Aims of Workshop
Pregnancy-related musculoskeletal tissue injury is common and ranges from strain on the pelvic ligaments to injury to the pelvic floor and changes associated with fascial system, including widening of the linea alba, called diastasis rectus abdominis (DRA). Exploring the topic of pregnancy-related musculoskeletal conditions, specifically from the perspective of understanding the potential relationship and relevance of pelvic floor function to the linea alba, is important. In most cases, conservative management strategies are established as first line care. This workshop will overview pregnancy-related musculoskeletal tissue changes and injuries with a focus on the pelvic floor muscle and the linea alba according to our past and evolving understanding of DRA.

Learning Objectives
1. Understand pregnancy-related musculoskeletal tissue changes and associated conditions such as diastasis rectus abdominis and differentiate those that require intervention (conservative management) and those that do not.
2. Identify scientific update on evidence pertaining to various aspects of pregnancy-related diastasis rectus abdominis.
3. Determine the current evidence-informed and integrative conservative care principles for pregnancy-related DRA from a primary health care perspective and with an emphasis on the roles of physiotherapists and primary care providers.

Learning Outcomes
After this workshop, participants will be able to understand the need to mount a cohesive evidence-based approach in the conservative management for pregnancy-related musculoskeletal tissue concerns that involve the pelvic floor and linea alba, such as diastasis rectus abdominis. Furthermore, participants should have a greater understanding of how to determine when pregnancy-related musculoskeletal changes to the linea alba and pelvic floor require conservative intervention, and when they do not impact function. The audience will appreciate the inter-relation of tissue function through the perinatal stage of which the pelvic floor is central. As such, participants will have enhanced clinical reasoning that will lend to both prevention and management of pregnancy-related musculoskeletal conditions like diastasis rectus abdominis.

Target Audience
Primary care practitioners, specifically: physiotherapists, midwives, obstetricians, nurses and other allied healthcare professionals interested in understanding pregnancy-related musculoskeletal tissue changes and associated impairments.

Advanced/Basic
Basic

Conditions for Learning
This is an interactive workshop that does not have a restriction on the number of delegates.

Suggested Learning before Workshop Attendance
This is an entry level workshop and no particular preparation is required.
**Suggested Reading**


**Speakers Presentation Summaries**

**Morphology and biomechanics of the linea alba and pelvic floor – connecting the system**

**Cynthia Chiarello**

Cynthia will begin the workshop by exploring the anatomical and functional interdependence of the muscular and connective tissue components of the trunk. The “pressurized can” concept will be described as a theoretical model for the potential association between diastasis rectus abdominis (DRA) and pelvic floor dysfunction. Several concepts will be introduced and related to explain the integrated function of the anterior abdominal wall and pelvic floor. The morphology and biomechanics of the linea alba will be presented with attention to muscular and fascial connections. Synergistic and feed-forward trunk muscular mechanisms will be presented along with load transfer and support across the pelvis. These foundational concepts will provide a rational for intervention strategies.

**Overview of the scientific literature**

**Kari Bø**

Kari will give an overview on the scientific literature on prevalence and complications of diastasis recti abdominis and the effect of treatment of abdominal and pelvic floor muscle exercises for diastasis. A special emphasis will be on the connection or lack there of non between the pelvic floor muscles and the abdominal muscles from a treatment perspective. To date there are few published studies in this area and newer experimental research raises questions regarding the evidence for the commonly used clinical physiotherapy protocols that emphasize training of the transverse abdominal and pelvic floor muscles to address pregnancy-related DRA.

**Speakers**

**Cynthia Chiarello**

- Email: cmc3@cumc.columbia.edu
- Country: United States
- Profession: Physical Therapist
- Experience & Qualifications:
  - Dr. Chiarello is an Assistant Professor at Columbia University, Department of Rehabilitative and Regenerative Medicine, Doctoral Program in Physical Therapy where she teaches kinesiology, biomechanics and orthopedics. She is the Editor-in-Chief of the Journal of Women’s Health Physical Therapy, the peer reviewed publication of the Section on Women’s Health of the American Physical Therapy Association. Dr. Chiarello received a BS in Biology and Psychology from SUNY Fredonia, a MS in Physical Therapy from Duke University and a PhD in Pathokinesiology from New York University. Her basic science research has examined the linea alba in cadavers as a foundation for the characteristics of diastasis rectus abdominis. Her clinical research examines the relationship between diastasis rectus abdominis, low back pain, and abdominal muscle function in pregnant and post-partum women. Her current research includes studies investigating exercise for pelvic girdle pain in pregnancy, and ultrasound imaging of inter-recti distance and abdominal muscle contraction in functional positions.

