Pregnancy & Postpartum

Kelly Dunlap SPT

About Me

- From: Vienna, VA
- Undergrad: Virginia Tech
- Plans after Graduation: TBD
- PT Interests:
  - Peds, Ortho, Pelvic Health

Objectives

- Describe the physiological changes that occur during pregnancy and postpartum
- Understand the additional exam requirements for this specific population
- Understand when to refer to another provider
- Describe exercise considerations during pregnancy and postpartum
- Learn the basics for a Diastasis Recti Abdominis assessment

Outline

- Pregnancy
- Postpartum
- Low back pain (LBP)
- Evaluation
- Treatment/Interventions
- Diastasis Recti Abdominis

Vocabulary[1,37]

- Primiparous = pregnant with 1st child; giving birth for first time
- Multiparous = pregnant with 2nd child or subsequent children; given birth before

Pregnancy

Physiological Changes[2,20,21]

- Skeletal changes
- Hormonal changes
- Postural changes
- Biomechanical changes

Skeletal & Body Weight changes[20,27]

- Increase in mass 10-15 kg or 20-30 lbs
  - Increased body water content
  - Mass of fetus
  - Increased blood volume

- Decrease in bone mineral density
  - Changes detected as early as 8 weeks
  - Greatest changes occur in 3rd trimester and postpartum lactating individuals

Hormonal Changes [3,5,11,27]

Increased levels of relaxin, progesterone, and estrogen:

- **Relaxin** = relaxes ligaments in preparation for delivery; increases mobility of pelvis and peripheral joints; inhibits uterine contractions
  - Peak level in 1st trimester – remains elevated until few days post-delivery
  - Increased pelvic/SIJ and other joint pain
  - Vasodilation and hyperfiltration -> increased urination

- **Progesterone** = relaxes smooth muscle
  - Leads to constipation, GERD, varicose veins, hemorrhoids, genital/perineal swelling

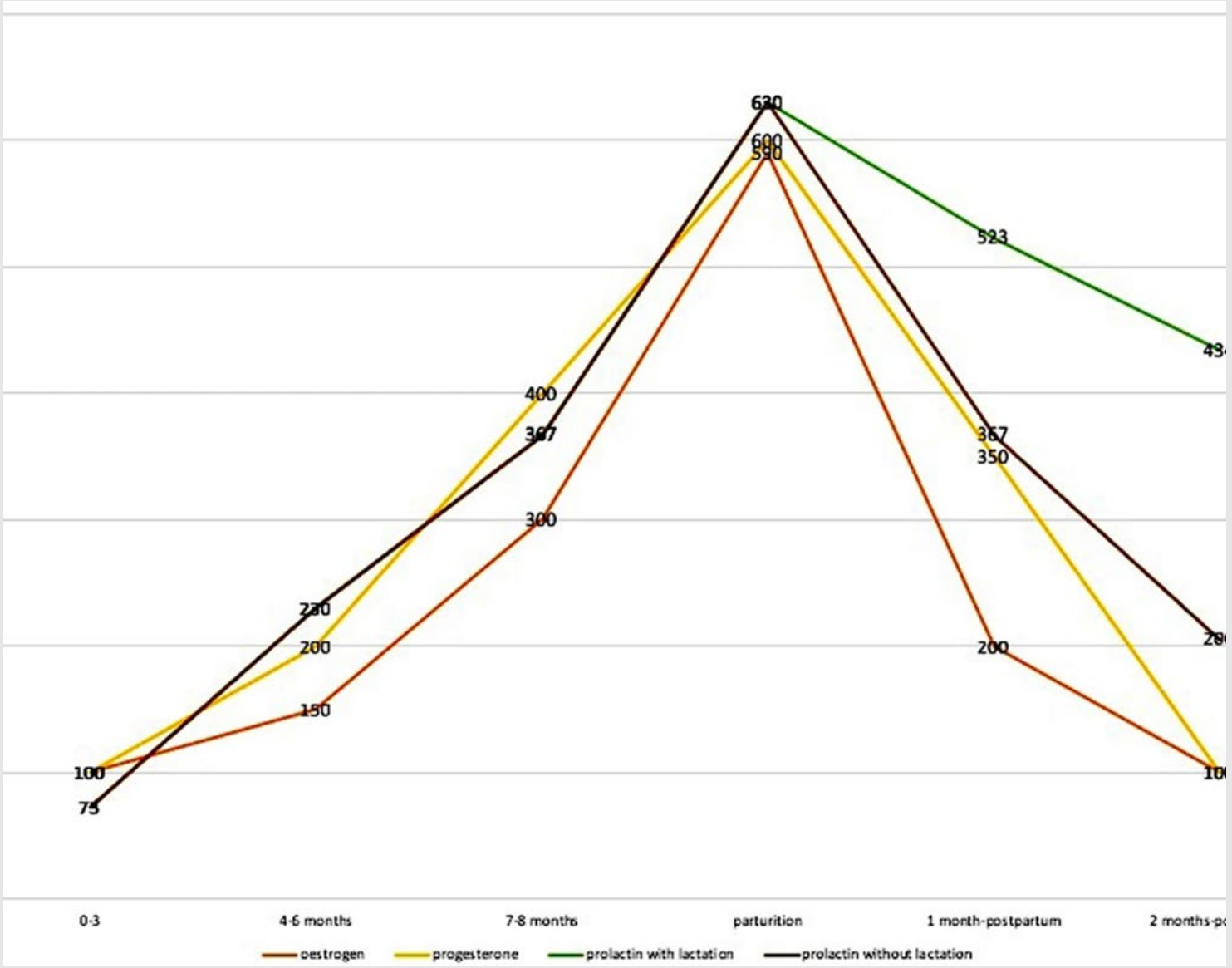
- **Estrogen** = fosters fetal growth
  - Increases size of reproductive structures

