

Development and Reliability of the Modified Tool for Assessment of Diastasis Recti

Dr. Pradnya Vinayak. Mesta
1st year MPT, Dept. of Community Physiotherapy,
DVVPF's College of Physiotherapy,
Ahmednagar. Maharashtra, India

Dr. Shyam D. Ganvir
Principal and Professor, PhD,
DVVPF's College of Physiotherapy,
Ahmednagar. Maharashtra, India,

Abstract:- DRA is the separation of the abdominal muscles at the linea alba, which can occur after childbirth. DRA may occur as the result of continuous transverse tension on the linea alba and is generally seen among postmenopausal women, and in women during pregnancy. At the moment limited studies exist that assess the different methods for measuring diastasis recti, with the most common method used for the evaluation of the width being is the 'finger - palpation' method, many claim it being "unreliable". Ultrasound measurements being the gold standard but method is very expensive. Hence, a new method was developed for accuracy, which is reliable and even cost effective. In this study the intra-rater reliability of the modified tool for assessment of diastasis recti was investigated.

Keywords:- Diastasis Recti, inter-recti distance, digital nylon caliper, tracing paper, post-partum women.

I. INTRODUCTION

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 [1]. As the gravid uterus grows during pregnancy, the linea alba needs to soften and increase in size to accommodate the developing fetus. This course increases the size of the LA, which is reflected in the inter-rectus distance (IRD). Beer et.al, stated the normal values of IRD at three mentioned points with normal widths of the linea alba in 150 nulliparous women Level Width, at the xyphoid: 15mm, 3 cm above the umbilicus: 22mm and 2 cm below the umbilicus: 16mm [2]. 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.

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 [4] [12]. 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. [4]

Generally, DRA is measured by placing palpating fingers between the medial borders of both the rectus abdominis muscles, parallel to the linea alba. Clinically, the finger palpation method is easy to perform but has not established satisfactory reliability and validity. A variation of this palpation technique using nylon dial or digital calipers to measure the IRD has been shown to be reliable in pregnant and postpartum women [4]. While using calipers for

the measuring inter-recti distance, the distance between the tips of calipers which is fitted across the width of the diastasis are noted.

Ultrasound measurements images are considered 'gold standard for measuring the distance between the diastasis recti but the assessment using this method is very expensive and time consuming for clinical practice as well. Hence, a new method was developed for more accuracy and also to be cost effective. Clinicians need to have dependable as well as cost friendly measuring tools to evaluate the inter-recti distance [5]. The aim of this study was to address the need for an accurate, practical and reliable measuring device for use in the clinical setup and evaluate the reliability of the developed modified tool for assessment of diastasis recti.

II. SUBJECTS

15 subjects of age 18-30 years ranging from day 2 to one year postpartum were recruited from a tertiary care teaching hospital. Subjects were excluded from the study Women with prior h/o respiratory, cardiovascular diseases, multiple pregnancy, hydrominos, anemia and those on chronic therapy for any other ailment were excluded from the study or if they were unable to speak or understand written or spoken Marathi or Hindi. All subjects gave written informed consent prior to participation in the study. Ethical approval was obtained from Ethical Committee of College of Physiotherapy, Ahmednagar.

III. PROCEDURE

This new developed method of assessment has been copyrighted by Dr. Pradnya Vinayak. Mesta under the guidance of Dr. Shyam D. Ganvir (Registration no. L-105240/2021) dated 8/07/2021.

In this method, we used digital nylon caliper 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. An opportunity to practice this activity prior to testing was allowed for each subject. When the subject was confident in doing the maneuver, 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 caliper's jaw were 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 caliper and these measurements will also be marked and noted on the trace paper as well. The measurements were for statistical analysis.

IV. RESULTS

Data was collected and analyzed using GraphpadInstat version 3.06.32 bit for windows statistical software. Statistical analysis of reliability was done using SPSS. Descriptive statistics for each participant characteristics and IRD at all three locations were calculated. Mean age of the postpartum women was 25.2 years while the mean BMI was 22.53kg/m². The reliability of the modified method for assessment of diastasis recti is ICC= -0.08.

Table no 1 shows the Mean \pm SD of the demographic data of the participants. Table 2 shows the of the inter-recti distance at all three locations of the diastasis recti.

Variables	Mean \pm SD
Age	25.2 \pm years
Height	156.26 \pm 1.83 cm
Weight	55 \pm 11.57 kg
BMI	22.53 \pm 4.780 kg/m ²

Table 1: Mean \pm SD of age, height, weight and BMI

Inter-recti Distance	Mean \pm SD	Standard error of Mean
Above Umbilicus	3.10 \pm 0.7613	0.1996
At Umbilicus	3.118 \pm 0.6204	0.1602
Below Umbilicus	2.679 \pm 0.5832	0.1506

Table no. 2: Mean \pm SD and standard error of mean of the inter-recti distance at the three levels

V. DISCUSSION

The results of this study demonstrated rather low reliability for active measurements of the inter-recti when using the modified tool for assessment of diastasis recti using the digital nylon calipers. During testing, the investigator experienced that the medial edges of the recti muscles were tough to palpate in some participants, due to reduced muscle tone as many were in the early postpartum period.

Many of the participants had difficulty in maintaining the hook lying for the palpation of the medial borders of the rectus muscles. The method for testing DRA has not been standardized and various previous studies have varied in choice of location for measurement of the inter-recti distance, position of the subject while testing as well the test action. The negative value of the reliability of the method can be because of the limited sample size that has been

taken but can be stated as prediction of reliability of the particular stated method.

The IRD in women in their first postpartum year has been shown to exceed that which is considered normal in nulliparous women stated by Beer et.al. in which he evaluated 150 women between 20 and 45 years of age in whom the stated that normal IRD was distinct if any value between the 10th and 90th percentile, or greater than 22 mm at 3 cm above the umbilicus and any value up to 16 mm at 2 cm below the umbilicus.

IRD measurements reported by Liaw et al at 2.5 cm above and below the umbilical ring as well as the individuals in our study were measured at a similar location along the linea alba. Boissonnault and Blaschak's study stated that the active curl-up i.e. hook lying maneuver for assessing DRA, which is now the most common technique used clinically practice but most investigators also assess the IRD with the abdominal muscles at rest.

To date, there is no commonly approved measurement location as well as the assessment tool for measuring the DRA. It is important to consider that measurement location, the testing position, parity, and measurement tool used for the interpretation of IRD values.

VI. CONCLUSION

This reliability study evaluating the DRA using tracing paper with digital nylon calipers can be used preliminary assessment tool as well as a method for documentation of measurements of the inter-recti in both males and females above the umbilicus with the abdominal muscles during contraction i.e in hook lying position.

VII. LIMITATIONS

The small sample can be considered the limitation in this study.

VIII. FUTURE SCOPE

A large sample should be considered for evaluation of the reliability of the method as well as this method can be compared with other methods to evaluate the concurrent validity of the method.

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