**Kari Bø**

- Email: kari.bo@nih.no
- Country: Norway
- Profession: Physiotherapist and Exercise Scientist
- Experience & Qualifications:
  - Professor Kari Bø obtained her PhD on pelvic floor muscle training in 1990 and was appointed professor of Exercise Science and Physiotherapy in 1997. Since then, she has been elected rector (head) of the Norwegian School of Sport Sciences, (specialized university) in Oslo 2013-2017, and was the first vice president of the International Organization of Physical Therapists in Women’s Health, WCPT 1999-2007. Further, she has been the vice president of the Norwegian Council for Physical Activity for 8 years, giving direct advice to the Norwegian Minister of Health. Kari has published > 260 scientific papers on pelvic floor...
dysfunction, treatment of incontinence and low back- and pelvic girdle pain, exercise during pregnancy and after childbirth, diastasis recti abdominis, measurement methodology, fitness and women’s health and has given > 260 invited international keynote presentations. She has been awarded with the most prestige's award from the World Confederation of Physiotherapy and the ICS Lifelong Achievement award for her research and education on the pelvic floor and incontinence.

**Exploring the “gaps”: knowledge users vs. scientific literature**
**Stéphanie Bernard**

Stephanie Bernard will introduce participants to who are knowledge users, how meaningful it can be to have knowledge users participating in the various steps of research processes, and at the different research methods that have been used in the DRA literature to inform readers of practice-based evidence they have provided. Additionally, she will explore the findings from practice-based inquiry that also integrate principles from basic science research and contrasts them with non-practice-based evidence from the literature, highlighting the areas of coherence and dissemblance between the two. This will lead to a more complete understanding of what we know regarding the conservative management of pregnancy-related DRA, as well as how can further research help fill the identified gaps in evidence.

Email: stephanie.bernard@cirris.ulaval.ca
Country: Canada
Profession: Physiotherapist
Experience & Qualifications:
Ms. Stephanie Bernard is a Physiotherapist with expertise in pelvic floor therapy and a Doctoral candidate at Université Laval in Québec, Canada. She has been a clinician for over 12 years, where she treats various pelvic floor dysfunctions, with a special interest for patients with pregnancy-related musculoskeletal dysfunctions and pelvic floor disorders after cancer. She lectures at both Université Laval and Université de Montréal since 2014. She is the Past Editor-in-Chief of the Women’s Health Division of the Canadian Physiotherapy Association, and a member of the ICS Working Group on Terminology of pelvic floor function and dysfunction.

**Primary care approach to conservative care provision for pregnancy-related DRA: Interprofessional considerations**
**Sinéad Dufour**

Sinéad will close the workshop with a translation of the collective evidence discussed (basic science, clinical science and practice-based) applied to a clinical vignette. The vignette has been developed by the collaborators to operationalize in a pragmatic way how the state of the evidence related pregnancy-related dysfunction in the linea alba (aka DRA) can be applied. The vignette will be presented to span two different points in time through the perianal care period and will be explored from the perspective of different primary care providers. Aspects or both assessment and management will be discussed. As such, relation patient education, lifestyle counselling and exercise prescription considerations will all considered. Pregnancy-related musculoskeletal conditions are common and can be managed more effectively with conservative approaches by all relevant primary care providers. Many barriers to optimal care exist and lack of clarity of the state of the evidence as well as how to clinically apply the current evidence represent barriers we hope to ameliorate through this workshop.

