Physiotherapeutic strategies for the treatment of diastasis recti abdominis: a narrative review

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Abstract

Background: Diastasis recti abdominis (DRA) is a common condition characterized by the abnormal separation of the rectus abdominis muscles, frequently observed postpartum. It poses substantial health challenges, leading to compromised trunk stability, altered posture, and diminished physical performance. Given the variability in therapeutic approaches, a systematic analysis of the effectiveness and impact of physiotherapeutic interventions is essential to guide clinical practices.

Aims: The objective of this review is to analyze contemporary therapeutic methods applied in the treatment of postpartum DRA, with particular emphasis on their effectiveness and impact on abdominal muscle functionality.

Materials and Methods: A comprehensive literature review was conducted to evaluate the effectiveness of therapeutic interventions used for treating DRA, including kinesitherapy, manual therapy, electroacupuncture, and Kinesiotaping. The analysis included studies examining the impact of these therapeutic methods on selected parameters in women with DRA.

Results: The findings indicate significant improvements in abdominal muscle function among patients with DRA. Complementary techniques, such as electroacupuncture and Kinesiotaping, may support tissue regeneration processes, enhance tissue flexibility, and aid in trunk stabilization. Specific exercise protocols targeting deep core stability and transverse abdominal muscles were particularly effective in reducing muscle separation and enhanc-

Key words

Kinesiotaping, physical therapy, surgical treatment, conservative treatment, diastasis of the rectus abdominis muscles.

ing overall functional performance. Additionally, methods such as Pilates and yoga demonstrated substantial benefits in improving posture, reducing symptoms associated with DRA, and enhancing patient-reported quality of life. The integration of manual visceral manipulation also showed promising initial results, contributing to the overall effectiveness of conservative treatment strategies.

Conclusions: A comprehensive therapeutic approach for managing DRA should primarily incorporate kinesitherapy as a core component of rehabilitation, complemented by supportive methods. Further studies are needed to standardize therapeutic protocols and determine their long-term effectiveness.

Introduction

The rectus abdominis muscle is a primary component of the anterior-lateral abdominal wall, playing a pivotal role in trunk stabilization and protecting internal organs. It spans from the cartilage of ribs V–VII, the xiphoid process of the sternum, and the costoxiphoid ligament down to the pubic symphysis and the pubic crest of the pelvic bone. Structurally, it forms a symmetrical pair of muscles—right and left—connected centrally by the linea alba. The linea alba itself is a collagenous, tendinous band running along the midline, formed by the aponeuroses of the oblique and transverse abdominal muscles [1]. A pathological condition called diastasis recti abdominis (DRA) can occur along this structure, characterized by an excessive separation of the two muscular bellies [2].

DRA affects 66–100% of women during the third trimester of pregnancy, 53% immediately postpartum, and 45.5% six months after childbirth. Among these, 35–70% experience persistent DRA without proper treatment and exercise [3]. This condition creates a midline gap that can negatively affect trunk stabilization functions, compromising the muscles' ability for respiration, rotation, and flexion of the torso. Additionally, diastasis may reduce the protective function of the abdominal muscles over internal organs such as the liver, stomach, and intestines. As the linea alba is crucial for muscular attachment, maintaining its integrity is fundamental for proper muscle function [4]. Weakening of this structure and excessive muscular separation can lead not only to abdominal dysfunction but may also disturb pelvic and lumbar spinal stabilization. Such disturbances can cause postural defects, back pain, and other discomforts, significantly reducing the individual's quality of life [5, 6].

DRA is a common condition among pregnant women, particularly during the third trimester, when the growing uterus exerts increased pressure on the abdominal wall, causing stretching and weakening. As the uterus enlarges, intra-abdominal pressure also increases, leading to the stretching of the linea alba and separation of the rectus abdominis muscle bellies. Hormonal changes, including elevated relaxin levels, further enhance tissue elasticity, facilitating abdominal muscle separation. Although this condition may spontaneously resolve within several months postpartum, physiotherapeutic intervention is frequently necessary to minimize the separation and restore normal muscle function. Without appropriate rehabilitation, DRA can result in further consequences such as trunk muscle weakness, pelvic instability, and even lower back pain [7, 8]. In some cases, when the separation exceeds the width of a fist, surgical intervention might be required to restore muscle continuity. However, according to current recommendations, physi-

otherapy should constitute the initial treatment approach [9-11].

