1. This document was created to support maximum accessibility for all learners. If you would like to print a hard copy of this document, please follow the general instructions below to print multiple slides on a single page or in black and white.
2. If you are viewing this course as a recorded course after the live webinar, you can use the scroll bar at the bottom of the player window to pause and navigate the course.
3. This handout is for reference only. Non-essential images have been removed for your convenience. Any links included in the handout are current at the time of the live webinar, but are subject to change and may not be current at a later date.
4. Copyright: Images used in this course are used in compliance with copyright laws and where required, permission has been secured to use the images in this course. All use of these images outside of this course may be in violation of copyright laws and is strictly prohibited.

How to print Handouts

- On a PC
  - Open PDF
  - Click Print
  - Choose # of pages per sheet from dropdown menu
  - Choose Black and White from “Color” dropdown
- On a Mac
  - Open PDF in Preview
  - Click File
  - Click Print
  - Click dropdown menu on the right “preview”
  - Click layout
- Choose # of pages per sheet from dropdown menu
- Checkmark Black & White if wanted.
- If more details needed please visit our FAQ page: https://www.physicaltherapy.com/help

Technical issues with the Recording?

- Clear browser cache using these instructions
- Switch to another browser
- Use a hardwired Internet connection
- Restart your computer/device

Still having issues?

- Call 866-782-6258 (M-F, 8 AM-8 PM ET)
- Email customerservice@PhysicalTherapy.com

Diastasis Rectus Abdominis

Lisa J Martin, PT, MPT, CAPP

Moderated by: Calista Kelly, PT, DPT, Cert. MDT, ACEEAA, Managing Editor, PhysicalTherapy.com

Webinar FAQs

- How to ask a question:
  - Click Q&A, type your question and Send.
- Where to get the handout:
  - Download from Pending Courses
  - Or Click on link from Chat
- How to earn CEUs:
  - After the webinar, go to your Pending Courses and pass the multiple-choice exam.
- For assistance or tech support:
  - Call 866-782-6258
  - customerservice@physicaltherapy.com
  - Use the Q&A window

Diastasis Rectus Abdominis

Lisa J Martin, PT, MPT, CAPP

- Presenter Disclosure: Financial: Lisa Martin has received an honorarium for presenting this course. Non-financial: Lisa Martin has no relevant non-financial relationships to disclose.

- Content Disclosure: This learning event does not focus exclusively on any specific product or service.

- Sponsor Disclosure: This course is presented by PhysicalTherapy.com.

Learning Outcomes

After this course, participants will be able to:

- Identify at least two aspects of anatomy and function of the rectus abdominis.
- Identify at least two evaluative techniques/clinical tools to assess Diastasis Rectus Abdominis (DRA) and the correct positioning for active testing with the use of a caliper.
- Outline at least two educational methods to increase awareness of transverse abdominis (TA) activation.
- Identify at least one possible clinical symptom associated with DRA.
- Identify at least three benefits of physical therapy intervention for DRA.

Physical Therapy

Building “Bridges” Through Knowledge

“Bridging” research to practice
Diastasis Recti Abdominis (DRA)
Assessment & Treatment

Women's Health

Diastasis Recti Abdominis (DRA)*

A Widening of the gap between the two sections of the rectus abdominis muscle.

"Bridging the Gap" With Physical Therapy
Restoring Integrity To The Linea Alba (LA)
Building Strength & Function

Beautiful Changes Occur in Pregnancy

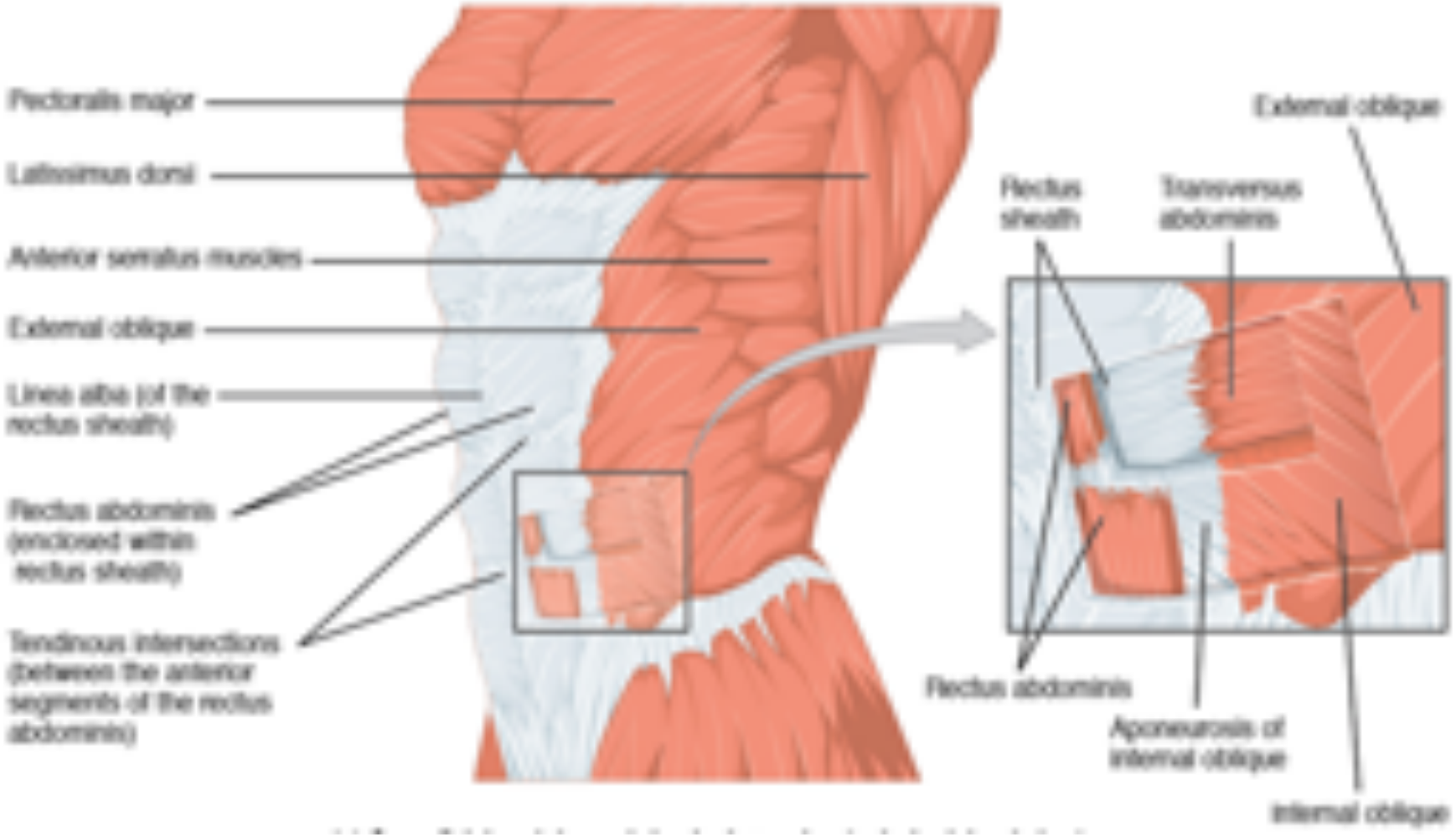


Image: OpenStax College, CC BY 3.0 <https://creativecommons.org/licenses/by/3.0>, via Wikimedia Commons