Hormonal changes: Impact on PT Care[27]

- Expect to see:
  - Increased motion in joints due to laxity
  - Increased stresses placed on joints due to laxity
  - Complaints of joint pain due to joint laxity

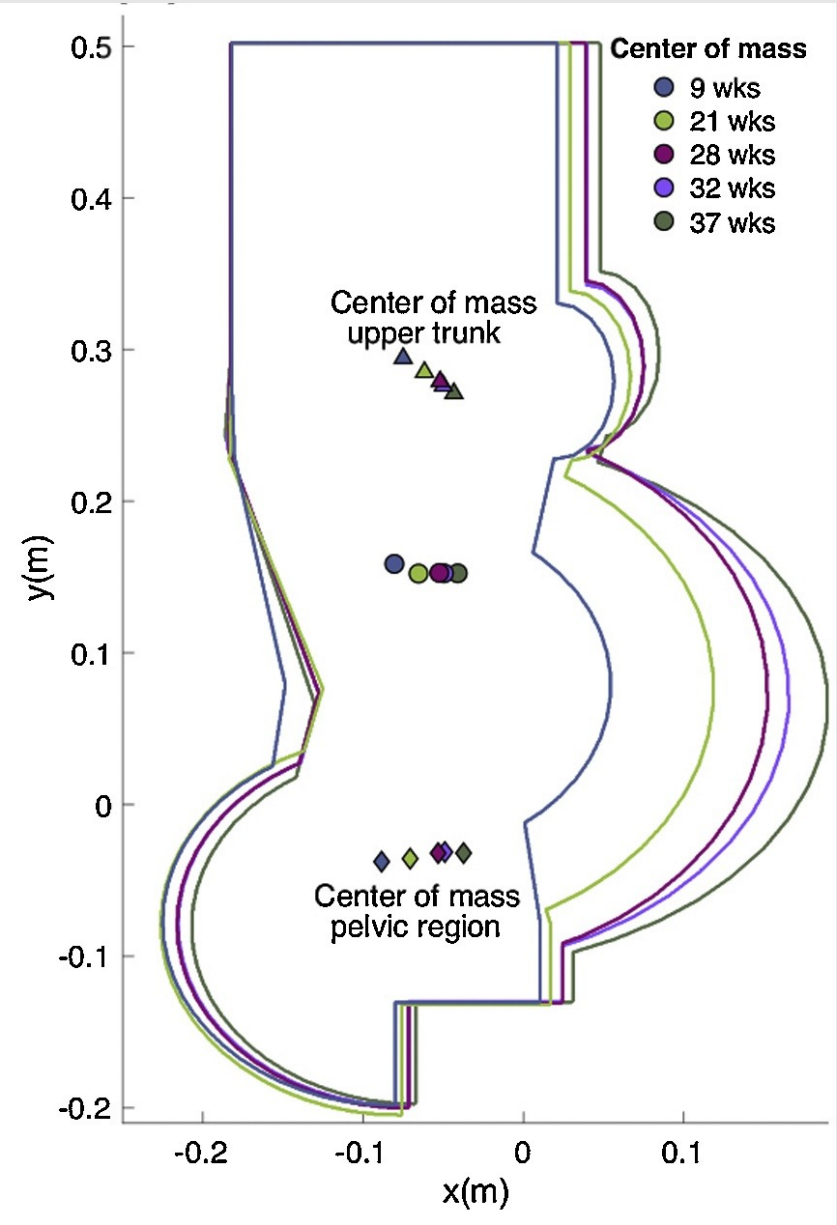
Hormones cont.[25,33]