DRA represents a serious and prevalent concern among postpartum women and beyond. Effective and precise diagnosis of this condition is essential for appropriate treatment and improvement of patient quality of life. DRA is typically diagnosed by measuring the distance between the two sides of the rectus abdominis muscle. Measurements are performed not only to diagnose the separation itself but also to monitor treatment progress [12]. Currently, literature has not defined a universally accepted international parameter for DRA. Nevertheless, normative values have been established, indicating that the normal distance between the linea alba and abdominal muscles should not exceed 15 mm at the level of the xiphoid process, up to 22 mm three centimeters above the umbilicus, and no more than 16 mm three centimeters below the umbilicus. Various methods for assessing DRA are reported in the literature, including ultrasonography, palpation, computed tomography (CT), and caliper measurements (both analog and digital). In finger-width palpation diagnostics, a gap of two finger-widths at the umbilical level and one finger-width below the umbilicus is generally considered pathological [11, 13].

Therapeutic methods and their effectiveness

In most women, diastasis recti abdominis resolves spontaneously during the postpartum period, typically within the first eight weeks. During this time, the linea alba undergoes natural regeneration, and the gap between the rectus abdominis muscle bellies decreases. However, if muscles fail to return to their pre-pregnancy state, physiotherapeutic intervention becomes necessary, recognized as the only effective non-invasive treatment method. Despite numerous studies confirming the positive impact of exercise on reducing inter-rectus distance, a widely accepted therapeutic protocol for DRA has yet to be established, and definitive guidelines regarding the most effective exercises remain a significant clinical challenge [14, 15].

The selection process for studies included in this review focused on research addressing diagnostics and treatment of DRA in pregnant and postpartum women. Inclusion criteria comprised diverse methodological approaches, such as randomized controlled trials, pilot studies, systematic reviews, and observational studies. Particular attention was given to interventions involving kinesitherapy, core muscle stabilization exercises, Pilates, yoga, Kinesiotaping, and electroacupuncture. An essential criterion for inclusion was the assessment of dysfunction using ultrasonography, digital calipers, palpation examination, and muscle strength testing.

Conservative treatment

Conservative treatment of DRA involves a variety of approaches, including abdominal belts, electrostimulation, manual therapy, and targeted exercise programs. Among these, therapeutic exercises are most frequently employed by specialists, playing a crucial role in restoring normal abdominal muscle function. In the initial stages of treatment, particularly postpartum, abdominal belts may support the abdominal wall by providing stabilization. Research findings suggest that interventions such as electroacupuncture and manual therapy demonstrate promising potential in improving muscle function and reducing the separation between rectus abdominis muscles [11, 16].

Kinesiotherapy

The period of six to eight weeks postpartum is considered an optimal time to begin conservative treatment for women with DRA.

A study conducted by Gluppe et al. [17] evaluated the effects of a 12-week Curl-up exercise program on abdominal muscle function in women with DRA, occurring from 6 to 12 months postpartum. The program included home-based exercises involving head lifts, crunches, and trunk rotations, performed by the experimental group five times

weekly for ten minutes per day. Seventy women who had experienced at least one childbirth participated in the study, including primiparous and multiparous women, single and multiple pregnancies, irrespective of delivery type. Diagnostic criteria included an inter-rectus distance greater than 28 mm at rest or 25 mm during abdominal crunches, confirmed via ultrasonography. The study consisted of an experimental group and a control group that received no intervention. Results indicated that, although Curl-up exercises did not significantly reduce the inter-rectus distance, they notably enhanced abdominal muscle strength and thickness.

Research by Thabet [18] aimed to assess the effectiveness of a deep core muscle stabilization exercise program in reducing DRA and improving the postpartum quality of life. The study involved 40 women with DRA aged 23 to 33 years, divided into two groups. The first group of 20 participants performed core-strengthening exercises combined with traditional abdominal exercises, three times per week for eight weeks. Exercises included abdominal muscle contraction with a towel or sheet around the abdomen, diaphragmatic breathing, plank exercises, isometric contractions, and traditional abdominal routines. The second group, also consisting of 20 women, performed only traditional abdominal exercises, including static abdominal contractions and trunk rotations, with the same frequency and duration. Upon completing the program, inter-rectus distances were measured using digital nylon calipers, and quality of life was assessed using the Physical Functioning Scale. Results demonstrated that women in the first group experienced statistically significant reductions in muscle separation and improvements in quality of life.

