

Do Women with Persistent Diastasis Recti Demonstrate Impaired Trunk Muscle Function?



J. Bilodeau¹, M. Farley¹, M. Plesko¹, S. Therrien¹, N. Hills²,
L. McLean^{1,2}

¹School of Rehabilitation Sciences, University of Ottawa

²School of Rehabilitation Therapy, Queen's University

Disclosures and acknowledgements

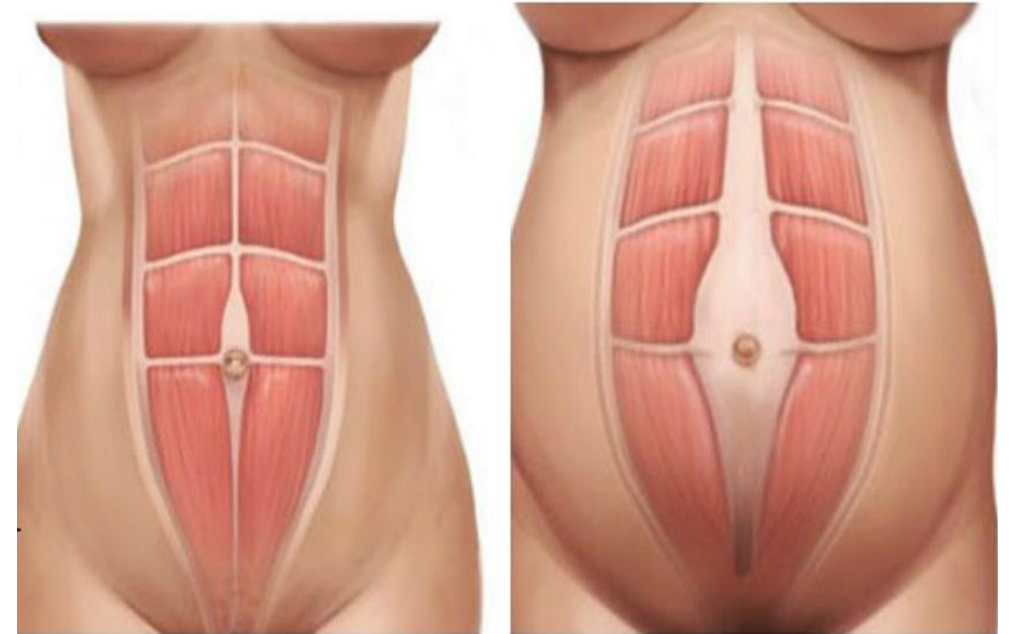
Infrastructure support for this research was provided through grants to Dr. L. McLean from the Natural Sciences and Engineering Research Council of Canada. Operating funds were provided by the University of Ottawa Research Development Program.

The authors have no conflicts of interest to disclose.

Background/Rationale

The impact of diastasis recti abdominis (DRA) on women's health is largely unknown.

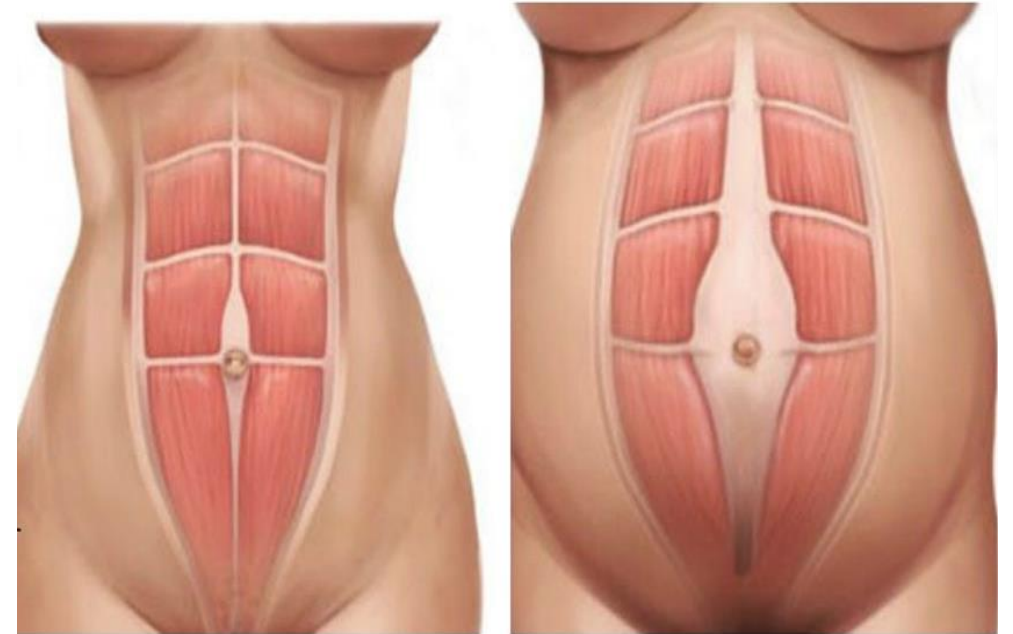
While studies have focused on primiparae in the early post-partum period, dysfunction may become more evident over time, especially as women return to their pre-pregnancy activities.



