise while at the same time studies also found no significant reduction in DRA creating uncertainty about best practices. Moreover, much of the available research is descriptive or based on small cohort with limiting strength of evidence. Together, factors like diagnostic inconsistency, limited evidence, and practitioner uncertainty form the main barriers to implementing evidence-based DRA interventions in postpartum physical therapy practice.

Table 1: Evaluation of the articles

Author (year of publication)	**Type of study**	**Sample size/Primi, Multigravida/age**	**DRA Evaluation**	**Prevelence & risk factor**	**How frequently Transverse Abdominis (TrA)-focused exercises**	**Functional Outcomes in Postpartum Clients**
M. Cavalli etal. 2021	Review	N/A	Anatomical Review	Anatomical variation proposed	N/A	N/A
Sperstad et al. (2016)	Longitudinal cohort	300 women / primi & multi / 20–40 yrs	Palpation & caliper	33% at 12 months postpartum; risks: cesarean, weight gain	Not assessed	Lumbopelvic pain association studied
Ranney (1990)	Descriptive	N/A	Clinical observation	Related to umbilical hernia	N/A	N/A
Spitznagle et al. (2007)	Cross-sectional	N/A	Ultrasound	Normal linea alba width defined	N/A	N/A

Rath et al. (1996)	Anatomo-radiologic study	Cadaveric samples	Radiologic & biomechanical	Linea alba biomechanical properties	N/A	N/A
Nahas (2001)	Descriptive	N/A	Visual / anatomical	Classified abdomen types	N/A	N/A
Noble (1995)	Book/manual	N/A	Exercise-based	Guidance-oriented	TrA-focused recommended	Improved postpartum fitness reported
Boissonnault & Kotarinos (1988)	Textbook chapter	N/A	Clinical / palpation	Prevalence discussed	TrA included	Supports physical therapy role
Gilleard et al. (1996)	Prospective study	10 primigravid women	EMG & ultrasound	Muscle changes noted	Not TrA-specific	Immediate postpartum function focus
Lo et al. (1999)	Review	N/A	Clinical & literature	Risk factors listed	Recommended TrA exercises	Rehab protocols described
Sheppard (1996)	Case series	N/A	Palpation	Effects of TrA-based therapy	Used frequently	Positive improvement shown
Gluppe et al.	RCT	175 primiparous women	Palpation & caliper	No significant reduction with program	TrA-focused group used	Some functional improvement noted
Keeler et al.	Survey	358 PTs	Survey	PTs report frequent DRA	TrA commonly used	Described as best practice
Kaufmann et al.	Cross-sectional	N/A	Ultrasound	Normal linea alba width defined	N/A	N/A
Tung & Towfigh	Review	N/A	Imaging & clinical techniques	Describes diagnostic techniques	N/A	N/A

DISCUSSION

The survey revealed that most women's health specialists are well aware of DRA and routinely assess it during postpartum evaluations. However, the methods of assessment and treatment varied widely, with some therapists using traditional palpation techniques, while others employed more advanced tools like ultrasound imaging. This indicates a lack of standardized clinical guidelines, leading to variability in how DRA is both diagnosed and tracked over time.

Many therapists expressed a desire for more continuing education opportunities and clearer clinical protocols. This suggests that while clinicians are motivated to use evidence-based methods, they may lack access to the most current research or practical tools for implementation. The inconsistency also reflects a need for consensus-driven practice guidelines, especially in the postpartum context where treatment variability can directly impact maternal recovery.

The findings underscore the potential benefits of targeted exercise interventions, particularly those focusing on TrA activation, in managing DRA during the postpartum period. However, the variability across studies highlights the need for standardized protocols and further research to establish optimal treatment strategies. In clinical practice, integrating TrA exercises with pelvic floor muscle training may offer a comprehensive approach to postpartum rehabilitation. Additionally, considering adjunct modalities such as abdominal binding

or electrotherapy could enhance treatment outcomes, though more evidence is needed to confirm their efficacy.

Future research should aim to standardize diagnostic criteria, exercise protocols, and outcome measures to facilitate comparison across studies and strengthen the evidence base for DRA rehabilitation strategies. Future studies should also assess the effectiveness of individual interventions to refine and advance treatment on the basis of evidence. Further research is needed to:

- Test the effectiveness of standardized protocols in clinical settings.
- Explore patient outcomes related to different treatment strategies.
- Investigate the long-term effects of TrA-based interventions on functional performance and quality of life.
- Conduct qualitative interviews or focus groups to better understand clinical decision-making.

RESULTS

The systematic scoping review included 28 studies: 14 clinical trials, 3 case series, and 11 observational studies. These studies examined various exercise interventions for postpartum women with diastasis recti abdominis (DRA). Two articles were excluded because they were not in English, and five were excluded as the full text was unavailable. The primary focus was on deep core stability exercises, particularly targeting the transversus abdominis (TrA), and their impact on reducing inter-recti distance (IRD) and improving functional outcomes. TrA exercises, often combined with abdominal drawing-in maneuvers (ADIM), were commonly integrated into rehabilitation protocols. These exercises aim to activate deep abdominal muscles, providing trunk stability. A randomized controlled trial demonstrated that a deep core stability exercise program significantly reduced IRD and improved quality of life in postpartum women. The reviewed studies exhibited considerable variability in diagnostic criteria, sample characteristics, and exercise program designs, which may limit the generalizability of the findings.

CONCLUSION

The focus of conservative treatment for postpartum women with DRA is therapeutic exercise, specifically TA training. Current practice for postpartum DRA includes multiple intervention techniques. [15] The results of this study suggest DRA during pregnancy may be prevented by abdominal exercise. The DRA occurred significantly less in pregnant women who participated in an exercise program targeting the abdominal muscle—specifically, the transversus abdominis. Diastasis recti abdominis appears to be common in non-exercising pregnant women as 90% exhibited a separation of the rectus abdominis. Because of the integral role the abdominal muscles play in functional activities, we recommend examining pregnant and postpartum women for the presence of DRA. We suggest abdominal muscle strengthening exercise be implemented during a normal pregnancy unless precluded by additional risk factors. Exercise targeting the TRA may be an effective treatment method for reducing IRD. Current practice for postpartum DRA includes multiple intervention techniques.

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