Email: sdufour@mcmaster.ca
Country: Canada
Profession: Physiotherapist
Experience & Qualifications:
Dr. Sinéad Dufour is Assistant Clinical Professor in the Faculty of Health Science at McMaster University. She teaches and conducts research in both the Schools of Medicine, which houses the Midwifery Education Program and School of Rehabilitation Science. She completed her MScPT at McMaster University (2003), her PhD in Health and Rehabilitation Science at Western (2011), and returned to McMaster to complete a post-doctoral fellowship (2013). Her current research interests include: conservative approaches to manage pelvic floor dysfunction, pregnancy-related pelvic-girdle pain, and interprofessional collaborative practice models of service provision to enhance pelvic health. Sinéad stays currently clinically through her work as the Director of Pelvic Health Services at The World of my Baby (the WOMB) in Ontario Canada and is member of the urogynecology committee of the Society of Obstetricians and Gynecologists of Canada.
Morphology and Biomechanics of the Linea Alba and Pelvic Floor

Cynthia M. Chiarello, PT, PhD

Editor-in-Chief, Journal of Women’s Health Physical Therapy
Assistant Professor of Rehabilitation and Regenerative Medicine at CUMC, Program in Physical Therapy, Columbia University, New York, USA

Objectives:

After completing this session, you will be able to:

• Illustrate the integrated function of the musculofascial system in providing support and stability to the trunk and pelvis.

• Explore theoretical models which present the interrelated mechanical function of the trunk.

• Summarize mechanical properties of some trunk structures.

Trunk Function

• Contains organs
• Respiration
• The musculoskeletal trunk functions as a mechanical unit
  • Supports weight
  • Transmits forces
  • Produces and controls intra-abdominal pressure
  • Maintains stability
    • Form and force closure

Anatomical Trunk Components

Model for Integrated Function of the Trunk

“Abdominal Canister”
Pelvic floor support

- Pelvic organs (boat) supported by the levator ani muscle (water) and stabilized by the ligaments (cables).
- Levator ani weakness causes increased reliance on supportive connective tissue.

Model for Integrated Function of the Trunk

“Abdominal Canister” (Lee, 2014)

- Ideal trunk function requires a balance between movement and stiffness.
- Impaired function of one part of the canister can diminish load transfer negatively impacting support mechanisms.
- Synergistic muscle activation of pelvic floor musculature, the deep abdominal muscles, and diaphragm:
  - intra-abdominal pressure
  - Lumbo-pelvic stability
  - Continence
  - Muscle forces are transferred through fascial attachments.

Diastasis Rectus Abdominis (DRA)

The “abnormal” midline separation of the right and left rectus abdominis muscles along the linea alba.
- Appears as a visible increase in the width of the linea alba or Inter-Recti Distance (IRD).
- Connective tissue alterations of the linea alba
- Damage of the fixation of the rectus muscles

Is there a relationship between Diastasis Rectus Abdominis and Incontinence or Pelvic floor dysfunction?

DRA Measurement: Technique

Palpation
- Palpation & Calipers
- Ultrasound
- Clinical Relevance

The Abdominal Wall

- Function
- Abdominal Muscles
- Abdominal wall connective tissue
  - Components
    - Linea Alba - tendinous fibers from abdominal muscles
    - Anterior Rectus Sheath
    - Posterior Rectus Sheath
**Morphology of Linea Alba and Rectus Sheaths**

1. Collagen fibers - 3-D highly structured meshwork of collagen
   1. Oblique Fiber Layer
   2. Transverse Fiber Layer
   3. Irregular Fiber Layer

- Distinct Cranio-caudal regions
  - Supraumbilical
  - Umbilical
  - Transition zone
  - Infra-arcuate

- LA Gender differences
  - Thickness $♀ > ♂$
  - Infraumbilical
  - More transverse (relative to oblique) bundles

**Mechanical Function of Linea Alba**

- Withstand abdominal pressure
- Stabilizing the abdominal wall
- Sustain and transmit muscle contraction forces
- Stiffest structure, most work
- Most important component for stability of the abdominal wall
- Sustains the highest stresses under physiological load

**Mechanical Behavior of Linea Alba**

- Anisotropic & Non-linear
- Transverse direction is stiffer (smaller compliance) than longitudinal
- LA is 3x stiffer for small strains, 4x stiffer for large strains
- Collagen & elastin adapted to the type of loading. Microstructure strongly affected the mechanical response of the linea alba
  - Dorsal layer mechanical resistance to transverse load
  - Ventral layer resists transverse and longitudinal

