Pregnancy-Related Diastasis Rectus Abdominis: Bridging the Research Practice Gap

Sinéad Dufour PT PhD
Director of Pelvic Health
World of my Baby
Associate Clinical Professor
McMaster University
Outline

• What is DRA?
• Structure and function: Canister Theory
• Critical appraisal of the literature
  – Gaps Analysis
  – Assessment Concepts
  – Management Concept
• Future Directions
• Discussion (Q&A)

DRA – Defined

• A condition in which the rectus abdominis muscle separates in the midline at the linea alba. (Boissonnault, 1987)

• A condition concerning laxity of the linea alba. (Akram 2014)

• A condition characterized by a gradual thinning and widening of the linea alba. (Brauman 2008)
DRA – Defined

• Consensus that IRD is important.

• No consensus on many aspects of IRD:
  • where to measure along the linea alba?
  • cut off point for diastasis (pathology)?
    • What is NORMAL or representative of health and function?
    • Usually < “two finger widths”. (Mota 2017)

• Consensus among Canadian experts that assessing IRD alone is not clinically meaningful. (Dufour 2019)

DRA Considerations

• Is it appropriate to ascribe the label of DRA in pregnancy?

• Can DRA be prevented?

• Have risk/prognostic factors been established?
Considerations - triggers for DRA?

DRA Considerations

• DRA is prevalent and it is an issue at the top of mind for many – both those seeking and providing care.

• What is the state of the science?
  – How are we approaching DRA?
  – What do we know about assessment?
  – What do we know about management?

• How can we best address the research-practice gap?
Linea Alba and the Canister- Theory

Hypothesis:
• A disorder in one component of the canister is associated with the development of a condition in another component. (Smith 2013)

• Before inserting into the linea alba, the aponeuroses of the abdominal muscles come together to surround the rectus muscles.
• anterior & posterior layers above
• anterior only below
Linea Alba and the Canister-Theory

Linea alba = stiffest structure of the abdominal wall and the most important contributor to the mechanical stability of the abdominal wall.  
(Hernandez-Gascon 2016)

In men and nulliparous women, inter-recti distance does not change during a sit-up.  
(Chiarello 2016, Lee 2015)

Is the function of the canister impaired if the linea alba gets thinner and larger such as during and after pregnancy?
Linea Alba and the Canister- Theory

• A larger linea alba appears to “distort” more during effort. (Hills 2018)

• IRD was found negatively correlated to trunk flexors and rotators strength and endurance after birth and at 6 months post-partum. (Liaw, 2011)

• IRD was found negatively correlated to trunk rotation torque and ability to perform a sit-up. (Hills, 2018)

• TA contraction widens IRD (Mota 2012; Sancho 2015; Mota 2015; Lee & Hodges 2017; Theodorsen 2017)

• PFM contraction widens the IRD (Theodorsen, 2017; Lee & Hodges, 2017)

• Sit up/curl up narrows IRD (Mota 2012; Sancho 2015; Pascoal 2014; Chiarello 2016; Lee & Hodges 2017).

• Implications?
Linea Alba, Canister Theory & Pregnancy

- Do we have evidence that pregnancy-related changes (anterior aspect of the canister) lead to impairment and symptoms in other compartments of the canister (low back pain, pelvic pain, incontinence, etc...)?
Linea Alba, Canister Theory & Pregnancy

• Prospective study N=300 first time pregnant women.
  – No difference in pelvic floor muscle strength & endurance at 6 weeks, 6 months and 12 months between women with and without diastasis. (Sperstad & Ø 2016; da Mota 2015).

• No greater IRD in women with and without back or pelvic girdle pain. (Chiarello 2017).

Linea Alba, Canister Theory & Pregnancy

• IRD does not appear to correlate with pregnancy-related PGP.

