

## DOES DIASTASIS RECTI ABDOMINIS INFLUENCE PELVIC FLOOR MUSCLE FUNCTION DURING PREGNANCY?

### Hypothesis / aims of study

This study aims to correlate the size of diastasis recti abdominis (DRA) with pelvic floor muscle (PFM) function in pregnant women. We hypothesized that women with larger DRA will present lower PFM strength.

### Study design, materials and methods

This is an observational study which includes women in their first pregnancy, between 19 and 38 weeks of gestational age (second and third trimester). This research received approval from the local ethics committee. The inclusion criteria were physiological first pregnancy with only one fetus, alive, without malformation. The exclusion criteria were conditions that pregnancy was considered to be high risk as diabetes mellitus, hypertension, heart conditions, alcohol or drug use or any known condition that affects the health of mother or fetus. Besides, patient who presented pelvic floor disorders as urinary incontinence and those who could not perform a correct PFM contraction were also excluded. Patients were invited to participate of this research by obstetrician, in a routine consultation. Those who agreed signed the informed consent. Then a standard evaluation form was conducted which contain information about pregnancy, maternal and fetal health and gestational age followed by physical exam. First of all the weight and height were measured in order to calculate body mass index (BMI). A caliper was used to measure DRA size at three marked sites along midline of each subject's abdomen 4,5 cm above the umbilicus, at the umbilicus and 4,5 cm below the umbilicus. A tape measure was applied in the subject's abdomen and each site was marked with a pen to ensure accuracy of repeated movements. After this procedure, subjects were asked to lie in her back in a hook-lying position, arms extended at her side, with a pillow placed beneath the head, with flexed knee and hips. Patients were asked to lift their head and shoulders off the mat, reaching towards their knees, with outstretched arms until the spine of scapula cleared the surface. The subjects were asked to maintain this position approximately 10 to 20 seconds to allow the examiner to palpate the rectus abdominis muscles. Then the patient rested with examiners fingers remaining on the rectus abdominis muscles. The subject repeated the movement maintaining a partial curl-up while the examiner placed the measuring probes of calipers against the medial border of the rectus abdominis muscles. Another examiner provided manual assistance and support beneath the subject's shoulders. Two measurements were taken at each site and the average was used for statistical analysis<sup>1</sup>. Then pelvic floor muscle function was measured by vaginal squeeze pressure (Peritron perineometer) and by vaginal palpation (Oxford grading scale). An urogynecology physiotherapist performed all evaluation process. First of all, the perineometer was inserted into the vagina, with middle of the probe was inserted 3.5 cm. Then patient were required to pull (contract) their PFM in and up as strongly as possible 3 times and to sustain the contraction for 5 seconds. It was used an interval of 30 seconds between the contractions. We only considered those contractions for which it was possible to observe the cranial movement into the vagina. The average peak value of the three contractions was used for statistical analysis<sup>2</sup>. At last the vaginal palpation was conducted. Examiner introduced two fingers into distal vagina and again asks women to lift and squeeze pelvic floor as strongly as possible and graduate this contraction between 0 and 5, according to Oxford grading system. Data analysis was performed by a specialized professional, who used the SPSS (Statistical Package for Social Sciences) version 17® to analyze the correlation between DRA and PFM function using Spearman correlation test and to compare the second and third trimester group it was used Mann Whitney test.

### Results

Seventy four primigravidae women were included in this study. Mean age was 26 ( $\pm 5$ ) years old and BMI was 27 ( $\pm 2.47$ ) Kg/m<sup>2</sup>. Twenty-three pregnant women (31%) were in second trimester (G2T) and 51 pregnant women (69%) were in the third trimester (G3T) of pregnancy. Regarding PFM function, when comparing two groups, G2T presented mean vaginal palpation 3.3 and G3T presented 2.3 ( $p=0,0000$ ); and regarding to perineometry, G2T presented mean 23.8 cmH<sub>2</sub>O and G3T presented 18.7 cmH<sub>2</sub>O ( $p=0,002$ ). On the other hand, with respect to DRA, G3T presented higher values when comparing with G2T. In above umbilicus measurement, groups presented 5.8 and 3.6 cm respectively ( $p= 0,000$ ), at umbilicus groups presented 6.3 and 4.1 cm respectively ( $p=0,000$ ) and in below umbilicus measurement, groups presented 5.4 and 3.5 cm respectively ( $p=0,000$ ). When correlating PFM strength values with DRA values it was observed a significant negative correlation and the same result was found when correlating perineometry with DRA values, as showed in Table 1. These results demonstrated that the higher DRA, lower PFM function was presented.

Table 1 – Correlation between PFM function and DRA in primigravidae:

Correlation	r value	p value
PFM strength x DRA above umbilicus	-0,5945	0,003*
PFM strength x DRA umbilicus	-0,6375	0,001*
PFM strength x DRA below umbilicus	-0,6761	0,000*
Perineometry x DRA above umbilicus	-0,5551	0,000*
Perineometry x DRA umbilicus	-0,5517	0,000*
Perineometry x DRA below umbilicus	-0,5186	0,000*

\*Spearman correlation test

### Interpretation of results

It was previously demonstrated, in non-pregnant women with pelvic floor dysfunction, that PFM were weaker in those women who had larger DRA, and that there is a relationship between the presence of DRA and pelvic floor dysfunction. However these women were older and reported higher gravity and parity<sup>3</sup>. In this research a similar relationship was demonstrated in young and

primigravidae women, without influence of labor and delivery process<sup>3</sup>. These results suggest that maybe pregnant women who present high DRA should underwent to a PFM strength evaluation, in order to develop a strength training program and prevent future dysfunctions occasioned by PFM weakness.

#### Concluding message

Pregnant women who presented higher DRA had lower PFM function. Maybe these women with higher DRA deserve a PFM evaluation during a routine consultation, in order to develop a strength training program, if necessary.

#### References

1. Chiarello CM, Falzone LA, McCaslin KE, Patel MN, Ulery KR. The effects of as exercise program on diastasis recti abdominis in pregnant women. *Journal of Women's Health Physical Therapy*. 2005;29(1):11-6.
2. Barbosa PB, Franco MM, Souza Fde O, Antônio FI, Montezuma T, Ferreira CH. Comparison between measurements obtained with three different perineometers. *Clinics*, 2009;64(6):527-33.
3. Spitznagle TM, Leong FC, Dillen LRV. Prevalence of diastasis recti abdominis in aurogynecological patient population. *IntUrogynecol J*.2007;18:321-8.

#### Disclosures

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