- Generally Hormones:
  - Increase during pregnancy
  - Decrease during postpartum
- Prolactin remains high in breastfeeding individuals
  - Returns to normal = 2-3 weeks postpartum
- Normalize to pre-pregnancy levels = 3-6 months



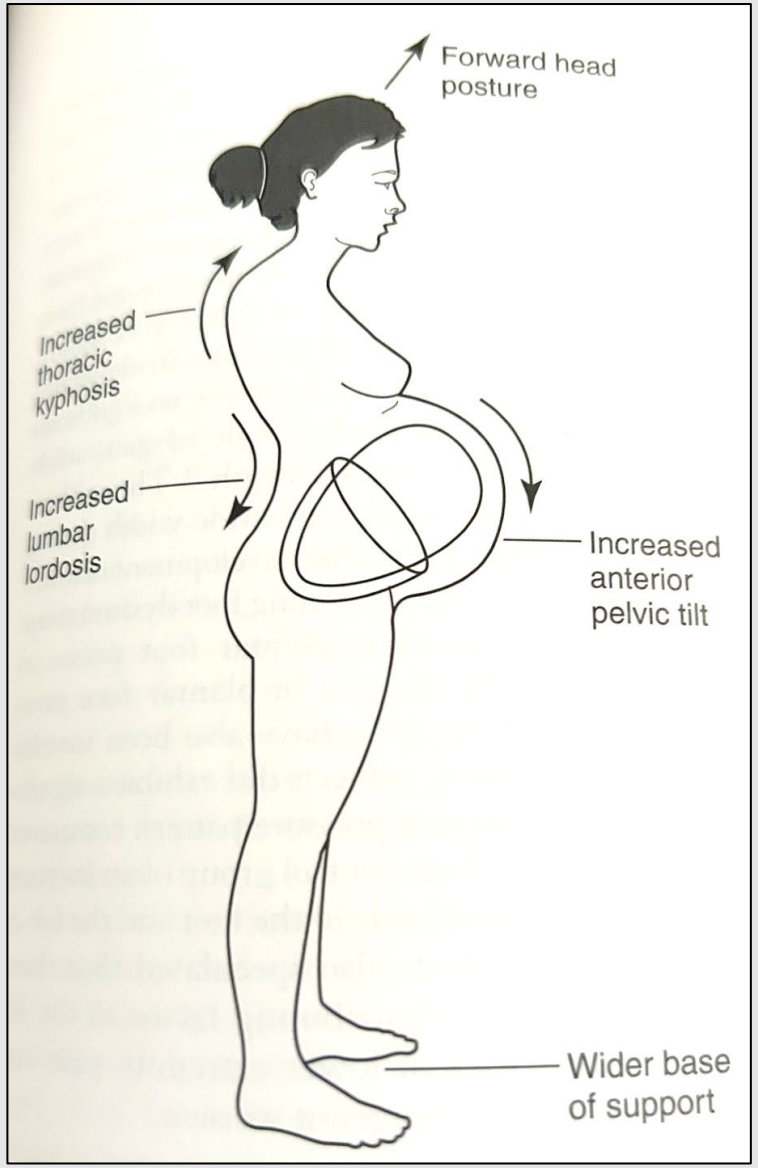
Postural Changes[10,27]