• DRA (as defined by IRD) has recently been correlated with POP. (Benjamin 2018)

• What about other aspects of the LA?
  – Implications?
Linea Alba, Canister Theory & Pregnancy

- Prevention and management of DRA in pregnancy?
  - No RCTs
  - One retrospective study (Chiarello 2005)
  - One consensus study (Dufour 2018)

what do efficacy studies say?
RCT DRA Walton et al, 2016

• 9 women with either vaginal birth or CS
• Randomized to 3 visits/week for 6 weeks (3x10 reps + progression during period)
  – Plank OR
  – Modified sit up
  – In addition; Both groups had pelvic tilt, PFMT, obliques, external support
• Results (ultrasound and caliper)
  – Sig reduction in both groups (only at navel)
  – No diff between groups

RCT DRA Gluppe et al, 2018

• Control: usual care
• 4 month group training once a week
  – Strength training:
    • 5 sets of PFM exercises in different positions
    • 3 sets of abdominal exercises
    • 3 sets of back exercises
    • Strength training of arms and legs
  – Stretching of shoulder and neck
  – Total body relaxation
  – Home PFMT: 3 sets of 8-12 contractions/ day

<table>
<thead>
<tr>
<th>Training group</th>
<th>6 weeks post</th>
<th>6 months post</th>
<th>12 months post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>48 (95.2%)</td>
<td>36 (93.3%)</td>
<td>36 (93.4%)</td>
</tr>
<tr>
<td>Control group</td>
<td>48 (96.1%)</td>
<td>38 (94.9%)</td>
<td>38 (94.8%)</td>
</tr>
</tbody>
</table>

No statistically significant difference between groups at any time
Evidence Summary

Systematic Review DRA (PP) Benjamin et al 2014

- 8 studies; 1 RCT
- Poor quality

“Based on the available evidence and quality of this evidence, non-specific exercise may or may not help to prevent or reduce diastasis of the rectus abdominal muscles during the ante and postnatal periods”

- 5 new RCTs = no change in this statement
- Urgent need to bridge the research practice gap
  - Highlights the important role of practice-based research!

Researchers have no idea how to fix your 'mummy tummy'

April 15, 2018 - 00:00

For years, researchers have promoted treating separated abdominal muscles, called diastasis recti abdominis, with specific exercises. A new study shows this approach doesn’t really work.

“Several studies have shown that the transverse abdominal muscle is activated when we exercise the pelvic floor muscles, and our starting point was that the stomach exercises would work on the diastasis, but they did not. The gap was not affected by pelvic floor training or stomach muscle exercises,” she said.
BUT....(Critical Appraisal)

- Heterogeneity across trials
- Focus on “what” exercises – not “how” or “when”
  - IAP management likely important
  - Critical healing period likely distinct
    - CERT exercise intervention criteria*
- No attention to lifestyle and behaviours
  - Consider comparison to POP (Hagen 2017)
- Limited to IRD as the sole defining characteristic
- What about other potential influencing features?

Bridging the Gap

Evidence from practitioners (practice-based evidence)

Identification of areas of agreement and disagreement

Evidence from the literature
Practice-Based Research

Scientific research methods can be used to report on knowledge from knowledge users:

1. **Survey** (Keeler et al 2012)

2. **Delphi Consensus** (Dufour et al 2019)
• Questionnaire to 2200 members of APTA Women's health (13.5% response rate)
• Treatment
  – Average visits/week: 1.6
  – Duration: 4-6 weeks
  – Reported success rate: *41-100%
• Intervention
  – 89% TrA training
  – 83% TrA + functional
  – 63% "Noble technique"
  – 87% pelvic floor muscle training
  – 81% therapeutic modalities
  – 59% manual therapy

Manual therapy = 59%
  - Myofascial release: 46%
  - Triggerpoint release: 36%
  - Muscle energy technique: 33%
  - Visceral manipulation: 21%
Other: "Joint mobilization":
  Sacrum
  Innominate
  Lumbar spine
  Coccyx
  Pelvic symphysis
Assessment

Scientific Literature

- IRD

Experts

- Integrity of LA (palpation)
- Pelvic floor function (digital palpation or RUS)
- Tension generating capacity of LA (voluntary PF/TA contraction)
- IRD

= a more comprehensive and functionally relevant assessment protocol

(McLean et al, 2018)

- Reliability and Concurrent Validity of Inter-Rectus Distance and Linea Alba Stiffness in Women With and Without Diastasis Recti Abdominis

- Background/Rationale: Inter-rectus distance (IRD), measured using ultrasound imaging (USI), is the standard by which diastasis recti abdominis (DRA) severity is described. However IRD is not associated with dysfunction. The capacity of the Linea Alba to transmit loads across the midline may be more functionally important than IRD, and this capacity can be measured in-vivo using shear wave elastography (SWE).