Walton et al. [19] conducted a study comparing the effectiveness of a traditional treatment program to an experimental program utilizing deep muscle stabilization exercises (plank exercises) in reducing DRA among postpartum women. Women experiencing DRA were randomly assigned to either a traditional or an experimental group. DRA measurements were obtained via ultrasonography and caliper measurements. Both groups demonstrated reductions in inter-rectus distance, with the traditional program showing slightly greater effectiveness.

The study by Saleem et al. [20] examined the impact of abdominal and stabilization muscle-strengthening exercises on reducing inter-rectus distance and alleviating lower back pain in young postpartum women. In this controlled trial, participants were divided into two groups: one performed a "crunch" exercise protocol, while the other executed a double straight-leg raise (DSLR) protocol for six weeks. Forty women participated, three months postpartum, with DRA greater than two finger-widths and more than 2 cm, irrespective of delivery method. Results indicated that the "crunch" group showed superior outcomes in reducing inter-rectus distance and alleviating lower back pain compared to the DSLR group.

Kinesiotaping with exercises

Kinesiotaping, a therapeutic technique involving the application of elastic tapes to the skin, is increasingly popular in the management of DRA. This method aids the healing process by providing mechanical support to tissues and stimulating cutaneous receptors.

A study conducted by Gürşen et al. [21] evaluated the effectiveness of therapy combining Kinesiotaping (KT) with physical exercises in postpartum women following a cesarean section. Twenty-four women, between 4 and 6 months postpartum, participated in the study. They were randomly assigned either to a group receiving KT combined with exercises or to a group performing exercises alone. Kinesiotaping was applied twice weekly for four weeks, covering the rectus and oblique abdominal muscles and the cesarean scar area. All participants followed an exercise program focused on correcting pelvic alignment, trunk stabilization, and strengthening abdominal muscles. Intervention efficacy was assessed using muscle tests, sit-up tests, abdominal muscle endurance

tests, Visual Analog Scale (VAS) pain ratings, waist circumference measurements, and the Roland-Morris Disability Questionnaire (RMDQ). Results showed significantly greater improvements in rectus abdominis muscle strength, sit-up test performance, pain reduction, and waist circumference reduction in the KT plus exercise group compared to the exercise-only group.

In a pilot study by Tuttle et al. [22], the efficacy of interventions combining transverse abdominal muscle (TrA) strengthening exercises and Kinesiotaping was assessed among 30 women, 6 to 12 weeks postpartum, diagnosed with palpable DRA. Participants were divided into four groups: TrA exercises alone, Kinesiotaping alone, a combination of TrA exercises with Kinesiotaping, and a control group. The primary outcome measure was the inter-rectus distance, evaluated via ultrasonography. The greatest reductions in inter-rectus distance were observed in the groups performing TrA exercises alone and those combining TrA exercises with Kinesiotaping. Although differences between these two groups were not statistically significant, they were significant compared to both the Kinesiotaping-only and control groups.

Another research conducted by Gürşen and Akbayrak [21, 22] suggests Kinesiotaping can support the rehabilitation process, particularly in women following a cesarean delivery. However, findings by Tuttle and colleagues did not indicate significantly greater benefits from combining Kinesiotaping with TrA exercises compared to performing TrA exercises alone. Consequently, further studies with larger participant groups and long-term follow-up are necessary to comprehensively assess the effectiveness of Kinesiotaping in the treatment of diastasis recti abdominis.

Physical intervention training

The Pilates method is based on precise, controlled movements designed to strengthen deep muscles, stabilize the trunk, and enhance proprioception. Exercises within this method particularly activate the transverse abdominal muscles, which play a crucial role in stabilizing and supporting the rectus abdominis muscles.