**Pelvic Floor**

- Pelvic floor muscles
  - Tonic contraction, transverse load bearing, antigravity support
  - Passive support through connections to endopelvic fascia

**Pregnancy: Connective Tissue Changes**

- Peripheral joint laxity increases during pregnancy
- Hormonally mediated connective tissue changes
- Pregnancy can result in lasting changes in knee joint laxity

**Connective Tissue Mechanical Properties**

- Both the pelvic floor and the anterior abdominal wall are composed of both muscle and connective tissue.
- CT provides support for the organs
- Muscular components of both the pelvic floor and the abdomen attach to the connective tissue
- A decrease in the stiffness or strength of this connective tissue would predispose an individual to dysfunction as abnormal displacements under normal physiological pressures could occur impairing muscular contraction efficiency.
Summary

- Mechanical support for the anterior abdominal wall and the pelvic floor both depend on the precise interplay between muscular contraction and adequate tension of the ligament and fascial connective tissue.
- Weakened muscles leads to impaired function.
- Lax connective tissue leads to impaired function.
- The “Canister” theoretical model presents the potential interdependence between pelvic floor and anterior abdominal function.
- In pregnancy, hormonally mediated changes in connective tissue may lead to decreased support.

References


The pelvic floor and linea alba connection: Overview of the scientific literature

Kari Bø
Professor, Ph.D
PT, Exercise scientist
Norwegian School of Sport Sciences
Dept of Sports Medicine
Akershus University Hospital
Dept of Obstetrics and Gynecology

Measurement methods
van de Water & Benjamin-16

- Palpation finger width: K = 0.70.5 Mota et al-15
- Calipers: ICC: 0.9 (intra) Boxer&Jones-97
- Ultrasound: ICC 0.9/0.7-0.9 Mota et al-12
- NO consensus on:
  - where to measure along the linea alba
  - cut off point for diastasis
  - What is NORMAL? Mota et al-17
  - Usually ≥ "two finger widths"

Forskning.no
Diastasis and the PFM? Prevalence of diastasis recti in a urogynecological patient population
Spiznagle et al-07

- 541 patients seeking help for PFD (myofacial pelvic pain, UI, FI, POP), mean age 52.5 years (SD 16.6)
- Evaluated diastasis with finger width
- Results
  - Prevalence 52% in middle-aged women
  - 35% of nulliparous DRA women were older, reported higher parity, had weaker PFM, Caucasian/African, menopausal, using hormonal replacement therapy, abdominal surgery

PFM function & DRA in 300 first time pregnant women
Bø et al-16

- At gestational week 21 women with diastasis had significantly better PFM function:
  - VRP: mean diff: 3.06 cm H2O (95% CI: 0.70;5.42)
  - MVC: mean diff: 5.08 cm H2O (95% CI: 0.76;9.42)
  - Endu.:mean diff: 47.08 cmH2Osec (95% CI: 15.18; 78.99)
- However: No statistically sign differences in VRP, PFM strength or endurance between women with and without diastasis at 6 weeks, 6 months or 12 months postpartum

Is there any connection between the TrA and the pelvic floor/pelvic floor muscles?

NO muscular or facial connection between the two muscle groups

Part of same canister – what does it mean?
Weak connective tissue my be the common link between prevalence of PFD (urinary incontinence and pelvic organ prolapse) and diastasis recti abdominis

Cause effect relationship?
Any connection between PFM and abdominals via endopelvic fascia?

Does diastasis cause LBP or PGP?

- Women with DRA had more abdominal and pelvic pain, but not LBP, than women without DRA. 
  Parker et al - 09
- No diff in LBP/PGP at 6 months postpartum. 
  Seagrave et al - 15
- No diff in LBP/PGP at 12 months postpartum. 
  Seagrave et al - 15
- No diff between women with BP or PGP in IRD. 
  Chiarello - 17
- No corr IRD and LBP/Pelvic pain 3 weeks pp. 
  Keshwani et al - 17
- 69% of 16 with DRA had LBP vs 47% of 93 without DRA had LBP. 
  Dubkova et al - 18
- No studies on elite athletes. 
  Bø et al - 17

Is this a diastasis? Does it cause any problems?