Purposes

To determine:

- (1) whether parous women (> 1 year post-partum) demonstrate impairments in trunk strength, endurance, or function when compared to nulliparae, and
- (2) if the magnitude of inter-rectus distance (IRD) is associated with symptoms, impairment or dysfunction of the trunk in women.



Methods

Participants

- Recruitment through local recreational facilities, physiotherapy clinics and social media groups. Written informed consent obtained prior to participation.
- Thirty-two women (11 nulliparous, 21 parous) were recruited. Parous women were > 18 months after their last delivery.

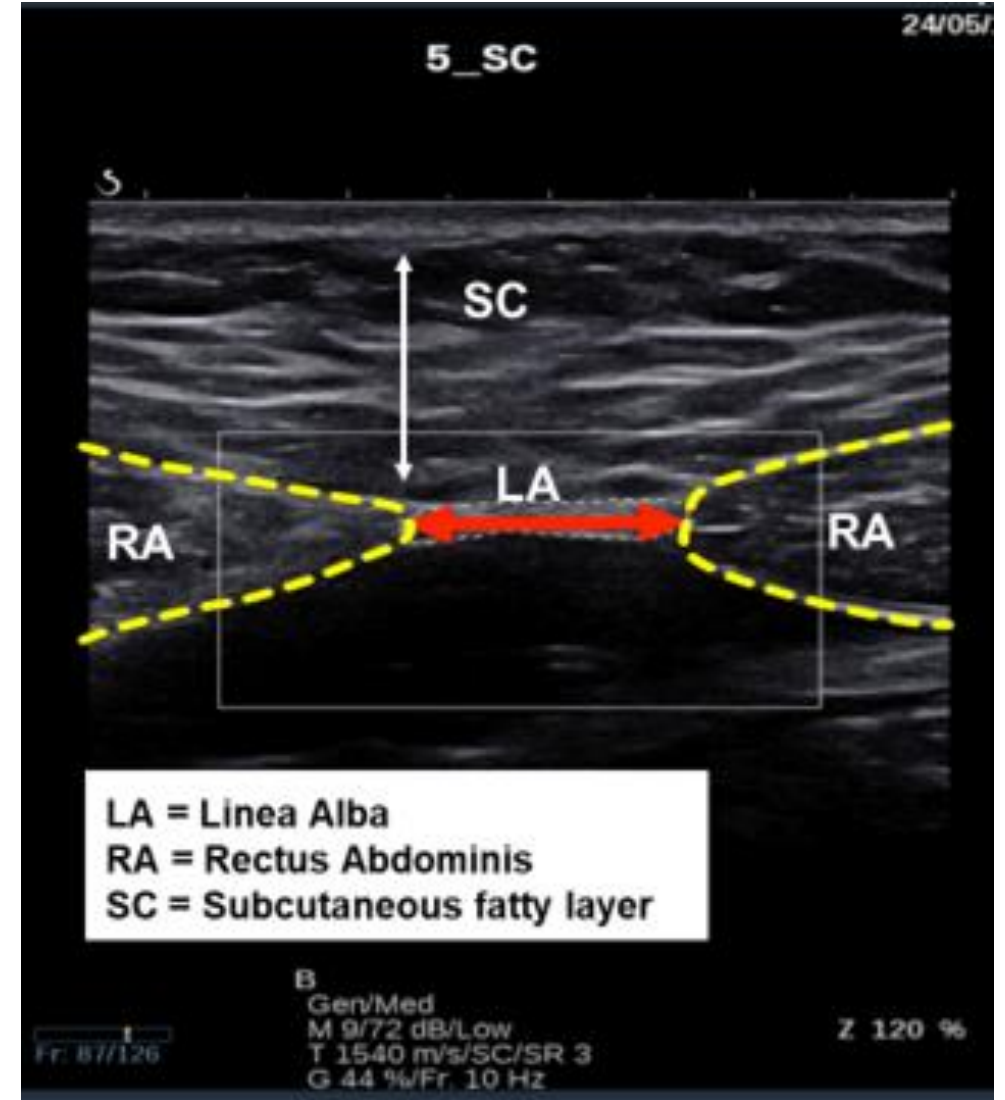
- Inclusion criteria:
 - Nulliparous group: no history of pregnancy beyond the second trimester.
 - Parous women: had delivered at least one baby either vaginally or by Caesarian section, and their youngest child had to be at least 18 months old.
- Exclusion criteria:
 - Pregnant at the time of screening
 - history of abdominal, gynecological or urological surgery
 - known neuromuscular or metabolic condition that may affect muscle contractility
 - any respiratory disease
 - history of lower limb injury (fractures or previous surgeries, etc.)

