

Correlation between Diastasis Rectus Abdominis and Lumbopelvic Pain and Dysfunction

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ABSTRACT

The purpose of this study is to examine the clinical assumption that a Diastasis Rectus Abdominis, when left untreated may leave the woman predisposed to lumbo-pelvic pain.

Objective: To find whether there would be a significant difference in some or all of dependant measures for lumbo-pelvic pain & dysfunction between those with Diastasis Rectus Abdominis. It was hypothesized that there would be a greater incidence of DRA among patients seeking physical therapy intervention for any of the specified lumbo-pelvic pain.

Method and Measures: Subjects (n=30; PG) included women seeking medical care for lumbar or pelvic area diagnoses (>18 years old) who had delivered at least one child. Subjects completed the Pelvic Floor Distress Inventory, Modified Oswestry Low Back Pain Disability Questionnaire, Visual Analog Scales (VAS) for pain. Diastasis Rectus Abdominis measurement was taken. Correlation test ($p \leq 0.05$) was performed to verify the relationship between Diastasis Rectus Abdominis and lumbopelvic pain and dysfunction.

Results: The incidence for the DRA was 83.33%.

Conclusions: Women with a DRA tend to have a higher degree of lumbo-pelvic pain.

Keywords: *Diastasis Rectus Abdominis, Lumbo-Pelvic Pain, Dysfunction*

INTRODUCTION

Diastasis recti abdominis (DRA) is the excessive widening or separation between the two bellies of the rectus abdominis muscle. The separation can occur anywhere along the linea alba and at times has been found to span the entire length from the xiphosternal angle to the pubic bone¹. The linea alba is the central seam that connects the fascia covering the rectus abdominis muscles. It is an important structure as it is the central insertion point of the rectus abdominis as well as the other 3 important abdominal muscles on each side: (1) internal obliques, (2) external obliques, and (3) transversus abdominis. These 4 muscles from each side join at the linea alba by way of their thin, broad tendons called aponeuroses.

This connection becomes vulnerable during pregnancy due to the expanding uterus and subsequent stretching of the abdominal muscles,

coupled with the hormonal changes that include increases in progesterone, estrogen, and relaxin^{1,2}. A DRA often goes unnoticed by patients, as well as health care professionals, and therefore is not addressed.

Several authors have examined the effects of treatment of DRA and its associated problems following pregnancy. Thornton et al³ presented a case report in which a multiparous woman presented with a significant DRA (23 cm, when >2cm= a DRA) in the second trimester. The subject had back and abdominal pain starting at 22 weeks gestation which was relieved during a ski trip when the woman wore fitted ski pants with overalls. A retrospective case control study on 55 postpartum women was conducted by Lo et al⁴ using patient charts and physical therapy treatment records. Subjects underwent an initial assessment regarding the presence, degree, and location of DRA and were started on an exercise program for DRA. Criteria for DRA was a palpable separation of >2.5cm or a visible midline

bulge with exertion⁵. Their results indicated that women with DRA are more likely to have larger babies and to have gained more weight during pregnancy.⁴ Diastasis rectus abdominis is also more commonly seen in mothers of multiples and those that delivered via Cesarean section. The incidence of DRA increases as the mother's age and parity increases. Lo et al³ also reported that higher activity levels both before and during pregnancy yielded a shorter time to DRA resolution, again supporting the positive effects of activity before and during pregnancy. Symptoms, or level of dysfunction, were not commented on, but rather recovery was implied by resolution of the separation to <2.5 cm. There has been significant variation in findings regarding the most common location of DRA (above, at, or below the umbilicus). Boissonnault and Blaschak¹ found only 11% of the DRA below the umbilicus and that it was never present below without also being present either at or above the umbilicus. Fifty-two percent of the DRA were found at the umbilicus and 36% above the umbilicus.