"Only cosmetic" or are there consequences of severe diastasis?

Prevention and treatment? www....

Physiotherapy for DRA? Keeler et al - 12

- 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% Keeler et al 2012

- Myofascial release: 46%
- Triggerpoint release: 36%
- Muscle energy technique: 33%
- Visceral manipulation: 21%
- Other: "Joint mobilization":
  - Sacrum
  - Innominate
  - Lumbar spine
  - Coccyx
  - Pelvic symphysis
- Theory/mechanism???

Prevention and treatment of DRA during pregnancy?

- No RCTs in the general pregnant population or in athletes
- One retrospective study Chiarello et al - 05
- Can stretched abdominals be trained?
  - At GW 36 length of abdominal muscles ↑ with mean 115%, Change in angle of insertion, reducing ability to generate torque Gilleard & Brown - 06
- Which exercises?

Drawing in vs sit up/abdominal crunch?

- "Drawing in" widens the IRD Mota et al -12, Sancho et al -15, Mota et al 15, Lee & Hodges – 17, Theodorsen et al 17
- PFM contraction widens the IRD Theodorsen et al-17, Lee & Hodges -17
- Sit up/curl up narrows the IRD Mota et al-12, Sancho et al-15, Pascoal et al-14, Chiarello et al-16, Lee & Hodges-17

RCT DRA Mesquita et al -99
- Published in Portuguese in BJPT
- 50 women after vaginal delivery, age: 18-40 years old
- Intervention
  - Two sessions 6 (10 repetitions) and 18 hours (20 repetitions) after birth
  - Basal respiration, pelvic tilt with isometric contraction of TrA, exercises for abdominal obliques, PFM contractions
- Results (caliper)
  - Intervention: from 3.45 (± 0.43) cm to 2.64 (± 0.45) cm
  - Control: from 3.16 (± 0.26) cm to 2.99 (± 0.28) cm
  - P < 0.05 between groups at 18 hours

RCT DRA Walton et al -16
- 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, PFM, obliques, external support
- Results (ultrasound and caliper)
  - Sign reduction in both groups (only at navel)
  - No diff between groups

RCT DRA Emanuelson et al -16
- 89 participants (2 men) 18-40 years old
- Randomized to
  - Surgery with mesh
  - Surgery with Quill
  - Exercise: 3 times/week for 3 months with physical therapist: rectus abdominis, obliques, TrA
- Results (ruler, SF-36, pain, abdominal strength (VAS, Biodex system)
  - Surgery better than exercise
RCT DRA, Kamel & Yousif - 17

• 60 women (25-35 years) at 2 months pp after normal vaginal delivery and DRA >2.5 cm
• Randomized to physical therapy 3 times/wk for 8 wk
  • A. Abdominal exercise + Neuromuscular e stim (frequency 80 pulses/min, pulse width 0.1–0.5 ms, on/off ratio of 5s:10s, 30 minutes)
  • B. Abdominal exercise (20 reps (+ increased by 4 reps /wk) of sit-ups, reverse sit-ups, reverse trunk twists, and U-seat) + 5 times respiration + TrA (increased per/wk)
• Results (ultrasound)
  • IRD: 50% vs 26% reduction in A vs B
  • Sign intra-group improvement in other measures, strength sign better improvement in A

Norwegian single blind RCT, Gluppe et al, Phys Ther - 18

• 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
    • Ergonomics: lifting technique
    • Posture, breathing and body awareness
    • Stretching of shoulder and neck
• Total body relaxation
• Home PFMT: 3 sets of 8-12 contractions/day

Pilot RCT on TrA and kinesiotape, Tuttle et al - 18

• 30 women 6-12 weeks postpartum with 2 finger palpable diastasis
• Randomized to 12 weeks of
  • TrA training n=10 (4 x 6 - 10 in 4 positions)
  • Kinesiotape n=8
  • TrA + kinesiotape n=5
• Control n=7
• Primary outcome: IRD assessed with ultrasound
• Secondary outcome: LBP (Roland Morris) & PFD (PDFI-20)
• Results
  • Statistical significant better results of TrA and TrA + kinesiotape compared to kinesiotape-alone and control
  • No diff in LBP or PFD

Evidence for PP abdominal training for DRA:
Benjamin et al 2014

• 8 studies; 1 RCT (Mesquita et al 99)
• 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 muscle during the ante- and postnatal periods
• 5 new RCTs did not change this statement (Walton et al 16, Emanuelson et al 16, Kamel &Yousif et al 17, Gluppe et al 18, Tuttle et al 18)
• No studies on elite athletes
• Dangerous exercises?
• Urgent need for high quality RCTs
• INTERVENTION???