Methods

First session

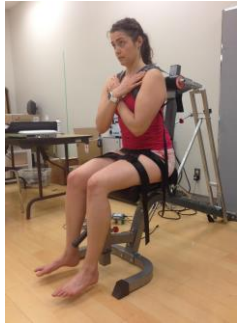


- Inter-rectus distance (IRD) measured using 2D B-mode ultrasound imaging (Supersonic™ Aixplorer®).
 - Superior border of the umbilicus (SBU)
 - 3cm above SBU
 - 5 cm above SBU
- Measures averaged for analysis



Methods

Second session



- Assessors blinded to parity and IRD.
 - trunk force generating capacity into flexion, extension, rotation
 - trunk endurance (front plank, side plank, Biering-Sorensen test)
 - Sit -up test
 - Sitting rising test

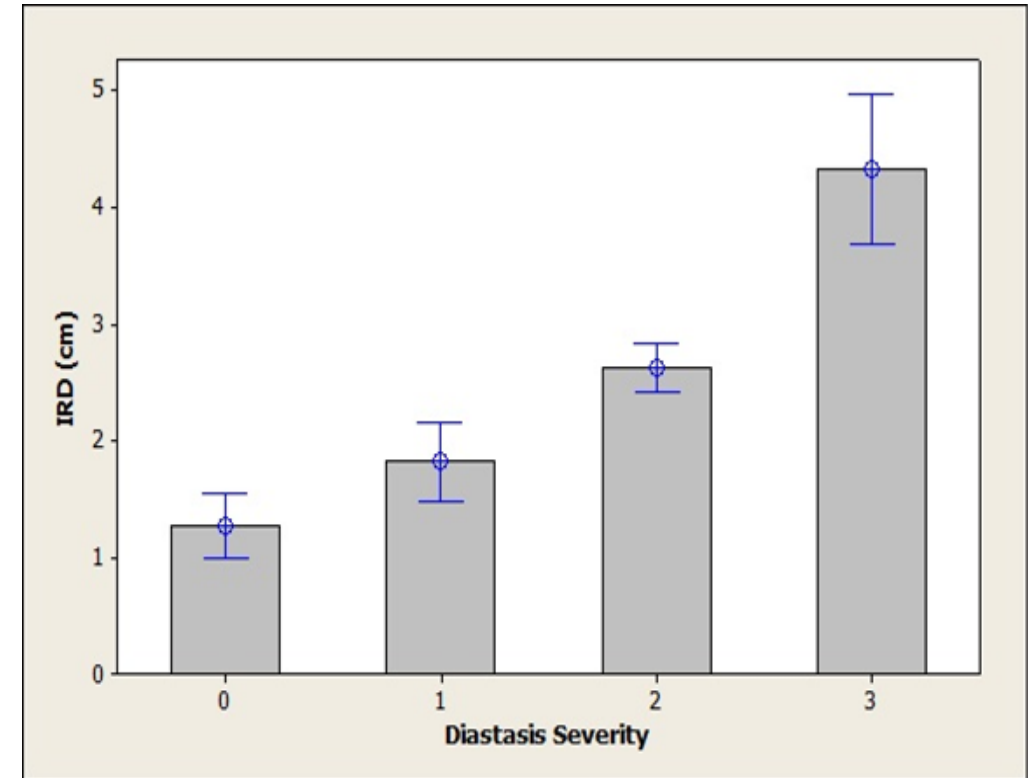
Questionnaires completed on-line:

- Roland Morris Questionnaire
- numeric rating scales for pain (upper and lower back, abdomen and pelvis)

Results: sample demographics and IRD

Outcome (units)	Nulliparous (mean±SD)	Parous (mean±SD)	P-value
Age (years)	25±3	37±6	0.000
Body mass index (m/kg ²)	24.85±4.26	24.46±3.42	0.800
Waist/hip (units)	0.79±0.05	0.80±0.05	0.068
Moderate Activity (min/week)	136±113	148±108	0.788
Roland-Morris Questionnaire (/25)	1±1	5±3	0.000
Abdominal pain NRS (/100)	1±1	5±5	0.000
Low back pain NRS (/100)	1±1	1±3	0.000
Mid-back pain NRS (/100)	3±8	7±18	0.359
Pelvic pain NRS (/100)	10±9	10±14	0.972

SD=standard deviation; min=minutes; m=meters; kg=kilograms; NRS = numeric rating scale



Participants were classified as nulliparous (0) and parous with (1) no DRA ($IRD < 2\text{cm}$)(2), mild DRA ($2\text{cm} < IRD \leq 3\text{cm}$) or (3) moderate to severe DRA ($3\text{cm} < IRD$).

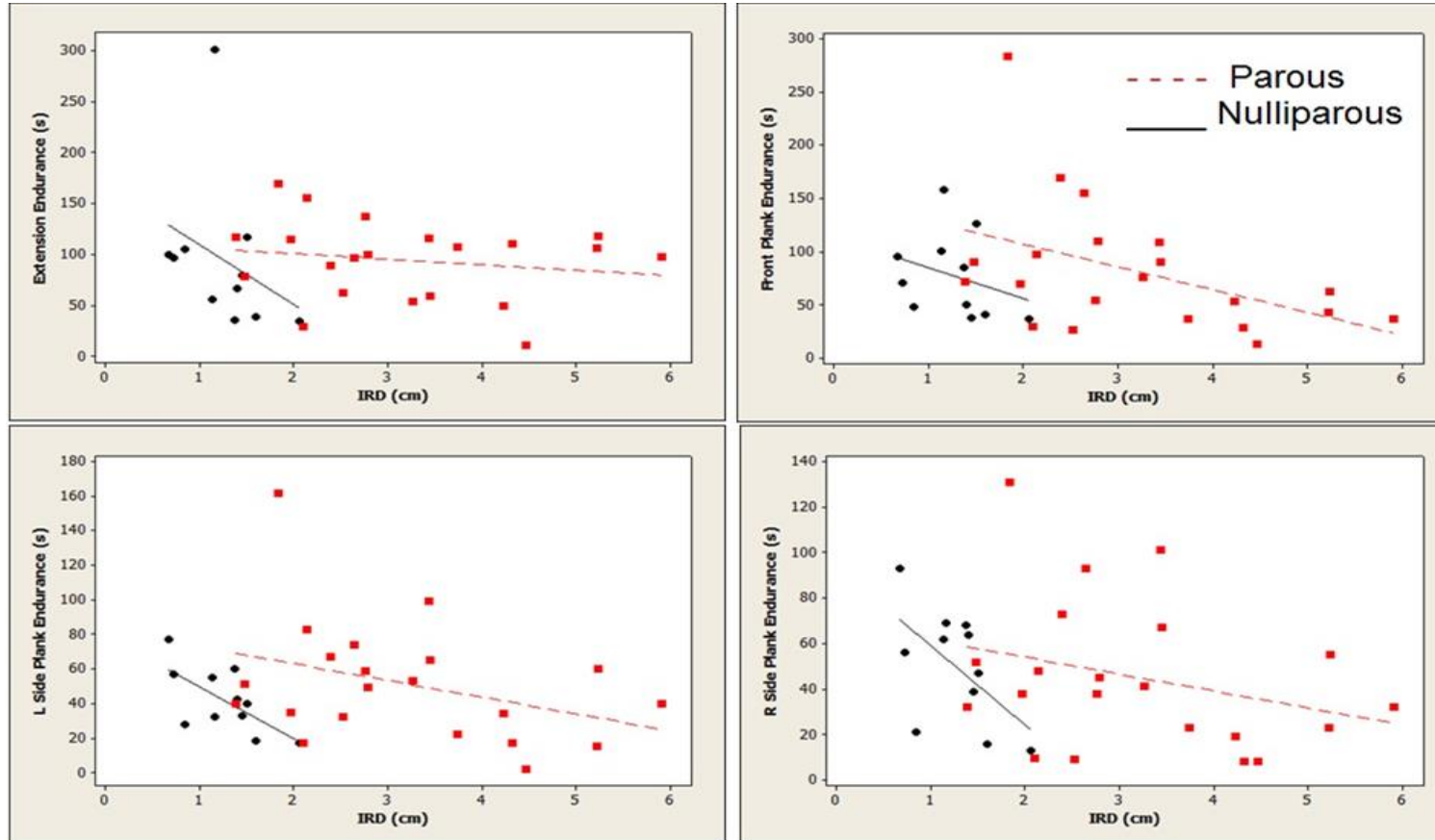
Results: normally distributed data

- Parous women: ↓ trunk **rotation force**

Task (units)	Nulliparous mean±SD	Parous mean±SD	P-value
Isometric Flexion (N·m)	60.46±17.47	48.90±19.28	0.147
Isometric Extension (N·m)	60.50±44.20	57.79±31.47	0.385
Isometric Rotation (N·m)			
Right foot forward, rotation to right	51.82±16.78	37.16±6.37	0.001
Right foot forward, rotation to the left	47.10±14.53	38.82±7.94	0.048
Left foot forward, rotation to the right	45.70±16.05	35.60±6.74	0.002
Left foot forward, rotation to the left	45.31±13.87	33.51±7.24	0.011
Flexion endurance (s) through front plank	93.6±74.9	94.1±39.4	0.969
Side plank endurance - right side (s)	49.8±25.3	45.8±32.9	0.729
Side plank endurance – left side (s)	41.7±18.8	51.2±35.2	0.363
Extension endurance through Beiring-Sorensen test (s)	93.6±74.9	94.1±39.4	0.876