- Purpose/Research Objectives: (i) To examine the between- and within-rater reliability of Linea Alba stiffness measured using SWE and (ii) to investigate the relationship between IRD and Linea Alba stiffness at rest, on head lift and on curl-up.

- Results: Twenty four women participated (11 nulliparous). Intra-class correlation coefficients for IRD and both peak and mean stiffness of the linea alba were >0.95. Peak and mean Linea Alba stiffness at rest, on head lift and on curl-up were negatively correlated with IRD (-0.25<r<-0.49, p<0.03), while linear regressions explained only 6.9-11.2% of the variance on head lift and 20.8-24.8% of the variance on curl-up.

- Conclusions: Although IRD is associated with less capacity to stiffen the Linea Alba, other factors may influence this capacity.
Assessment – Integrity of of LA

• Qualitative assessment of linea alba integrity
• Use the top of the LA as a reference
• Quantify the qualitative assessment of the integrity (fascial stiffness) through the LA on a five point likert scale
• Measurement taken at umbilicus, 2cm above and 2 cm below

The degree of integrity (fascial stiffness) equals that of the reference point
(Dufour et al, 2019)

Assessment – Tension Generation of of LA

• Qualitative assessment of linea alba integrity
• Use the top of the LA as a reference
• Quantify the qualitative assessment of the muscular tension generated through the LA with a voluntary pelvic floor contraction on a five point likert scale
• Measurement taken at umbilicus, 2cm above and 2 cm below

The degree of tension generated equals that of the reference point
(Dufour et al, 2019)
Dynamic Assessment of IAP Management

Table Top Assessment

Management during pregnancy...

- Encourage physical activity and movement patterns that do not excessively maintain high IAP to avoid persistent postpartum DRA.

- Encourage inner unit exercises to optimize postpartum recovery for DRA.
Management early postpartum...

- Encourage inner unit exercises very early after birth (within 24h).

- Encourage abdominal exercises to enhance trunk flexor and rotator muscles strength.
  - may not directly affect DRA, but important for trunk function.

Mangement late postpartum...

- Encourage abdominal exercises to enhance trunk flexor and rotator muscles strength.

- Avoid invagination or doming of the linea alba during exercises.

- Manual therapy strategies to address scar tissue and thorax mobility
Management

Scientific Literature
• Exercise

Experts
• Exercise
• Thoracic Mobility
• Lifestyle Management

= a more comprehensive and functionally relevant management approach

Lifestyle Management

• Involves the counseling related to the evidence-based use of lifestyle therapeutic approaches that include diet, physical activity, sleep, and stress management (Bo et al, 2016).

• How do we best implement lifestyle management (behaviour change)?
  – Health Coaching via Motivational Interviewing!
Lifestyle Management

• Posture & Breathing
  – Length tension relationship
  – Organ support and fascial connection
  – Diaphragm and PF – tango!
  – Deep core system - synergistic
  – Canister includes LA

• Lifting and other ADLs
  – Avoid breath holding
  – Breath before and through tasks
    • Antony Lo, 2016; Julie Weibe 2017
  – Consider principles from ROST MOVES MAMA
    • Rosttherapy.com
Pregnancy-related diastasis rectus abdominis: Impact of a multi-component group-based intervention

Abstract

Purpose: To explore the feasibility and effect on outcomes of a one-time multi-component group-based intervention among women with pregnancy-related diastasis rectus abdominis (DRA).