Anatomy & Function of Rectus Abdominis

- Origin: Pubic Crest
- Insertion: 5th, 6th, 7th costal cartilages

- Functions:
  - To support the viscera
  - To depress the ribs
  - To stabilize the pelvis

Anterior Abdominal Wall

Cross section

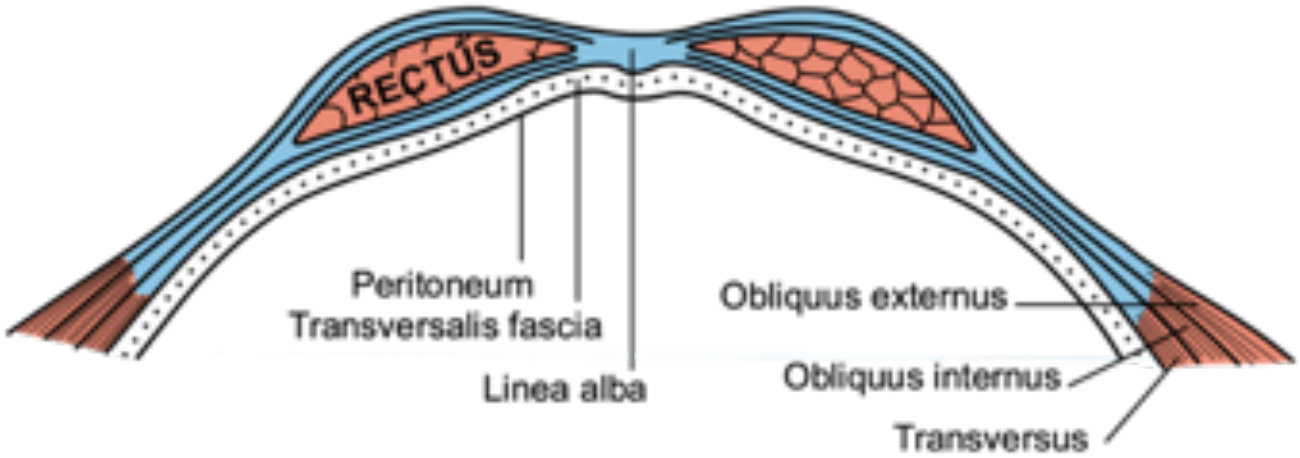
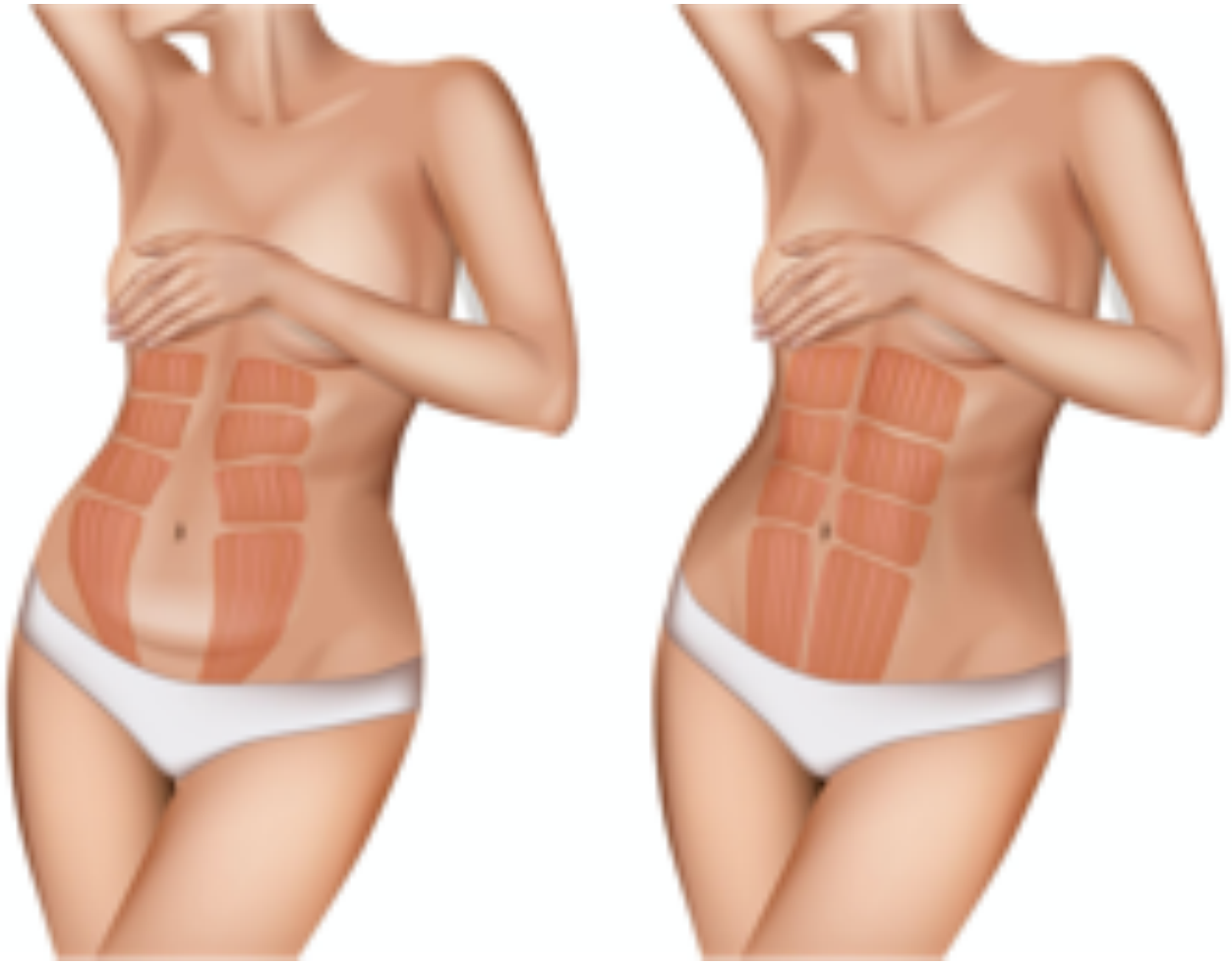
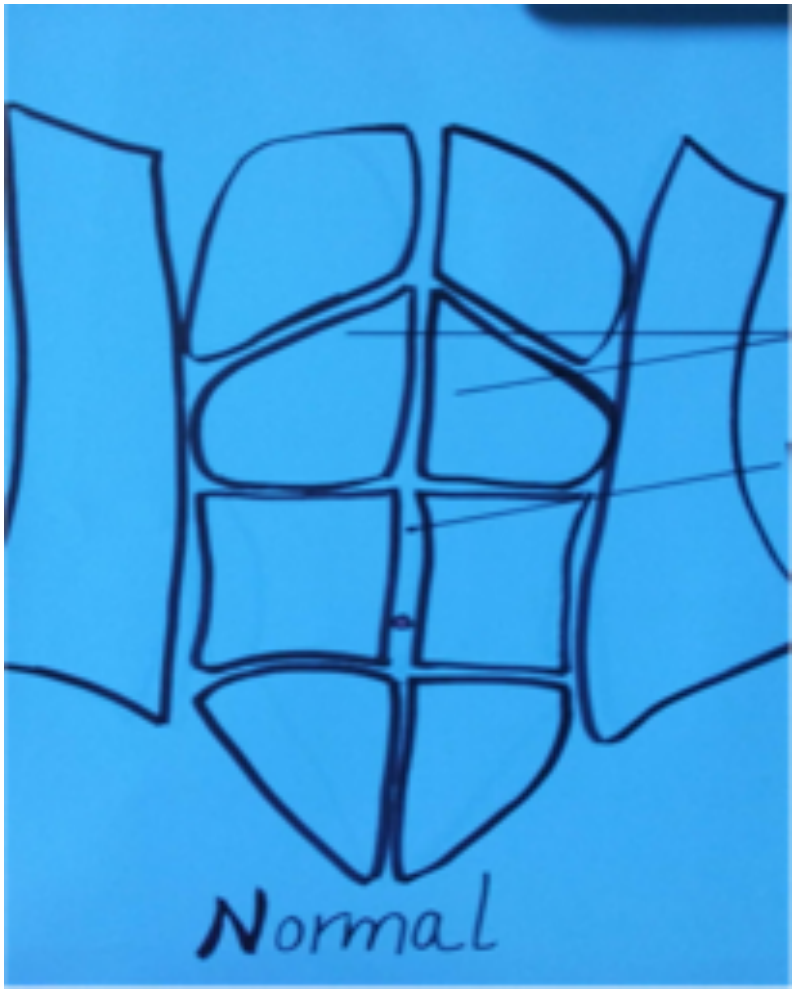