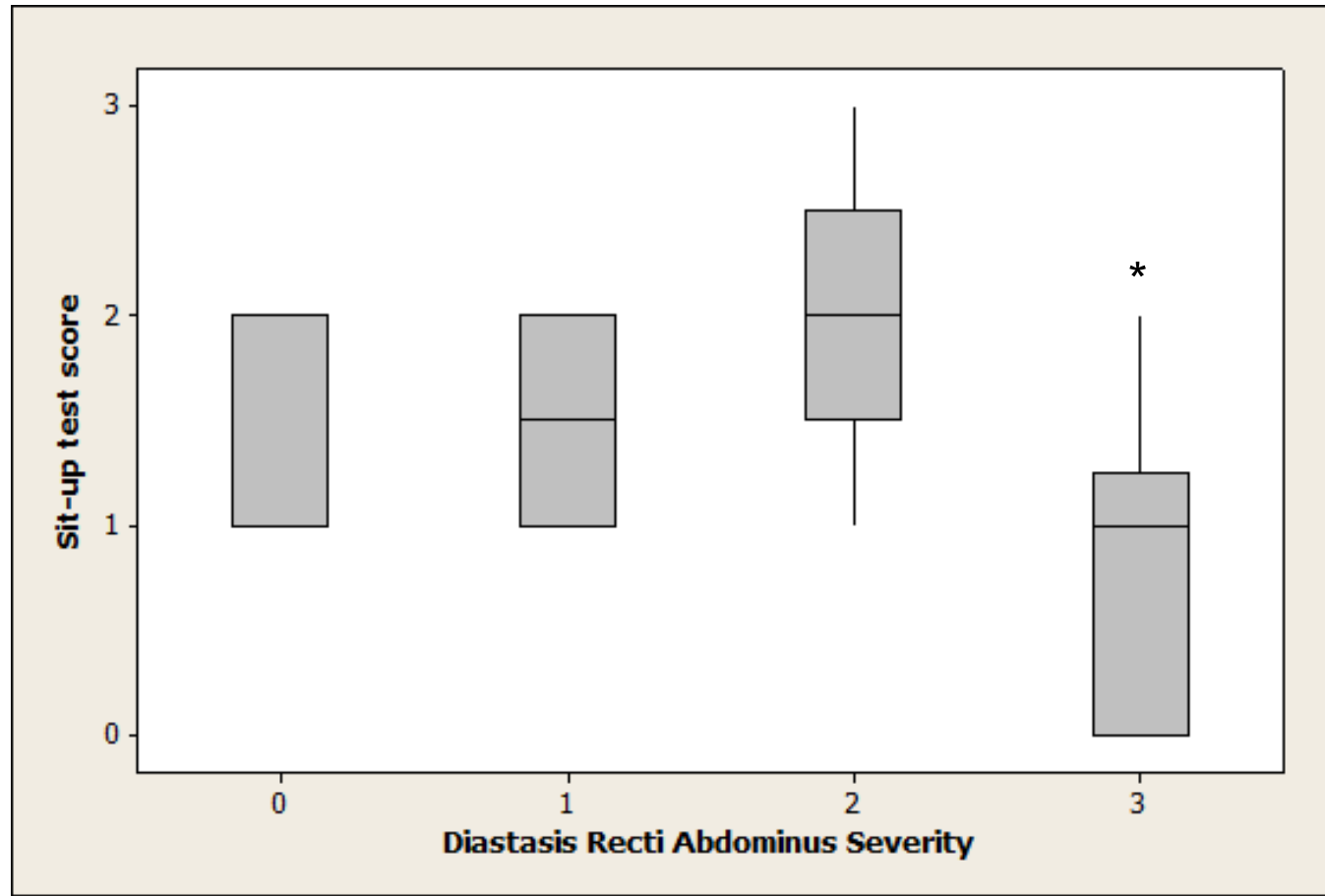
Results: associations between IRD and function

- Larger IRD: ↓ **front and side plank endurance**. Interestingly this effect is present in **nulliparous women as well as parous women**.



Results: non-normally distributed data

- Parous women: ↓ **sit-up test** performance than nulliparae- driven by DRA severity.



Conclusion

- Our results suggest that
 - parous women who are >18 months post-delivery have impaired trunk rotation strength compared to nulliparous women
 - larger IRDs may have functional implications, specifically being associated with lower capacity to perform a sit-up, hold a front plank, and possibly hold a side plank position.
- These results are an important contribution to physiotherapy as we seek to determine the need for intervention and, if appropriate, the most effective management approaches for women in general and specifically those with DR.

Thank-you!