- Contributing factors
  - Change in center of gravity (COG)
  - Weight gain
  - Skeletal changes
  - Ligament and soft tissue laxity



Posture[2,5,21,27]

- Forward head posture
- Increased cervical lordosis
- Increased thoracic kyphosis
- Increase in lumbar lordosis
- Increase in anterior pelvic tilt
- Genu Recurvatum (knee hyperextension)
- Increased foot pronation



Gait Characteristic Changes[5,9,10,27]

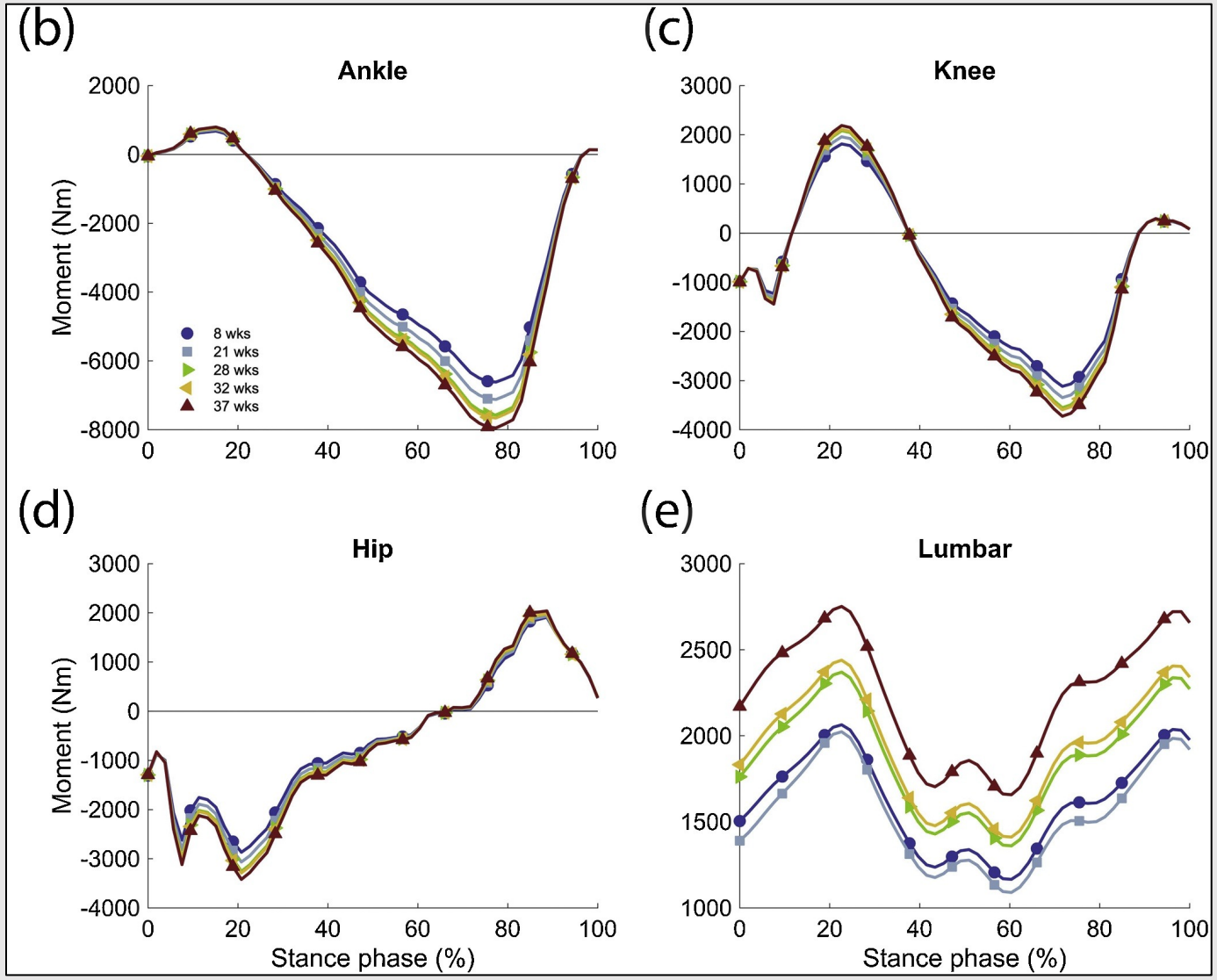
- “Waddling” = increased lateral weight shift over wider base of support
- Increased medial/lateral (M/L) sway
- Shorter steps
- Wider base of support (BOS)
- Increased stance width
- Decreased stride length and rate
- Increased stance time