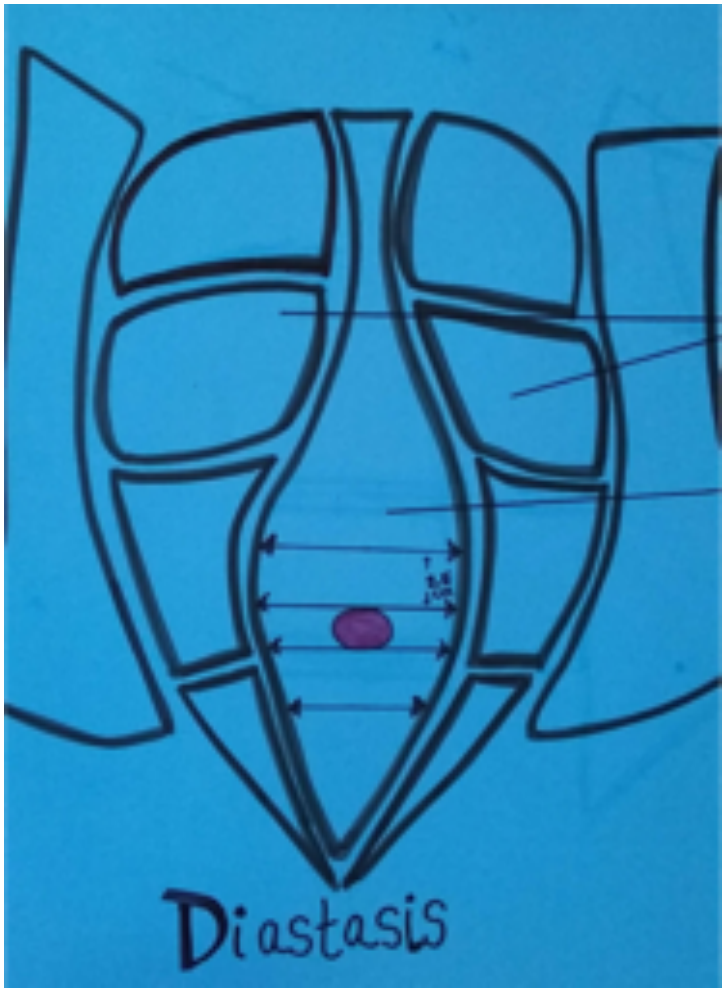
Image: Henry Vandyke Carter, Public domain, via Wikimedia Commons

Diastasis Rectus Abdominis



Diastasis Recti Abdominis





Measurement Tools

Measuring Inter-recti distance (IRD) objectively

- Calipers
- Ultrasound
- Finger width
- Tape measure

Digital Caliper

Clinical Presentation

- Low back pain
- Pelvis pain
- Abdominal pain

These symptoms may be present.

(Coldron 2008, Van de Water 2016, Thabet 2019)

Functional Limitations

- Walking, running, skiing, swimming
- Caring for children
- Lifting
- ADLS
- Any physical activity

3D Motion translates into activities such as reaching, lifting, pushing, pulling, rotation, lifting a child, walking, or running with arm motion. We want motion without losing stability.

We Want Stability and Motion

Strong
Structure

Muscular
Core

Functional
Kinetic chain
3D Motion

Active Lifestyles

Being Active

Opens doors

To opportunities, better health

Better strength to care for our children

And families...

Postpartum Health

Healthy Babies

Healthy Moms

Active Moms

Physical Therapy

We are all Unique

We all have different goals

We desire painfree motion

We desire to **work and play**

Physical Therapy Evaluation

DRA testing

Resting: performed in supine, feet flat. Head and shoulders relaxed. Arms at side. Patient is asked to lift head, and exhale.

Active: supine, feet flat.*Patient lifts head and shoulders reaching hands to knees. * PT palpates medial borders of recti abdomini (RA).

- Cues to relax muscles prior to testing

Observation & Palpation

- Is there bulging/tenting (convex) of abdomen?
- Do you feel a separation between the RA borders, or do the muscles “grab” your finger?
- IRD: How far apart are the borders of the RA?
- LA tension: (tight, firm quality) along the linea alba at rest, or is it soft (saggy, concave)?
- Depth: Do fingers sink in deep (function) (cm?)?
- Is there any pain reported on testing: back, pelvis, or abdomen?
- LA integrity: comparison from “normal,” scale 1-5

Linea Alba Integrity

- Depth and qualitative assessment
- Likert scale (Dufour 2019) 1-5
- Location: superior LA, under xiphoid process (typically intact area): as comparison/benchmark

Perceived LA integrity= importance for stability of the abdominal wall.

Palpation: 1-5, slack/soft- firm/tight(normal), as compared to “normal” limits.