The most recent study found on this topic is by Spitznagle et al⁶ who examined the prevalence of DRA in an urogynecological patient population and its association with pelvic floor dysfunction, particularly support-related pelvic floor dysfunction diagnoses. Data were collected via retrospective chart reviews of patients presenting with myofascial pelvic pain (MPP), urinary incontinence (UI), fecal incontinence (FI), and/or pelvic organ prolapse (POP), collectively referred to as support-related pelvic floor diagnoses (SPFD diagnoses).¹ The finger width palpation method was used to check for DRA. Their results revealed an overall DRA prevalence of 52% within the 547 charts reviewed. Sixty-six percent of the patients with a DRA had one or more pelvic floor dysfunctions present.⁶ Their results supported previous studies reporting a positive correlation between the presence of DRA and age, parity, and gravity.^{1,5,7} The present study, however, found a correlation between DRA and pelvic floor muscle weakness. They found a relationship between DRA and stress urinary incontinence, fecal incontinence, and pelvic organ prolapse.⁶ A major significance of this study is that the women being examined were, in the majority of cases, well beyond the child-bearing years. The mean age of the subjects was 52.5 years and 58% of the subjects were menopausal.¹ Previous studies on DRA primarily focused on premenopausal women likely due to the association between DRA and pregnancy. The fact that more than half of this patient population was found

to have DRA, and that those with DRA have a higher chance of pelvic floor dysfunction, points to the need to further examine women at this stage of life. Also supported is the idea that DRA should be caught as early as possible to prevent future dysfunction.

The purpose of this study was to examine the clinical assumption that a DRA, when left untreated, may leave the woman predisposed to a variety of different dysfunctions including lumbo-pelvic pain, as well as bowel or bladder issues. It was hypothesized that there would be a greater incidence of DRA among patients seeking physical therapy intervention for any of the specified lumbo-pelvic pain.

MATERIALS AND METHOD

- 30 postnatal females from ndmvp medical college were considered as part of a sample of convenience. Inclusion criteria for all subjects were: women, ages 18 years or older, who had delivered at least one baby vaginally or via cesarean section 3 months or more prior to participating in the study. Women having primary complaints when seeking medical or physical therapy treatment: pelvic pain, back pain, SI joint dysfunction, pubic symphysis dysfunction, coccydynia, urinary or fecal incontinence. The exclusion criteria included individuals who had a history of abdominal or lumbar back surgery except-cesarean section, as well as any type of connective tissue disorder, pregnant females and Females who have taken antenatal fitness program & post natal fitness program, exercises specific to diastasis rectus abdominis.

Patients recently delivered through caesarean section not included in study till 3 weeks. This study was approved by the Committee for Ethics and Research of the NDMVP medical college and the patients signed a term of free and informed consent confirming their agreement to participate in the study. Initial measurements were taken within the first 2 to 3 treatment sessions.

OUT-COME MEASURES

Modified Oswestry low back pain disability questionnaire⁸ and The Pelvic Floor Distress Inventory (PFDI)⁹, was completed by all participants. 2 Visual Analog Scales (VAS)¹⁰, One VAS for low back pain and one for abdominal or pelvic area pain was issued to each subject. An intake form with questions regarding

age, parity, and surgical history, mode of each delivery, breast feeding status, connective tissue disorders, and chief complaint was also included in the data collection. The traditional finger width palpation method for identification of Diastasis Rectus Abdominis measurement (finger method) was used ^{6,11}.

DRA Measurement Protocol: The subject was asked to lie supine in a hook lying position (knees bent, feet flat on the table) with her arms at her side on a treatment table. The measurement sites on the abdomen were marked with a water-soluble pen at the superior border of the umbilicus, 4.5 cm above the superior border of the umbilicus, and 4.5 cm below the inferior border of the umbilicus. Next, the woman was asked to perform a modified curl-up. The examiner demonstrated one curl up for the subject to show how high the curl-up should be; spine of the scapula was to be off the table, but not the inferior angle. The subject was asked to maintain the curl-up for approximately 10 seconds in order for the examiner to palpate the rectus abdominis muscles. The examiner palpated the medial borders of the rectus bellies and then kept her fingers in place while the subject returned to the resting position. The subject was asked to repeat the partial curl-up as noted above while the examiner placed caliper ends on the medial borders of the rectus abdominis perpendicular to the surface of the muscle. Two measurements were taken at each site. An average of the 2 measurements for all 3 locations were calculated and recorded. The subject rested between measurements and was permitted to rest at any time during the session.

Data Analysis: Pearson Correlation test was performed to verify the relationship between Diastasis Rectus Abdominis and lumbopelvic pain and dysfunction. Analyses were considered significant if at the .05 level of probability. Descriptive statistics included means and standard deviations for age, DRA measures at all 3 identified abdominal locations, as well as for the pain and function scale values. Frequency and percentage was calculated for the presence or absence of DRA, parity, and mode of delivery. The independent variable in this study was DRA status (present or not present) while the dependent variable was the scores from the different scales used.