Methods: Women with clinically diagnosed DRA and minimum 8 weeks postpartum participated in a pre-post cohort pilot study. Subjects participated in a group workshop consisting of education and exercise prescriptions. They were assessed before the workshop, and 6 weeks later with a booster session at 4 weeks. The following measurements were used inter-recti distance (thicker width), linea alba (LA) integrity; LA tension, maximum capacity, rectus caught by tape (ALCTR), and perceived change (SBC).

Results: Thirty-two participants were enrolled in this study and 16 completed both pre and post measurement (53%). Following intervention, all outcomes improved significantly but no statistically significant change was noted in SBC (thicker width), LA integrity; LA tension, and LA tension remained consistent.

Conclusions: We found that the participants experienced improvement in pregnancy-related DRA outcomes. Future studies are needed to further explore the effect of the different components within this intervention, particularly in the long term. Further, the benefits of applying self-management principles in DRA interventions as well as further investigating movement techniques is also warranted.

Keywords: abdominal rectus, DRA, self-management, feasibility

Pelvic floor muscle training for secondary prevention of pelvic organ prolapse (PREVPROL): a multicentre randomised controlled trial

Suzanne Hagen, Cathryn Glazener, Doreen McClung, Christine Macarthur, Andrew Elders, Peter Herbison, Don Wilson, Philip Toazs-Hobson, Christine Hemming, Jean Hay-Smith, Marissa Collins, Sylvia Dickson, Janet Logan

Procedures

Pelvic floor muscle training was delivered both as one-to-one sessions and in a class setting. Women were offered five appointments with a specialist women’s health physiotherapist over 16 weeks (weeks 0, 2, 6, 11, and 16). The physiotherapist assessed pelvic floor muscles, taught correct exercise technique, prescribed individualised home pelvic floor muscle training programme (three sets of exercises daily, completion of exercise diaries), provided a prolapse lifestyle advice leaflet (with a focus on weight loss, avoidance of heavy lifting, constipation, coughing, and high-impact exercises), and tailored lifestyle advice (phase one). Women in the intervention
Exercise Management

- Exercise is a form of activity that is usually performed on a repeated basis over a period of time with specific objectives related to different parameters of fitness (strength, endurance, motor control and flexibility) (Bo et al, 2016).

- How do we best implement exercise management?
  - *Individualized Exercise Prescription!*

Exercise Management

- Needs to be individually tailored
- Needs to be carried out such to adequately manage IAP
- Inner unit exercise – emphasize co-ordination and motor control.
- Functional outer unit and abdominal exercises
- No one size fits all
  - but some common culprits!

*Five Exercises That Cause DIASTASIS RECTI During Pregnancy*

- All Planks
- Push Ups
- Quadruped Positions
- Twisting Movements
- All Crunches
• Exercise needs to be individually tailored and carried out in order to out such to adequately manage IAP.

• Consider general health status for training and success with tissue remodeling.

• Determine what exercises impact the tissues with as many variables removed as possible.

---

Is our lens Myopic?

• We still have not conferred the canister theory
  – We have not adequately teased out the “what”, “how” and “when” related to exercise prescription as congruent with this theory

• We have yet to evaluate behavioural aspects of care (lifestyle)

• We have yet to explore and consider immune and endocrine factors
  – Could we be missing the link as was the case for pregnancy-related PGP?
Other Considerations

- Abdominal adhesions
- Immune and endocrine factors

New Research

- Stay tuned for research from Dr. Linda McLean and colleagues
- RCT – DRA Exercise Management: PI- K Bo (completion 2021)
- Scoping Review – DRA Assessment: PI- S Bernard (completion 2020)
Closing Remarks

• There is an important role for rehabilitation for pregnancy-related DRA
• There might be a role for prevention
• PTs tend to frame DRA from the perspective of the canister theory
  – yet to be fully substantiated
  – potentially myopic
• No magic list of “best exercises”
  – Lots of contextual factors to consider

Thank You & Questions?

Dr. Sinéad Dufour
Director of Pelvic Health
The World of my Baby (WOMB)
Assistant Clinical Professor
McMaster University
sdufour@mcmaster.ca
References

References

References