Measurement Sites

Measurements often taken at 3 sites(IRD)

- Umbilicus, above and below the umbilicus
- There is no consensus as to the exact points or distance for obtaining optimal measurements.

Umbilicus ring, 2.5 cm above, 2.5 cm below (Liaw L, Hsu M, et al 2011)

Umbilicus, 4.5 cm above, 4.5 cm below (Boissonnault 1988, Gallagher 2001, Boxer 1997, Chiarello 2005, Litos 2014,Sperstad 2016): measuring sites frequently noted in studies*

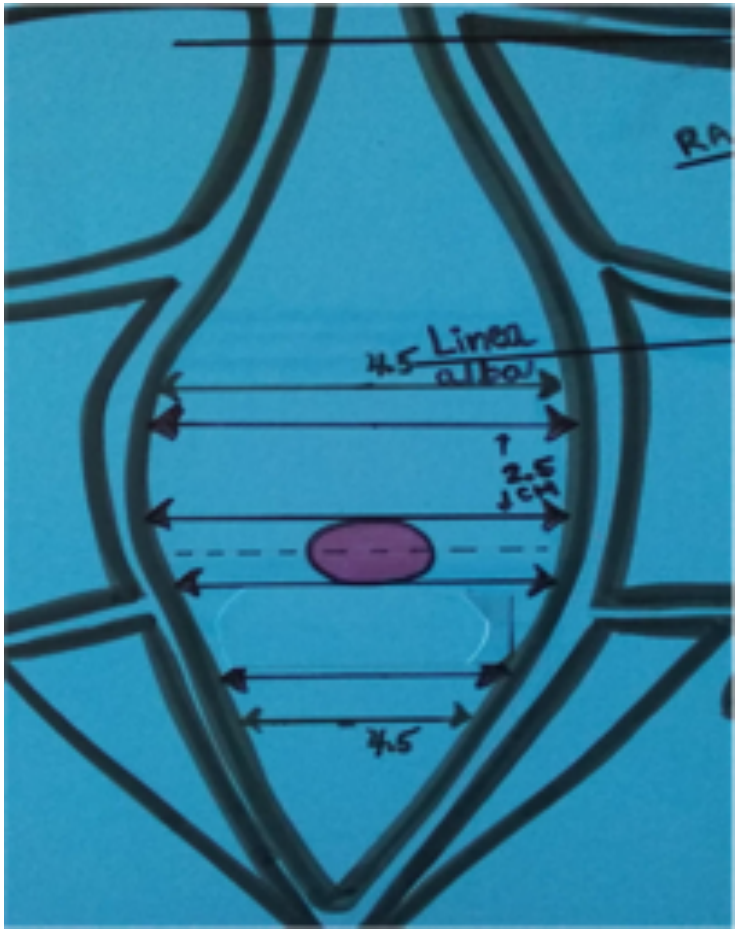
- No standard protocol for assessment

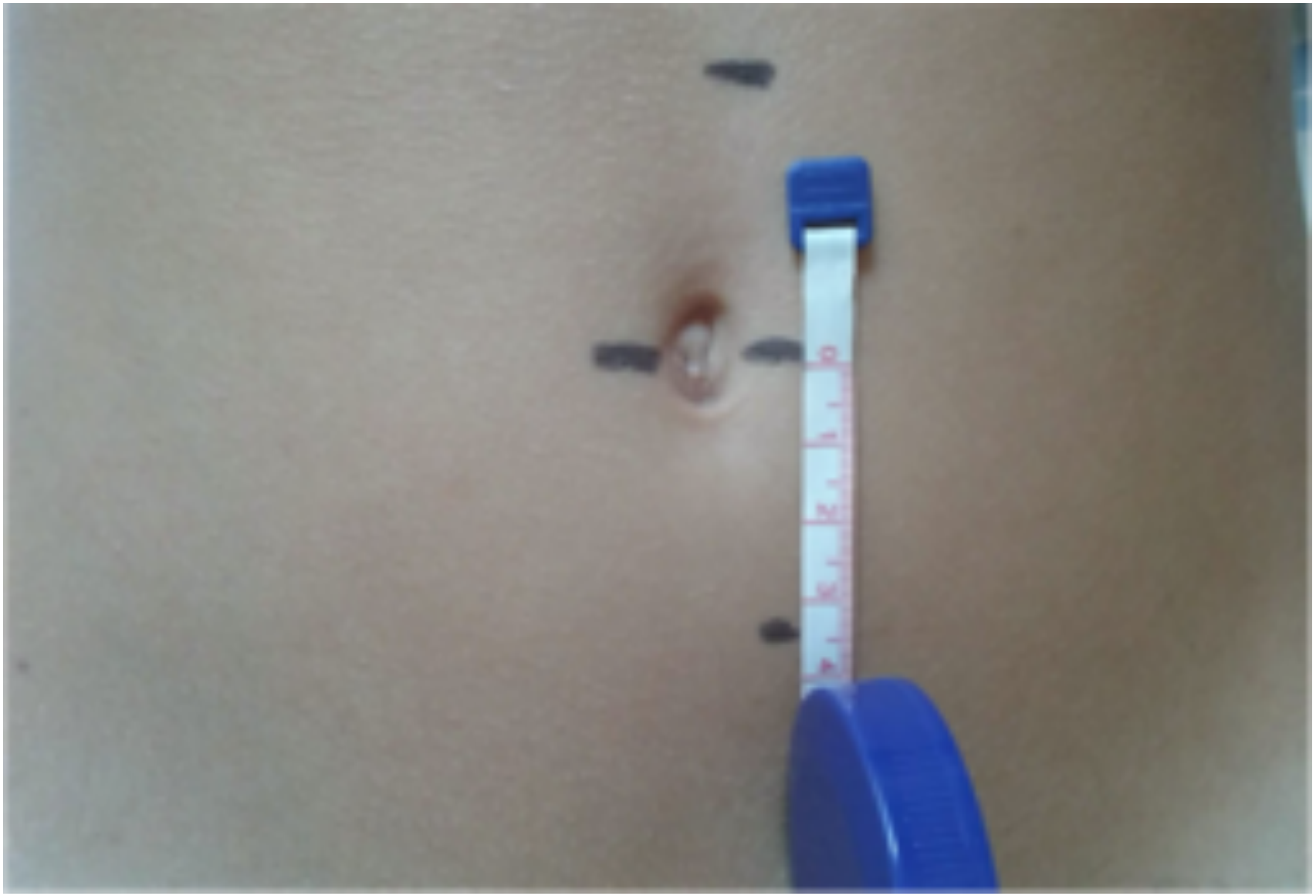
*** Measure at the exact same site each time, to monitor changes.**