Thank you for your attention!
The “gaps” between evidence from knowledge users and evidence-based literature

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Affiliations to disclose:

Université Laval, Québec
Centre de recherche en réadaptation et intégration sociale (CIRRIS)

Funding for speaker to attend:

- Self-funded
- Institution (non-industry) funded: (FRQS – Repar)
- Sponsored by:

Objectives

1. Understanding the advantages of integrating knowledge users in the DRA-related research;
2. Understanding agreement and disagreement between evidence from knowledge users and evidence-based literature;
3. Determine the current evidence-informed and integrative conservative care principles for pregnancy-related DRA from a primary health care perspective;
4. Recognize future directions for research and clinical practice.

DRA and physiotherapy

Participation of knowledge users in research presents many benefits:

- Bidirectional knowledge exchange
- Increased quality of research output
- Enhanced utilization of results in clinical practice

Who are knowledge users?

“(…) an individual who is likely to be able to use research results to make informed decisions about health policies, programs and/or practice.”

Canadian Institutes of Health Research, 2016

Taking knowledge users’ knowledge
Evidence from practitioners ("practice-based" evidence)

Identification of areas of agreement and disagreement

Evidence from the literature

Taking knowledge users’ knowledge

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

1. Delphi Consensus² study (Dufour et al 2018)
2. Survey⁴ (Keeler et al 2012)

During pregnancy...

What can we do during pregnancy to prevent persistent post-partum DRA?

**Dufour**
- Postures and activity patterns that ↓ IAP
- Inner unit x’s
- Tension-free diaphragmatic breathing
- Avoid concentric abdominal x’s

**Keeler**
- Posture training
- Isolated, and functional abdominal x’s

What can we do during pregnancy to prevent persistent post-partum DRA?

**Agreement with literature ?**

**Yes :**
- Heavy lifting > 20x/wk possibly ↑ risk to develop DRA² (LoE: 2b)
- Abdominal x’s during pregnancy reduces presence of DRA by 35%⁷ (LoE:3)

**Agreement with literature ?**

**No :**
- Curl-up exercise (concentric x’s) produces a narrowing of IRD in pregnant women.⁸ (LoE = 2b)

Reducing IRD during pregnancy?²³, ²⁴
- Posture ?
- Breathing ?

© Bougeotte Placotine

What can we do during pregnancy to prevent persistent post-partum DRA?

© HealthyfamiliesBC

IAP: Intra-abdominal pressure

© Bougeotte Placotine

During pregnancy...

What can we do during pregnancy to prevent persistent post-partum DRA?

© HealthyfamiliesBC

IAP: Intra-abdominal pressure
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 favorize postpartum recovery for DRA

Intrapartum phase...

What can we do during delivery to prevent persistent post-partum DRA?

**Dufour**
- Advocate mobility during labour
- Avoid directed pushing techniques that ↑ IAP for sustained periods
- Advocate for sacrum freeing rather than recumbent birth positions

**Keeler**
- Not assessed

What can we do during delivery to prevent persistent post-partum DRA?

Agreement with literature?

- Undemonstrated
  - ↓ # episiotomies with sacrum-free birthing positions⁵,⁶ (LoE: 1b)
  - ↓ severe perineal tear with sacrum-free position¹⁰ (LoE: 2b)
  - Co-activation patterns exist between the abdominals and the PFM²¹,²²

Intrapartum recommendations

- Advocate for sacrum-free birthing to decrease risk for severe perineal trauma
- Document birthing positions in future DRA research

Early postpartum...
What can we do during early post-partum phase (< 3 months)?

