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### RESEARCH ARTICLE

#### IMMEDIATE EFFECTS OF PELVIC FLOOR MUSCLE EXERCISES IN WOMEN WITH DIASTESIS RECTI ABDOMINIS

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##### Key words:-

IRD (Inter-Rectus Distance), PFM (Pelvic Floor Muscle), Diastasis Recti, Linea Alba

#### Abstract

**Aim:** The aim of this study was to find immediate effect of pelvic floor muscles exercise in women with diastasis recti abdominis.

**Method:** In this experimental study, 34 women who were parous, with a mean age of 36.2 years (SD = 5.2), diagnosed with DRA participated. IRD was assessed with 2-dimensional real-time ultrasonography during rest and during 8 randomly ordered different exercises. A paired t test was used to compare the IRD at rest with the IRD recorded during each exercise as well as the differences between exercises. Means with 95% CI are reported.

**Result:** Head lift and twisted curl-up exercises significantly decreased the IRD both above and below the umbilicus. Above the umbilicus, the mean IRD difference from rest during head lift was 10 mm (95% CI = 7 to 13.2), whereas during twisted curl-up it was 9.4 mm (95% CI = 6.3 to 12.5). Below the umbilicus, the corresponding values were 6.1 mm (95% CI = 3.2 to 8.9) and 3.5 mm (95% CI = 0.5 to 6.4), respectively, but PFM contraction, maximal in-drawing, and PFM contraction + maximal in-drawing increased the IRD (mean difference = -2.8 mm [95% CI = -5.2 to 0.5], -4.7 mm [95% CI = -7.2 to -2.1], and -5.0 mm [95% CI = -7.9 to -2.1], respectively).

**Conclusion:** Head lift and twisted curl-up exercises decreased the IRD both above and below the umbilicus, whereas maximal in-drawing and PFM contraction exercises only increased the IRD below the umbilicus. A randomized controlled trial is needed to investigate whether head lift and twisted curl-up exercises are effective in permanently narrowing the IRD.

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#### Introduction:-

“Pregnancy” is considered as the most important phase in a women’s life “Pregnancy” is considered as the most important phase in a women’s life “Pregnancy” is considered as the most important phase in a women’s life “Pregnancy” is considered as the most important phase in a women’s life “Pregnancy” is considered as the most important phase in a women’s life [1] There are various anatomical and physiological changes that occur during pregnancy. Uterus increases from pre-pregnant size of 5 by 10 cm to 25 by 36 cm; it increases 5 to 6 times in size. By the end of pregnancy, each muscle cell in the uterus increases approximately 10 times over its pre-pregnancy length. Once

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uterus expands upward and leaves the pelvis, it becomes an abdominal organ rather than the pelvic organ. In Connective tissue, ligaments connected to the pelvic organs are more fibroelastic than ligaments supporting to joint structures. [2,3] The abdominal muscles, particularly both sides of rectus are stretched to the point of their elastic limit by the end of pregnancy, leading to greater decrease the muscle's ability to generate strong abdominal contraction.[2]

Most common complication faced by postnatal women is diastasis of rectus abdominal muscle. [4] Diastasis Recti or generally known as diastasis of the rectus abdominis muscle is said to be the separation of the abdominal muscles at the linea alba which usually can occur after childbirth.6 The diastasis is a gap between the recti abdominal muscle greater than 25 mm2. Any separation larger than 2cm or 2 finger width is considered significant. It can occur above, below or at level of umbilicus. [1,2,4,5] Only 11% of the DRA is seen below the umbilicus and it is seldom present below the umbilicus. 52% of the DRA were found present at the umbilicus and only 37% were seen above it. It is essential, to see that there is disagreement regarding definition of normal inter-rectal distance (IRD), and when it can be classified as pathologic.[11]