Measurement Sites

Vary based on research

A DRA can be present at any one point

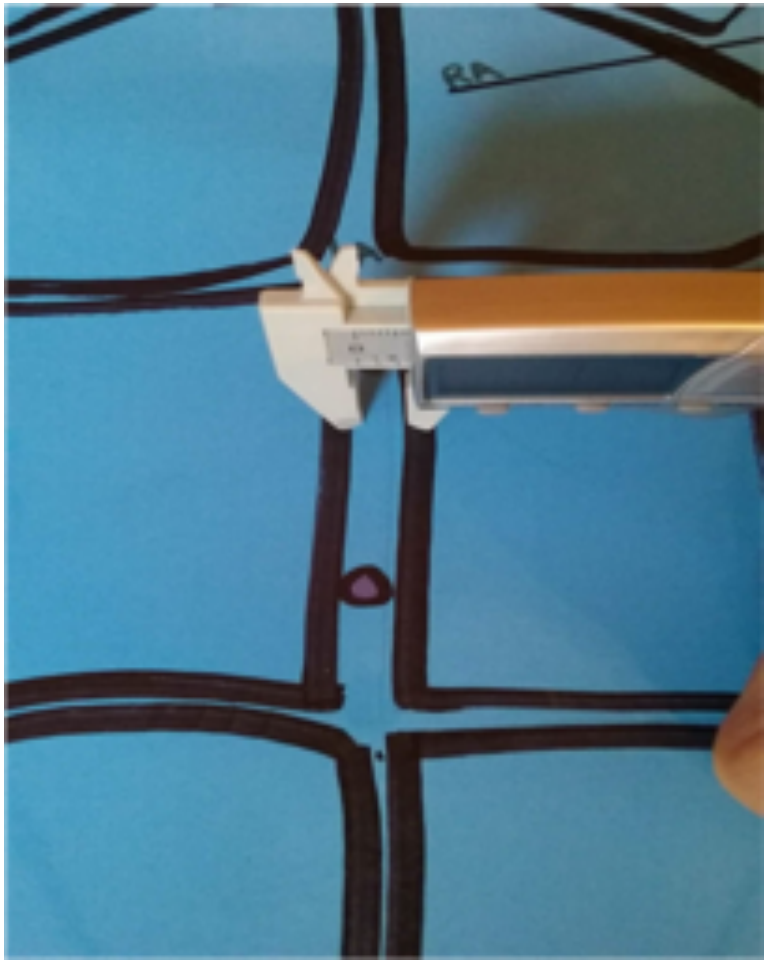




Caliper Testing

Measuring IRD

Jaws of the caliper at medial RA borders

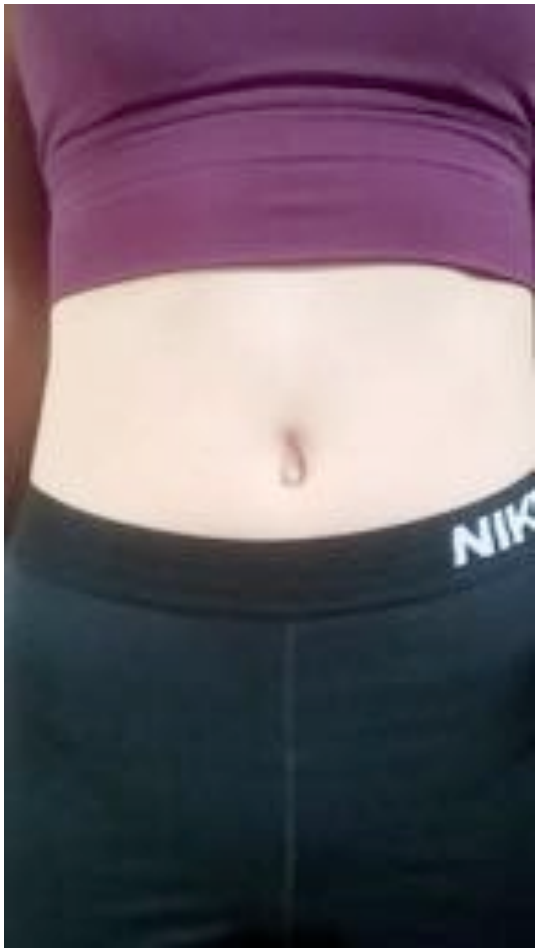


Measuring IRD with the caliper

Jaws of the caliper at medial borders

Palpation & Observation

LA Tension



Diastasis Recti Abdominis

Research varies on inter-recti distance (IRD) :

DRA= 2 cm or > (Keshwani 2015)

DRA = 2 fingerwidths or more (Noble, Dufour 2019)

DRA= 1.5cm or > (Gilleard & Brown 1996)

DRA = 1.6 cm below umbilicus (Mota 2015)

DRA= > 2 cm (Boxer 1997, Blaschak 1988, Chiarello 2013)

Research varies, based on studies **minimally 2cm=DRA**

Criteria for Dx remain unstandardized between studies

Classification of Rectus Diastasis

Ranney

• < 3 cm IRD	= mild diastasis
• 3- 5 cm	= moderate diastasis
• > 5 cm	= severe diastasis

Rectus Abdominis Diastasis

Rath Classification

Level	Age< 24	Age > 24
Above Umbilicus	1.0 cm	1.5 cm
At umbilicus	2.7 cm	2.7 cm
Below umbilicus	.9 cm	1.4 cm

Diastasis Recti Abdominis

- New thinking on DRA: not so much about the size of "the gap" (IRD) but impaired function of the "abdominal wall"
- The function of the abdominal muscles may be more important than the actual IRD
- Goal: Not to simply close the gap, but to restore function of the muscles of the core and pelvic floor, and generate normal tension of the linea alba (LA) to restore normal pain free motion. Q4

Prevalence of DRAs

DRA present in 66% of pregnant women in 3rd trimester

(Boissonnault & Blaschak 1998)

100% incidence of DRA in pregnant women

(Hannaford & Tozer 1985, Mota 2015)

Most postpartum women with some degree of DRA

(Nobel 1995)

DRA is a **common** clinical finding in postpartum women

- can occur in women, men, or infants

(Gitta 2016,Michalska 2018, Thabet 2019, Nahabedian 2018)

Diastasis Recti Prevalence

" Prevalence and risk factors of DRA from late pregnancy to 6 months and relationship with lumbopelvic pain"

84 healthy pregnant women

DRA= 100% prevalence @ 35 weeks

IRD : US testing

Mota et al 2015

DRA Prevalence

- Dx= determined @ 2cm below umbilicus
- DRA = 16mm (1.6 cm) IRD
- Outcomes: 100% DRAs @ 35 weeks gestation to 39% @ 6 months postpartum. DRA may persist in 35-60% of postpartum women.