Biomechanical Gait Changes[5,9,10,27]

- Increased hip flexion
  - Clinically may be decreased hip flexion due to abdomen or difficulty lifting leg
- Increased hip extensor & abductor & plantar flexion moments
  - Will likely need to strengthen
- Increased ankle and knee ROM
- Feet externally rotated
  - Due to increased hip external rotation which is in response to the widening of the pelvis

Phases of Gait[5,9,10]

- Terminal stance
  - Increase in anterior pelvic tilt & hip flexion ROM
  - Increased moments of hip abduction, extension, ankle plantar flexion
- Swing phase
  - Increase knee and ankle ROM to avoid tripping
- Push off
  - Increased net ankle moment



Falls[2,21]

- Incidence: 25-27% during pregnancy
- Highest rate of falls = 7th month
- Complications:
  - Preterm labor
  - Placental abruption
  - Labor induction
  - C-section
  - Fetal distress
  - Hypoxia

Fall risk factors[2]

Extrinsic:

- slick surfaces, clutter, uneven surfaces, poor footwear, hurrying, stairs, carrying items, poor lighting, obstructed view, sedentary life-style, physically demanding jobs

Intrinsic:

- age <30, height >160 cm, advanced pregnancy, unintended pregnancy, multiparity, hyperemesis gravidarum, LBP, gestational diabetes, increased abdomen circumference, ankle stiffness, joint laxity

Physiologic Changes Impacting Falls[2,21]

- Increased interstitial fluid → decreased sensation and coordination
- Decreased sensation → increases reliance on visual input to maintain balance
- Increased anterior/posterior (A/P) postural sway and increased stance width → increased reliance on visual input
- Stress, anxiety, fatigue, depression → decreased readiness for postural perturbations

Fall prevention strategies[2,5]

- Increase BOS in 3rd trimester to improve postural control
- Exercise
  - Be cautious when challenging balance during exercise
- Maternity Support Belts
  - Provide external support to improve stability
- Education

https://www.mayoclinic.org/healthy-lifestyle/pregnancy-week-by-week/in-depth/pregnancy-exercises/art-20546799

Supine Hypotensive Syndrome[22,27]

- Definition: “drop in systolic blood pressure (SBP) of 15-30 mmHG or increase in heart rate (HR) of 20 bpm”
- Cause: compression of Inferior vena cava (IVC) by uterus in supine
- Supine position reduces cardiac output (CO) and blood flow through IVC and abdominal aorta
- Avoid supine positioning late in pregnancy
  - Typically starting in 2nd trimester
- Feeling lightheaded or dizzy in supine → left side-lying

Supine vs Left Sidelying[27]