Dufour

- Encourage optimal posture and body mechanics (↓ IAP)
- Avoid exercises in which continence mechanism is not maintained
- Inner unit x’s, leading to more functional x’s
- Avoid concentric abdominal x’s
- Tension-free diaphragmatic breathing

Agreement with literature?

Yes:

- Inner unit x’s immediately after delivery and during early postpartum phase ↓ IRD\(^{11,12}\) (LoE: 2b)
- Trunk flexors and rotators’ strength and endurance are ↓ at 7 wks postpartum, and is negatively correlated with IRD\(^{13}\) (LoE: 2b)
- Isometric hold (in curl-up position) ↓ IRD during early (and late) postpartum\(^{14}\) (LoE: 3b)

No:

- A 16-wk x’s program (starting at 6 wks post partum) for PFM and abdominals strengthening did not ↓ prevalence of DRA\(^{15}\) (LoE: 1b)

Keshwani, 2018

What can we do during late post-partum phase (> 3 months)?

Dufour

- Advocate optimal posture (neutral spine)
- Encourage optimal body mechanics
- Correct or modify exercises that cause doming or invagination of linea alba
- Address contributing thoracic and pelvic movement impairments

Early postpartum...

- Encourage inner unit exercises very early after delivery (within 24h).
- Encourage abdominal exercises to enhance trunk flexor and rotator muscles strength (may not directly affect DRA, but important for trunk function)
What can we do during late post-partum phase (> 3 months)?

Keeler
- General inner unit training
- Inner unit x’s during functional activities
- Noble technique
- PFM x’s
- Manual release of restricted myofascial tissue
- Use of abdominal binders

Agreement with literature?
Yes:
- ↓ Trunk flexors and rotators’ strength and endurance at 6 months, and trunk rotation torque at 12-month
- Negatively correlated with IRD (LoE: 2b)
- Correlation b/w distortion of LA and IRD
- A global-approach (movement impairment system) can reduce IRD (LoE: 4)

No:
- Physiotherapy exercise programs can be successful at reducing IRD during a contraction, but not at rest. May play a role in the laxity of the ventral musculature.

Late postpartum...
- Encourage abdominal exercises to enhance trunk flexor and rotator muscles strength.
- Avoid invagination or doming of the linea alba during exercises.

Moving knowledge into action
Engaging knowledge users in the elaboration, the completion and dissemination of the results processes of research will be helpful for:
1. Evidence-informed practice
2. Research relevant to the needs of both providers and patients
3. Documenting the effects of interventions that reflect the practices of clinicians
4. Increase our understanding of what we are actually doing

Thank you!
References


References

Objectives

- Apply the presented research to a clinical case
- Two points in time
  - Pregnancy
  - Post-partum
- Two provider perspectives
  - Family Physician (General Practitioner)
  - Pelvic Health Physiotherapist

Evidence-informed approach?

- We treat people, not conditions
  - Saphia presents with both pregnancy-related PGP and DRA
- We need an evidence-informed, tailored approach that engages Saphia’s preferences
  - What assessment strategies are appropriate for pregnancy-related PGP and DRA?
  - What treatment strategies are appropriate for pregnancy-related PGP and DRA?

Pregnancy – Family Physician

Saphia is a 36 year old women in her second trimester of her third pregnancy. She has a three-year old son and had a miscarriage (8 weeks gestation) approximately 1 year ago. She presents with pain that she describes as being close to her groin that moves from one side to the other and is most irritable when she is getting dressed or changing positions at night. She also mentions that she is really worried about her “core” as she states she had DRA after the birth of her first child which never “got better”. Saphia wants to know if there is anything she can do now to prevent worsening of the DRA as well as address the pain she is having in her pelvis.

Pregnancy-related PGP (Clinton et al, 2017)

Assessment Strategies

- Physical orthopedic tests
  - Pain provocation tests
  - Functional tests (stroke test and active straight leg raise)
- Self-report measures
  - Pelvic Girdle Questionnaire
  - Fear Avoidance Belief Questionnaire
  - Pain Catastrophizing Scale
Pregnancy-related PGP
(Clinton et al, 2017)

Treatment Strategies
— Promotion of general exercise (level C)*
— Manual therapy (level C)
— Use of pelvic belt (level D)

Pregnancy-related DRA

• Assessment Strategies
  — Assess IRD
    • Assess other functional parameters
• Treatment Strategies
  — Limit heavy lifting (less than 20x/week)
    • Attention to sustained/repetitive increases in IAP
  — Abdominal exercises inclusive of inner unit activation

Pre-Natal Pelvic Health

Recommendations
1. Pelvic floor muscle training with a physiotherapist is recommended to prevent urinary incontinence during pregnancy and after delivery (I-A)
2. Core muscle training with a physiotherapist is recommended to prevent and treat back and pelvic pain during and following pregnancy (I-B)

Evidence-informed approach?