Mota et al 2015

Physical Therapy Evaluation

Subjective:

*OB history, differential diagnosis

* flags: pain abs, or perineum, heaviness, hernia

* Visual analog scale (VAS): pain

* Nature, behavior, intensity, location of pain

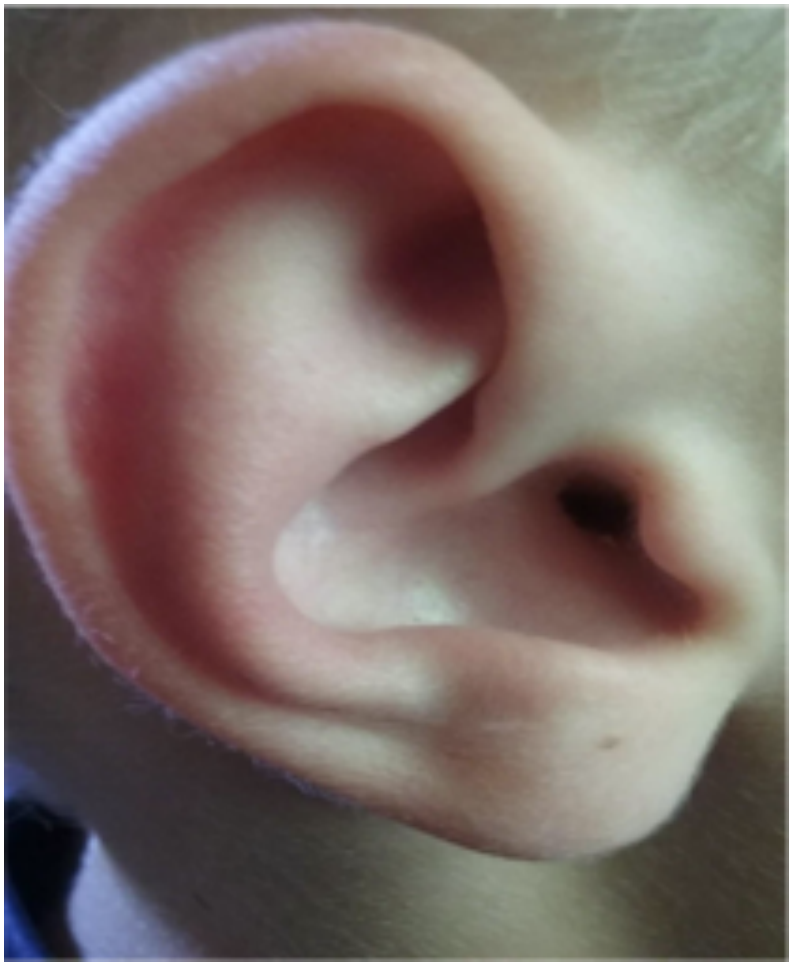
* Functional limitations*

* Previous & present exercise level

*** Patient specific functional scale (PSFS) 0-10**

Subjective: Listening

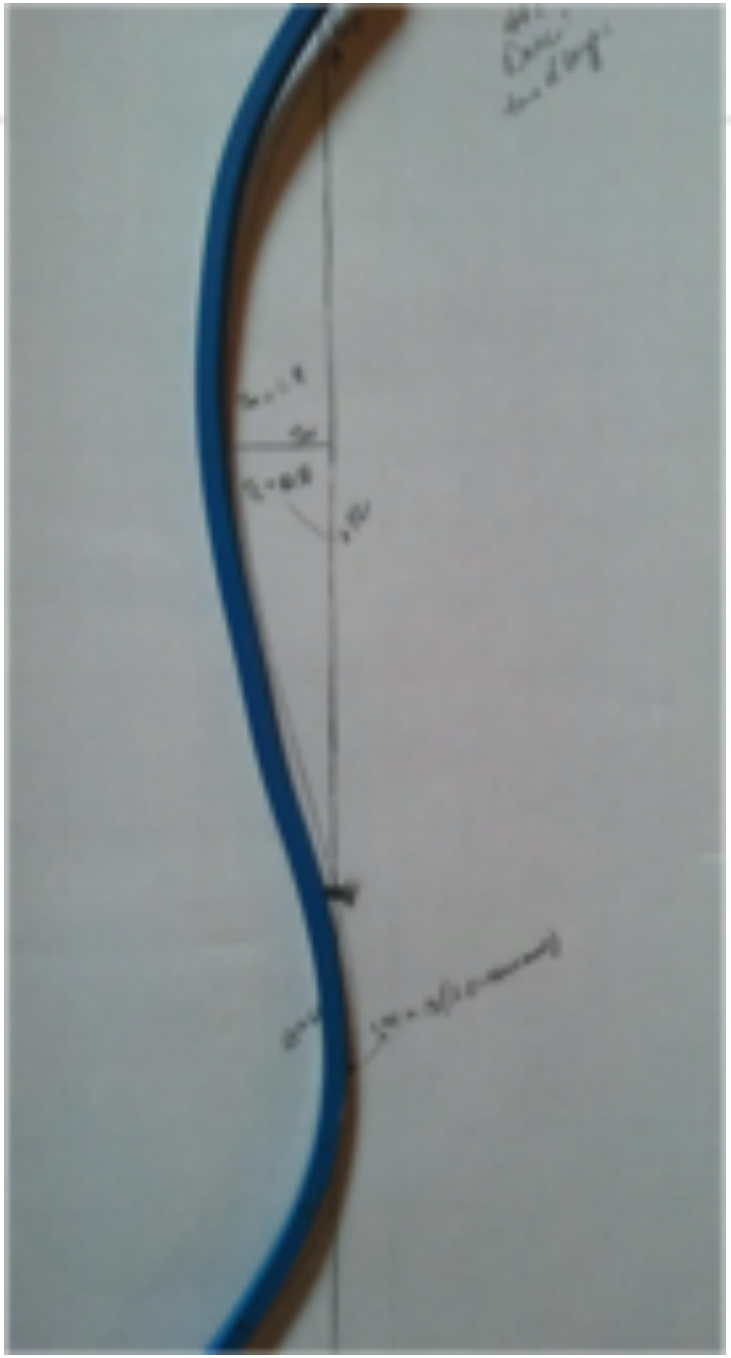
Key



Objective: Individualized exam is important

- DRA testing: IRD check, observation, palpation
- LA integrity: palpation
- Posture screen: Reedco Posture Scale (RPS),Flex Ruler
- SLR testing: passive & active
- MMT
- ROM/Flexibility testing
- Special testing (load transfer, provocation, compression)
- Functional motion screen
- PT DX: Diastasis Recti M62.08 ICD 10 code

Flex Ruler



Active Straight Leg Raise Test

Physical Therapy Intervention

Time to use our critical thinking skill

and elevate the quality of care through

an evidence based approach

- Physical Therapy: 1st line of treatment. (A. Carlstedt 2020)

Primary Goal

- To work as a team with the patient,
  and transform an individual.

- By optimizing movement to improve the
  human condition and experience

Correlates with APTA vision statement

Womens Health Case Study

- 45 year old women
- DRA
- OB history: parity: 4, gravity: 3
- Vaginal deliveries, uncomplicated pregnancies
- Unique study: most recent childbirth 13 years from initial evaluation date

- Lisa J Martin, PT, MPT, CAPP

Clinical Presentation

- Chronic history of LBP
- Nature: intermittent
- Unresolved with previous intervention
- B LBP, L4-5, nonradicular pain, B lower abdominal
- Initial Eval: Pain level: 5/10 VAS, no pain during sleep
- Pain range: at best 1/10, at worst 9/10
- Character of pain: “achy”, “cramping”
- Behavior: no difference am to pm

Patient goals

- To improve tasks such as lifting, perform laundry tasks, and to improve ability to walk further and with less pain.