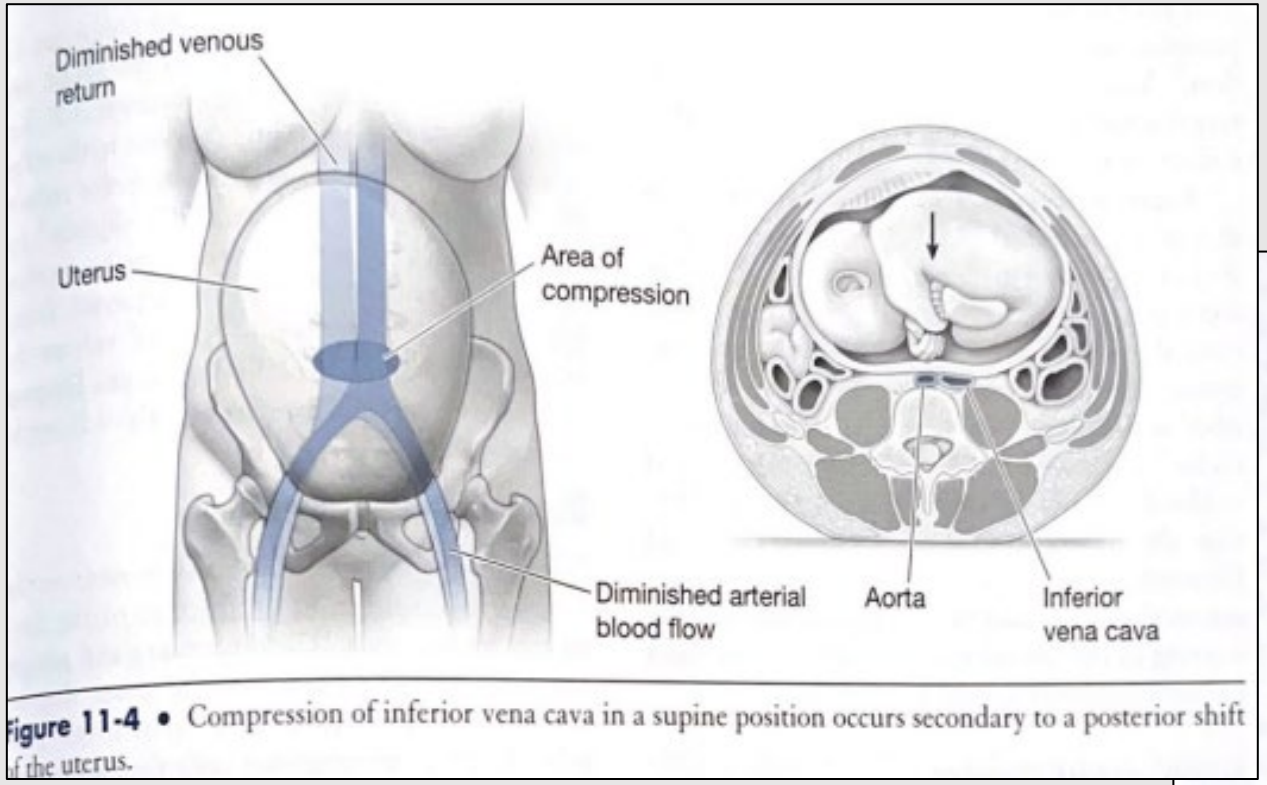


Figure 11-4 • Compression of inferior vena cava in a supine position occurs secondary to a posterior shift of the uterus.