A study conducted by Lee et al. [23] confirmed the effectiveness of Pilates in reducing inter-rectus distance in primiparous women with DRA. Thirty-five women participated, with 20 assigned to the intervention group performing Pilates exercises, and 15 assigned to a control group without intervention. Following the intervention, a significant reduction in inter-rectus distance was observed in the Pilates group. Pilates exercises engage the entire body but place particular emphasis on core muscles, helping reduce tension around the muscle separation. Strengthening weakened muscle structures leads to improved flexibility and posture correction, essential elements in the therapeutic process.

Research conducted by Li et al. [24] aimed to evaluate the impact of progressive yoga rehabilitation on rectus abdominis muscle separation in postpartum women. Participants were recruited from seven rehabilitation centers in Guangzhou and Zhuhai, totaling 116 women divided into a yoga exercise group (n=63) and a control group (n=53) receiving no intervention. The inter-rectus distance was measured using digital Doppler ultrasound equipment. The yoga program lasted 12 weeks, consisting of weekly instructor-led 60-minute sessions. It was divided into two phases: weeks 1–6 introduced physical activity and basic muscle strengthening, while weeks 6–12 focused on more intensive exercises aimed at further enhancing muscle stability and strength. The program included yoga poses such as "cat pose" and "tiger pose," which specifically targeted muscle strengthening. The control group did not perform any additional physical activities. Diastasis was measured at three locations: supraumbilical, umbilical, and subumbilical regions. Results indicated a significant reduction in muscle separation in the yoga group across all measured regions, whereas the control group showed reductions only at the supraumbilical and subumbilical regions.

Electroacupuncture

Acupuncture, particularly electroacupuncture (EA), is increasingly considered a therapeutic intervention for postpartum DRA. This method is rooted in traditional Chinese medicine, where thin needles are inserted into specific points on the body to stimulate regenerative mechanisms and restore the body's energetic homeostasis.

Electroacupuncture further involves stimulating inserted needles with electrical impulses, potentially increasing tissue excitability and supporting repair processes. In treating DRA, electroacupuncture specifically targets abdominal muscles that have become excessively stretched and weakened due to pregnancy. Through electrical impulses, the method aims to restore mechanical balance and tissue elasticity, facilitating more effective regeneration. The mechanism behind electroacupuncture involves stimulating local blood flow and enhancing the functionality of muscles responsible for trunk stabilization.

A study by Liu et al. [25] evaluated the effectiveness of electroacupuncture as an adjunct therapeutic method for treating DRA among 110 women aged 20–45 years. Participants were randomly assigned into two groups: 55 received electroacupuncture treatment, while 55 served as a control group without intervention. Ultrasonography was employed to measure inter-rectus distances. The follow-up period spanned 26 weeks, and the primary objective was to compare electroacupuncture's efficacy in reducing muscle separation between the two groups. Study results demonstrated benefits regarding the biomechanical improvement and elasticity of muscle tissues. Additionally, significant improvements in pelvic floor muscle function were observed. However, no statistically significant differences emerged between groups regarding other parameters, such as quality of life or pain reduction. While electroacupuncture shows potential as a supportive treatment method for DRA, its use should be considered as part of a comprehensive therapeutic approach rather than as a standalone treatment modality.

Visceral manipulation

Visceral manipulation (VM) is a key manual technique recently introduced in the treatment of DRA. This method involves mobilizing internal organs and fascial tissues to restore the natural positioning of the abdominal muscles and peritoneum. By enhancing tissue elasticity and proprioceptive communication, VM facilitates improved functioning of the rectus abdominis muscles and their return to normal alignment.

A pilot study conducted by Kirk and Elliott-Burke [26] among patients with DRA demonstrated promising outcomes following the application of this technique. After four sessions, primarily targeting the jejunum, all participants showed functional improvement. These positive outcomes were reflected in objective measurements: the distance between separated rectus abdominis muscles significantly decreased, and results remained stable from six to eleven months following the conclusion of rehabilitation.

Surgical treatment

In some cases where conservative management fails to yield the expected clinical outcomes, particularly among patients with advanced-stage DRA, especially multiparous women, surgical intervention may be justified. Indications for surgery typically include a lack of significant improvement following at least six months of conservative therapy and an inter-rectus distance exceeding the width of a fist. Surgical techniques employed in DRA treatment encompass various approaches, including traditional open surgery, minimally invasive procedures, laparoscopy, and endoscopy, all tailored to the severity of the pathology and the specific therapeutic needs of individual patients [2, 27].