- The individual's enjoyable form of exercise: walking

Physical Therapy Treatment

PT can reduce a DRA in the postpartum female

- Lumbopelvic stabilization: 1st: local stabilizers
- Retraining of the Core: transversus abdominis*
- Retraining of the multifidus: deep stabilizer
- Training of the pelvic floor: type1,2 fibers
- Postural education: alignment neutral spine
- Biofeedback training: lumbar pressure cuff and myotrac unit: auditory and visual cues
- Application of kinesiotape
- Fit and educate on abdominal binder/belly wrap*

Physical Therapy Treatment

Progressive exercises and education are beneficial

- Lumbar stabilization exercise: local stabilizers, global muscles, muscular sling systems
- Progressive exercise approach, closely monitored
- Education: basics on anatomy, use of imagery
- Education: proper posture/position, breathing
- Education: exercises to avoid*
- Education: TA activation with lifting, motions
- Education: nutrition: water, protein,healthy meals

Transversus Abdominis Muscle

- **Origin:** Lateral third of inguinal ligament, from inner lip of iliac crest
- **Insertion:** in front in a broad aponeurosis
- **Function:** To support & compress the ribs & viscera & provide thoracic & pelvic stability

Transversus Abdominis Muscle

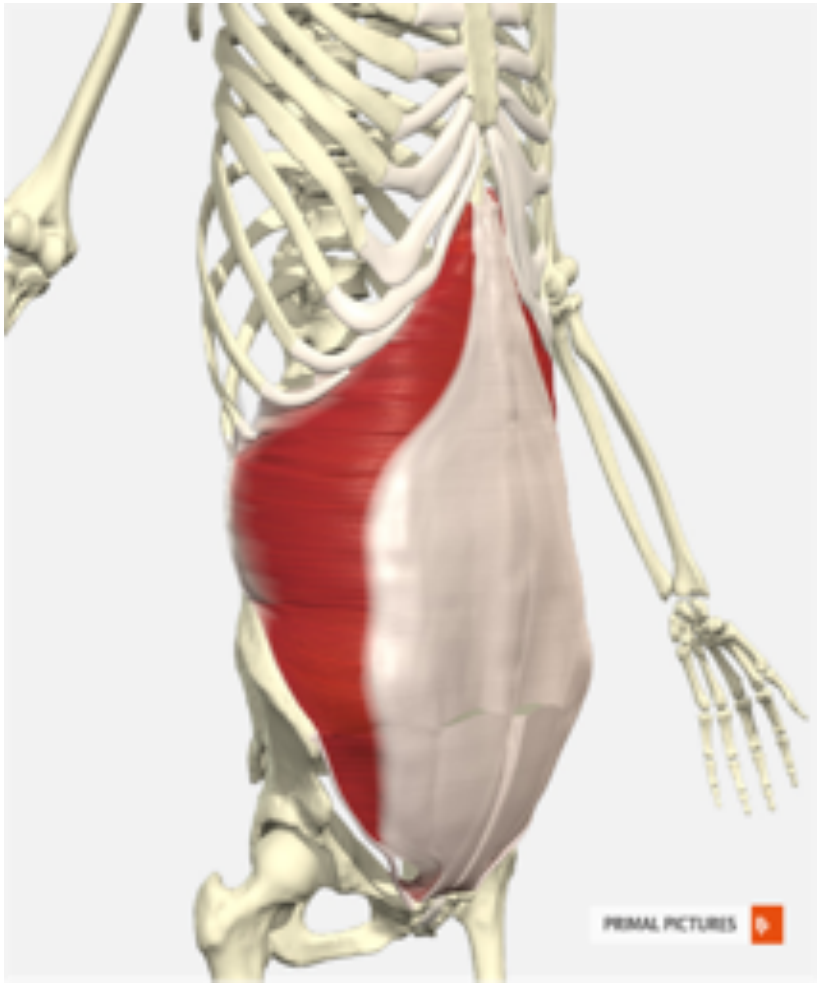
Teach awareness in

Supine

Sitting

Standing

In Function



Transversus Abdominis Activation

Verbal Cues	"Gently pull area below the navel Up and In"
Tactile Cues	Tapping medial from ASIS, with patient palpation on the muscle
Biofeedback	Auditory and Visual Feedback Myotrac unit Computerized software program

Activation of Local Stabilizers

Restore function, improve strength, increase tension at LA

Transversus Abdominis (TA)*	Contraction in neutral spine, flexion bias if needed
TA & Multifidus Cocontraction	Palpation anteriorly & posteriorly
TA & Pelvic floor Cocontraction Generates tension @ LA*	Education, imagery, pelvic wedge, tonic & phasic contractions

Abdominal Approximation

Transversus Abdominis Activation

Kinesiotape	ASIS to ASIS
Kinesiotape	Basket weave technique

Diastasis Recti Taping

Proprioceptive feedback

Indication	RA approximation abdominals engaged
Type of Tape	“I” Strips
Application	Pregnancy or postpartum
Tension	0-25%

Kinesiotape

ASIS to past midline

Kinesiotape

Abdominal Binder

Fit snug
1st 8 wks

Proprio
Feedback
supports
abdominal
“canister”

Physical Therapy Treatment

- Progressive Lumbar Stabilization Exercises

TA & multifidus TA & pelvic floor	TA & LE extension TA & SLRs
TA & hip adduction TA & hip abduction	TA & bicycling LEs
TA & bridging	TA & wall squat
TA & marching LEs	TA & partial squats

Progressive Exercises

- Goals: restore function, improve core strength, & improve tension of the linea alba

TA & Clamshell	TA with hip abduction in sidelie
TA & planks level 1	TA in Quad UE/ LE ext
TA single legged bridge TA bridge hip add/LE ext	TA with forward and lateral lunges Q4

Case Reflection

- 14 Physical Therapy treatment sessions
- + DRA with LBP, function affected
- Treatment: progressive lumbar stab program
- Education, kinesiotape, binder use, biofeedback
- Positive functional outcomes, & decrease in pain
- Decrease in width of IRD @ all 3 points
- Patient report: “90% better” @ 5 months

Summary of Outcomes

- Pain Response

- IE: LBP varies from 1/10 @ best 9/10 @ worst
- @ 5months: 1/10
- @ 6 months: 0/10
- Patient subjective report: “90% better” @ 5months

Digital Caliper Readings

- 3.5 cm above & below umbilicus, & @ umbilicus

Initial Eval	2 cm*	2 cm*	3 cm*
@ 2mos	1.9 cm	1.8 cm	2.8 cm
@ 4 mos	1.1 cm	1.2 cm	1.2 cm
@ 8 mos	.8 cm	.7cm	1.2 cm