RESULTS

Total 30 individuals were selected under the category of lumbopelvic pain after taking the pelvic floor distress inventory and Oswestry low back pain disability scale, noting their VAS of lumbar pain and pelvic pain. They were then examined for Diastasis Rectus Abdominis. On analysis it was found that 83.33% patient had Diastasis Rectus Abdominis,

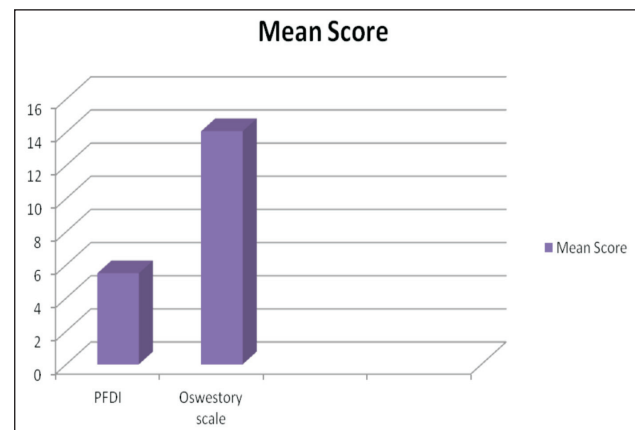
Table 1.

LEVELS	0CM	LESS THAN 2CM	2-4 CM	4CM & ABOVE
UMBILICUS	16%	10%	53%	13%
4.5CM ABOVE UMBILICUS	20%	10%	10%	60%
4.5CM BELOW UMBILICUS	26%	13.3%	46.6%	10%

Parity among all women ranged from 1 to 4 and the majority had 2 children. The mean age was 27.4 years. Regarding mode of delivery, 81% had vaginal deliveries, while 19% had had Cesarean section deliveries. It was also seen that multiparous females had a greater incidence of Diastasis Recti Abdominis i.e 60% of patients having Diastasis Recti Abdominis were multiparous against 40% being primigravida

The mean score of index of Pelvic floor distress inventory was 5.5 and Oswestry low back pain disability was 14.07.

Graph 1



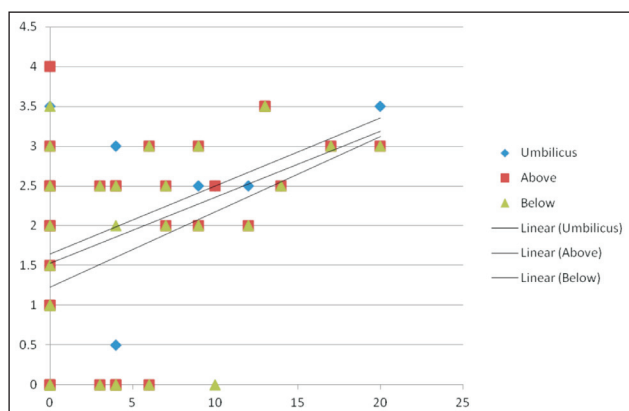
The mean VAS was;

Lumbar pain: 2.64

Pelvic pain 4.25

A positive correlation was found between Diastasis Rectus Abdominis and low back pain and Diastasis Rectus Abdominis and pelvic pain and dysfunction.

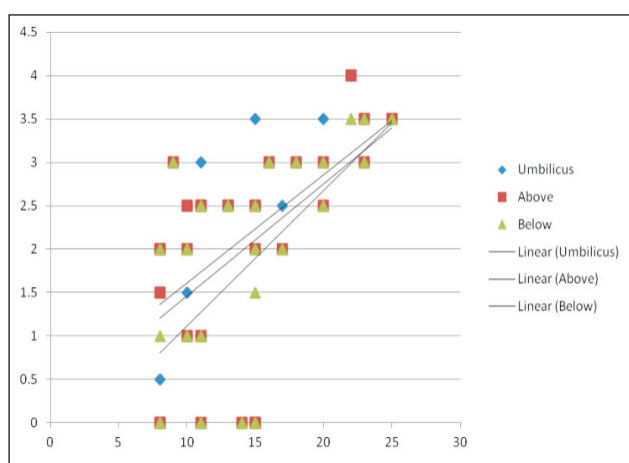
Graph 2



PFDI vs DRA

As r (coefficient of correlation) value lie between 0 and 1; and as the scatter is there around an imaginary mean line, the correlation is moderately positive .As P value is less than 0.05, the result is significant, i.e. there is co-relation between pelvic pain & dysfunction and Diastasis Recti Abdominis