• Assessment DRA:
  — Measure IRD using finger width in a curl up task

Evidence-informed approach?

• Assessment PGP:
  — Stoke Test
  — Administer Fear Avoidance Belief Questionnaire

<table>
<thead>
<tr>
<th>Statement</th>
<th>Completely Disagree</th>
<th>Unsure</th>
<th>Completely Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My pain was caused by physical activity</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2. Physical activity makes my pain worse</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. Physical activity might harm my back</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4. I should not do physical activities which might make my pain worse</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5. I cannot do physical activities which might make my pain worse</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Evidence Informed Approach
Family Physician

Assessment Findings
• IRD = 4 finger widths
• Stoke Test = positive
• Fear Avoidance Belief Score = 13

Findings consistent with pregnancy-related PGP and pre-existing DRA

Evidence Informed Approach
Family Physician

Management
• Counselling related to
  — General movement (not fearing movement)
  — Avoiding sustained or repeated strain through the abdominal wall such as straining on the toilet, heavy lifting or other similar activities that increase IAP.
• Refer to pelvic health physiotherapist for further Ax and Rx
  — PGP, global pelvic health promotion, prevention of UI

Post-Partum – Pelvic Health PT

Saphia is a 36 year old women who has been referred to you from her family doctor. She is 16 weeks post-partum with her second child. She had DRA after the birth of her first child and feels it is worse now after having another baby. She was referred during her pregnancy but never came. She denies having any issues with bladder control although when probed does indicate she leaks a small amount of urine when she sneezes. She indicates that she feels like she would probably have bladder control issues with exercise but that she has not returned to any exercise (other than walking) as she has researched about DRA on line is scared to exercise – she doesn’t want to make her DRA worse.

Evidence-informed approach?

• We treat people, not conditions
  — Saphia presents with both stress UI and DRA

• We need an evidence-informed, tailored approach that engages Saphia’s preferences
  — What assessment are the appropriate assessment strategies for SUI and DRA?
  — What are the appropriate treatment strategies for SUI and DRA?

Stress Urinary Incontinence

• Assessment Strategies
  — Pelvic Floor Muscle Strength (oxford scale)
  — Presence of pre-contraction pelvic floor muscle reflex (the knack)
  — Self-report measures

• Treatment Strategies
  — Pelvic floor muscle training represents the first line intervention for stress, urge or mixed urinary incontinence (Doumalin et al, 2014 ).
  • Level 1A evidence!

Pregnancy-related DRA

• Assessment Strategies
  — Assess IRD
    • Assess other functional parameters

• Treatment Strategies
  — Encourage abdominal exercises to enhance trunk flexor and rotator muscles strength
    • Inner unit exercise
  — Apply a global movement approach
    • Inclusive of self-monitoring
### Evidence Informed Approach

**Pelvic Health Physiotherapist**

#### Assessment Findings
- Oxford score = 2/5 (squeeze no lift)
- No presence of pre-contraction of pelvic floor contraction with cough
- IRD = 3 finger widths
- Doming noted through abdominal wall during curl up task

Presentation consistent with pelvic floor dysfunction and pregnancy-related DRA

#### Management
- Counselling related to
  - General movement (not fearing movement)
  - Self-monitoring of LA and IAP
- Abdominal exercises inclusive of inner unit work following established PFMT protocol
  - individually tailored

### Closing Remarks

- Evidence guiding practice for pregnancy-related DRA is lacking.
- Women with DRA will often present with other pelvic health concerns which are not necessarily correlated but need to be addressed in a concordant manner.
- Practice-based research has the potential to inform future RCTs to clarify what treatment interventions are the most effective.