Review of Data Based on Research

DRA present, with functional deficits present

2 fingerwidths or> =DRA	Noble, Sperstad 2016
Minimally IRD 2cm=DRA	Nahabedian
Mild DRA above &@ Moderate below	Ranney 1990
DRA above & below	Rath Classification
DRA below	Boxer 1997,Mota 2015, Beer 2009

Patient Specific Functional Scale

- Change in compliance with exercise *

Activity	IE	6 mo	7 mo	9 mo
Lifting	4	7	9	8*
Laundry	3	7	9	8
Walking	5	8	9	9

Case Reflection

- Patient report: goals met
- On initial evaluation patient was walking 2-3x/ week 20-30 min
- @ 5 months she was able to increase her exercise due to decrease in pain, to 30-40 min, 4x/ week
- Average HEP compliance: 4x/ week
- Functional gain: RPS= IE: 78/100 DC:91/100
- Not a healthcare issue that spontaneously resolves

National & International Research

USA

Canada

Sweden

Germany

Spain

Hungary

Portugal

Norway

Poland

Iran

Egypt

Denmark

National and International Research

Physical Therapy Research On Exercise & DRA

Physical Therapy is beneficial & can reduce a DRA

(Keshwani 2019, Tuttle 2018, Sheppard 1996, Mota 2015, A. Carlstedt 2020, Gitta 2016, Thabet 2019,Litos 2014, Deering 2020)

There exists a lack of consensus on which abdominal or pelvic floor exercises to recommend and the best treatment approach for DRA.

Physical Therapy Treatment

Noninvasive Treatment of Postpartum DRA

(Tuttle L 2018)

30 Women, 6-12 weeks postpartum, palpable DRA

Benefits of TA training & intervention with kinesiotape

Outcomes: US measurements, 3 groups

1. Transversus abdominis (TA) training only
2. Kinesiotaping
3. TA exercise & kinesiotaping

Largest changes in IRD measurements: 1 & 3

Successful Treatment of DRA with Exercise

32 y/o female gravida 2, para 2, 7 weeks postpartum

DRA: 11.5 cm IRD @ umbilicus > 9cm vertically

DRA: reduced to 2 cm @ umbilicus

Physical Therapy: 18 sessions, 4 months: progressive exercise program, gains in strength & function.

Litos K 2014

Physical Therapy Reduces IRD in Women Runners

- 13 females: 7 weeks to 2 years postpartum
- 8 week abdominal muscle retraining program
- Physical Therapy: exercise, biofeedback, running analysis with 3D motion capture.

- Results: IRD decreased below the umbilicus, & increase in running speed was noted with core strengthening Deering R 2020

Deep Core Stability Exercises

Deep core stability exercise program in postpartum women with diastasis recti abdominis

- 40 women with DRA
- Ages 23-33, Physical Therapy
- 3-6 months postpartum, vaginal deliveries
- 2 Groups (N=20) Exercise programs 3x/ wk 8 wks
- Caliper use: @ umbilicus, 4.5cm above, 4.5cm below
- DRA= > 2 cm @ one or more points, or a visible midline bulge with exertion
- Physical Functioning Scale= Quality of life

Thabet 2019

Deep Core Strengthening Effective

- Group A (N=20): Deep Core abdominal strengthening:
- abdominal bracing with sheet, pelvic floor contractions, planks, TA isometrics, abdominal exercise program.
- Group B (N=20): Traditional abdominal exercises static abdominal strengthening, pptilts, reverse sit ups, trunk twists, reverse trunk twists
- Both A & B: 3 sets, 20 reps, 5/10 sec hold/relax ratio daily
- Results: Group A: High statistical improvements in IRD & gains in quality of life.

Thabet 2019

Physical Therapy Effective

- Exercise program with focus on TA strengthening
- 33 year old female
- 6 wks postpartum, c-section, active testing: caliper
- IRD: supraumbilicus,5 & 10 cm above, 2.5 & 5 cm below
- LBP, abdominal weakness, DRA
- 3 months PT intervention
- Focus: TA training, progressive exercises, relaxed breathing, avoidance of performing any additional exercise
- Significant decrease in IRD measures at each point

Gitta 2016

Research on Exercise & Abdominal Binder

- Physical Therapy can impact body image & trunk flexion strength with programs targeting trunk muscles & use of an abdominal binder.

  (Keshwani 2019)

- Reflection: PT is beneficial to change a DRA, improve body image and improve trunk flexion
- in the early postpartum period.

Women's Health Physical Therapy Intervention

Physical Therapists who specialize
in women's health can effectively assess
& treat a diastasis rectus abdominis

- Teamwork to advance Medical & Scientific Work
- With gratitude to all the women who take part in research

Lisa

Physical Therapists
Advocates For Health & Fitness

Stronger Moms

Healthier

Children

Building Healthier Stronger Moms

And...Precious Time With a Child

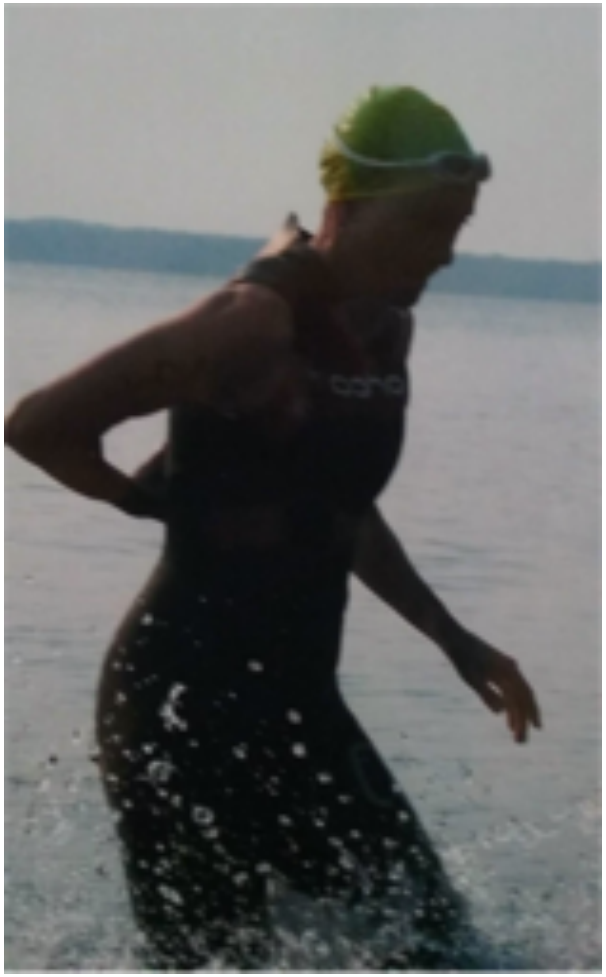
Questions?

Curiosity

Promoting Health & Fitness

In Motion

Dedicated to
the work of
health & healing



References

- Please refer to reference list

Gracias* Danke Schon* Thank You* Merci Beaucoup

“That’s All Folks”

Respect all

Provide quality
excellent care

High standards
with courage
& compassion