Graph 3



Oswestory scale vs DRA

As r (coefficient of correlation) value lie between 0 and 1; and as the scatter is there around an imaginary mean line, the correlation is moderately positive .As P value is less than 0.05, the result is significant, i.e. there is a co-relation between low back pain and Diastasis Recti Abdominis.

DISCUSSION

The current study examined signs and symptoms potentially associated with DRA. Incidence of DRA for current study was 83.33%. It was also observed that “normal delivery” had a greater incidence of Diastasis Recti Abdominis i.e of the population having Diastasis Recti Abdominis above 0cms, 81%of population had a normal delivery against only 19% having a C-section delivery.It was also seen that multiparous females had a greater incidence of Diastasis Recti Abdominis i.e 60% of patients having Diastasis Recti Abdominis were multiparous against 40% being primigravida. Ponka¹² reported an increased incidence in DRA below the umbilicus in a group of multiparous women and our study also supports the same.

Due to the various reports in the literature regarding the most typical locations for the DRA, it was decided that the measurements would be performed at all 3 sites for this study. The hypothesis that there would be a significant difference in some or all of our dependent measures for lumbo-pelvic pain and dysfunction between those with a DRA was proved.

There may be several reasons for co-relation of Diastasis Recti Abdominis & lumbopelvic pain and dysfunction:-

- The lumbosacral fascia & thoracolumbar fascia transmit forces generated by abdominal muscles to circumferentially support the spine. Therefore alterations in muscle’s angle of insertion will influence its line of action of pull & hence muscle’s functional capabilities.
- After delivery there are changes in rectus length, width, angle of insertion which is associated with decrease in ability to stabilize lumbopelvic area. Normally a reversal takes place by 4 weeks.a seperation persisting after 4wks is likely to disrupt the function of abdominal muscles. This may cause postnatal lumbar, pubic symphysis & SI joint pain & even incontenence due o interaction of pelvic floor & abdominal musculature as a stabilising unit.
- A split in linea alba can affect the ability of abdominal wall to dynamically stabilize the trunk & may contribute to pelvic floor dysfunction, back & pelvic pain, post natally.The linea alba is made

of collagen by intertunning of tendinous fibres of muscle of left and right side antero-lateral wall. The connective tissue layer contributes to linea alba.

- Hormones also have an effect over muscles, and so does increased tension by growing uterus.
- Because the integrity & functional strength of abdominal wall has decreased, this may aggravate low back pain instability.

These results will hopefully bring about awareness as to the importance of addressing DRA at any time during a woman's lifespan in an attempt to prevent the potential for abdominal and pelvic area pain

The another study completed by Spitznagle et al⁶ examined the association between DRA and various types of pelvic floor dysfunctions. They found a relationship between DRA and stress urinary incontinence, fecal incontinence, and pelvic organ prolapsed. Spitznagle et al⁶ did not find there to be a statistically significant association between the presence of DRA and myofascial pelvic pain.

Despite these findings, there is a need to expand the examination of the amount of separation after which symptoms or level of dysfunction becomes. Thornton et al³ described a woman with a 23 cm DRA with obviously associated low back pain. Perhaps our study did not have severe enough separations represented to detect an association.

The present study excluded the women's who participated in antenatal exercise programme, or those who exercise regularly, either at the time of the study or pre-and postnatally. Further study can be done to compare the females doing regular antenatal and postnatal exercise.

CONCLUSION

Based on the results of this study, there is a higher chance that a woman with a DRA will have a higher degree of dysfunction in the abdominal and pelvic region. As expected, patients seeking physical therapy treatment all showed significantly more lumbo-pelvic pain and dysfunction as measured by the PFDI, VAS, and the Oswestry scale for both low back pain.

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Conflict of Interest

- Small sampling size
- Traditional method of measurement of diastasis recti (finger width method) used instead of calliper
- Obesity may be related to incidence of DRA results could have been further validated if it had been included in the screening and if our subject group had represented more diversity.

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