Currently, the studies suggest that 33% to 74% of women present with DRA after child birth with this large range in incidence likely being the result of variation regarding the definition of DRA.[12] The muscles of abdominal wall rectus abdominis, obliquus externus and internus, and transverse abdominis, invest in an aponeurosis to form the rectus sheath, with tendon fibre crossing the midline and intertwining with linea alba.[9] The causative factors for diastasis recti during pregnancy are increased level of relaxin, progesterone and estrogen hormones that causes soften of connective tissues and weakening of the linea alba.[ 6,7]

The risk factors of diastasis recti are age, women over the age of 35, high birth weight of child, multiple birth pregnancy, caesarean section, and excessive abdominal exercises after the first trimester of pregnancy, massive weight loss occurring spontaneously or after bariatric surgery, previous or repeated abdominal surgery. [8,10]

## **Method:-**

### **Design**

We designed the study as a descriptive, experimental study.

### **Participants**

Total 34 patients of diastasis recti abdominis were selected from outpatient department of physiotherapy

### **Outcome Measure**

Digital Nylon Calliper

## **Procedure:-**

In this method, we used digital nylon calliper along with trace paper for measuring the inter-recti distance. The subject was asked to be in hook-lying test position and to lift their head and shoulders forwards and move their hands towards their knees.

When the subject was confident in doing the manoeuvre, they were asked to repeat it. IRD measurements using both tools were made during a single session. They were instructed to hold the position, which corresponded to the point when the inferior angles of the scapula were just off the bed.

The desired measurement locations were marked with a water-soluble pen, 4.5 cm above the umbilical midpoint and 4.5 cm below the umbilical midpoint. Similar markings of the desired measurements of all the three levels were also marked on a tracing paper. The inside of the calliper's jaw was placed between muscle belly at palpating fingers (palpation method) perpendicular to the surface i.e. against the medial edges of the rectus abdominis muscle. The measurements from all the three marked measurement locations will be noted using the calliper and these measurements will also be marked and noted on the trace paper as well. The measurements were for statistical analysis.

1. Head lift
2. Curl-up
3. PFM contraction

4. PFM contraction + curl-up
5. Maximal in drawing
6. PFM contraction + maximal in- drawing
7. Pelvic tilt

### Twisted curl-up

#### Result/Discussion:-

The Inter recti distance is measured using DIGITAL NYLON CALLIPER. The pre intervention mean value for DIGITAL NYLON CALLPER were 24.88. The post intervention mean value were 20.70. On comparing the pre and post intervention values of DIGITAL NYLON CALLIPER in participants with inter recti distance along with pelvic floor muscle exercise protocol, it was observed that the difference was highly significant( $p>0.001$ )

**Table No. 1:-** Above Umbilicus.

OUTCOME MEASURE	PRE		POST		P VALUE	T VALUE
	MEAN	S.D	MEAN	S.D		
ABOVE UMBILICUS	24.88	1.007	20.70	1.059	>0.001	15.94

The Inter recti distance is measured using DIGITAL NYLON CALLIPER. The pre intervention mean value for DIGITAL NYLON CALLPER were 20.97. The post intervention mean value were 18.47. On comparing the pre and post intervention values of DIGITAL NYLON CALLIPER in participants with inter recti distance along with pelvic floor muscle exercise protocol, it was observed that the difference was highly significant( $p>0.001$ )

**Table No.2:-** Below Umbilicus.

OUTCOME MEASURE	PRE		POST		P VALUE	T VALUE
	MEAN	S.D	MEAN	S.D		
BELOW UMBILICUS	20.97	0.86	18.47	1.74	>0.001	7.566

#### Conclusion:-

The study concluded that head lift and twisted curl-up exercises decreased the IRD both above and below the umbilicus. Maximal in-drawing and PFM contraction increased the IRD below the umbilicus.

#### Future Scope

RCT is needed to investigate whether the head lift and twisted curl-up exercises can permanently narrow the IRD. Other medical professional should be included in the study. Sample size should be more.

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