Open surgery approach

In open surgical management of diastasis recti abdominis, recurrence and complication rates are generally low, and any occurring complications are typically minor. Abdominoplasty remains the most frequently used surgical method and can

be performed either with or without a plication technique. This procedure facilitates the removal of excess skin, while plication enhances both aesthetic outcomes and muscular functionality. Surgical incision types include transverse incisions above the pubic symphysis, midline incisions above the umbilicus, suprapubic incisions on the left side, or midline abdominal incisions. In cases where diastasis is accompanied by a hernia, abdominoplasty is typically performed with an additional periumbilical incision [2, 27, 28].

Laparoscopic surgery approach

Laparoscopy represents a minimally invasive surgical technique increasingly favored within the medical community due to its beneficial outcomes. Laparoscopic procedures have demonstrated low recurrence rates and positive clinical results. Primary indications for laparoscopic surgery include aesthetic enhancement and restoration of abdominal wall muscle function. Within the context of DRA treatment, this approach is recognized as effective, providing substantial therapeutic benefits [2].

Endoscopic surgery approach

Endoscopic abdominoplasty, first introduced in 1991, is characterized by its minimally invasive nature. Compared to traditional open surgical methods, endoscopic techniques have gained popularity due to significant clinical advantages, such as reduced complication rates and decreased risk of disease recurrence. The endoscopic procedure involves introducing surgical instruments and a camera through small incisions, thereby minimizing tissue trauma, shortening recovery time, and reducing postoperative pain [2].

Own observations

An original study was conducted aiming to identify the most frequently applied physiotherapeutic methods for treating diastasis recti abdominis (DRA) and to evaluate their effectiveness. Data were analyzed from 78 women up to 35 years old who experienced postpartum DRA and underwent various forms of physiotherapy. The study, based on a diagnostic survey, considered therapeutic techniques used, the frequency and duration of therapy sessions, and the participants' subjective assessments of health improvement. Analysis revealed associations between therapy effectiveness and factors such as age, BMI, number of pregnancies, and gestational weight gain. Among women younger than 30, therapy was fully effective in 54.8% of cases, whereas in the group aged 31–35 years, 80.6% reported partial or no effectiveness. Women with a normal BMI experienced higher treatment efficacy than overweight or obese participants, who reported partial effectiveness or ineffectiveness in 78.8% of cases. The number of childbirths negatively impacted therapy outcomes—women with a single childbirth achieved better results (54.1% full effectiveness) compared to multiparous women, who reported partial effectiveness or no improvement in 75.6% of cases. Frequency of physiotherapy visits proved critical; therapy was effective in 61.8% of cases when conducted at least once every two weeks, whereas less frequent sessions correlated with reduced efficacy. Gestational weight gain also played a significant role: the best results were observed among women who gained between 3 and 6 kg (70.8% full effectiveness), while greater weight gains were associated with lower treatment efficacy. Lifestyle and the extent of muscle separation did not significantly affect therapy outcomes.

Conclusions

Contemporary treatment for diastasis recti abdominis (DRA) increasingly relies on physiotherapy, which effectively enhances muscular function, trunk stability, and overall quality of life among patients. Tailoring therapy to individual patient needs is crucial, with particular emphasis placed on targeted exercises that reduce muscular separation, strengthen deep abdominal muscles, and enhance stability.

However, a literature analysis reveals significant research limitations, including inconsistent

methodologies, small sample sizes, and inadequate standardization of therapeutic protocols. The lack of unified guidelines restricts clear evaluations of the effectiveness of specific techniques and complicates their implementation into clinical practice.

Declarations

Ethical Consideration: Ethical clearance was not obtained for this study as it does not include any human or animal participants and this consists of a literature review and presentation of own experiences.

Clinical Trials: This study was not registered as a clinical trial as it did not involve investigational products or interventions that would classify it under clinical trial regulations.

Conflict of Interest: The authors declare no conflict of interest. The study was conducted independently and without any influence from external organizations or entities.

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