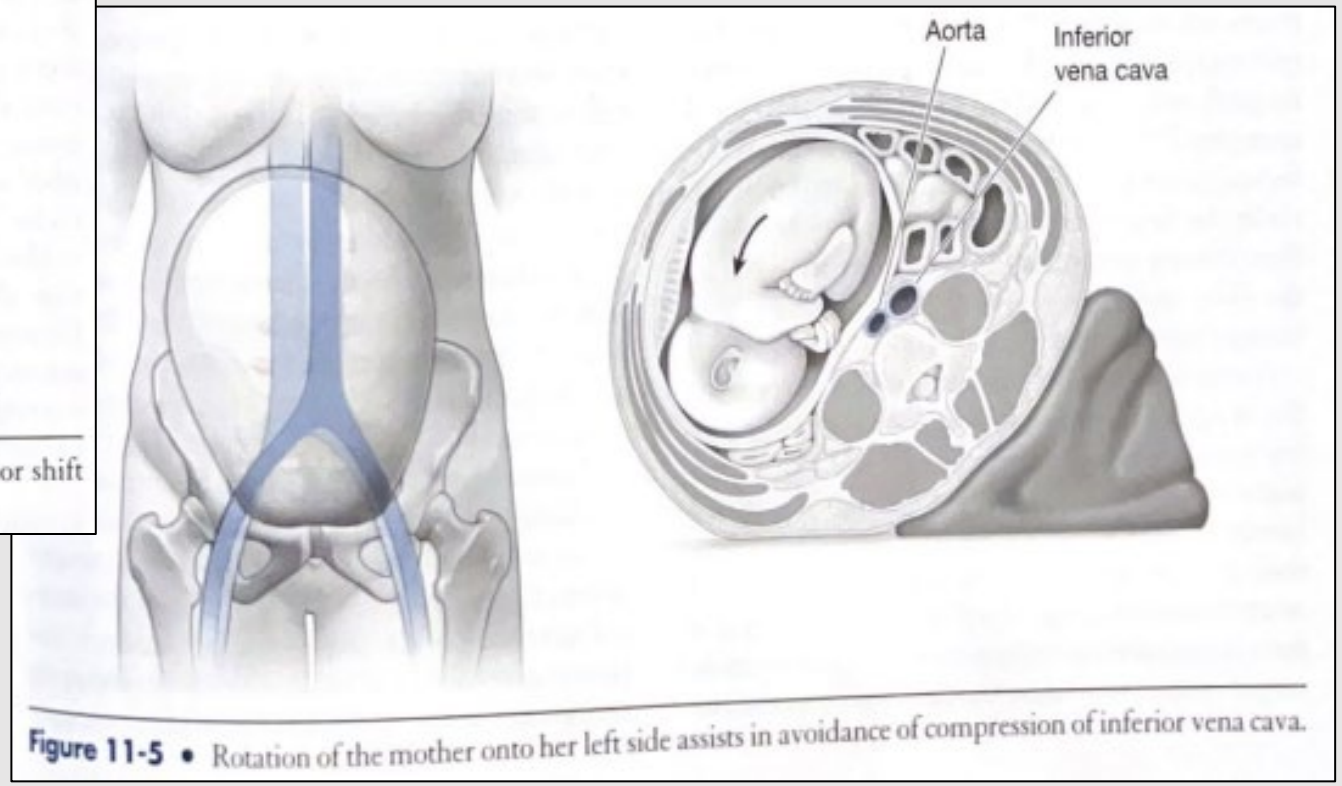


Figure 11-5 • Rotation of the mother onto her left side assists in avoidance of compression of inferior vena cava.

Gestational Diabetes (GDM)[23,24,26,28]

- Definition: diabetes developed during pregnancy and often resolves after pregnancy
- GDM associated with adverse maternal and fetal outcomes
  - Miscarriage, congenital malformation, stillbirth, neonatal death
- Exercise is safe and beneficial
- Recommendations for pregnant women with GDM with no contraindications
  - Brisk 20 min walks/day
  - Moderate intensity exercise for 30 minutes most days
    - Ex. walking 30 minutes after meals

Postpartum

Physiologic Changes[5,14,20]

- Increased thoracic kyphosis up to 8 weeks postpartum
- Decreased postural stability until 6-8 weeks
- BMD loss experienced during pregnancy usually resolves within 6 months postpartum
- Breastfeeding and heparin prolong recovery
- May experience
  - Urinary/fecal Incontinence
  - Sexual dysfunction
  - Fatigue
  - Depression
  - LBP
  - Pelvic girdle pain (PGP)

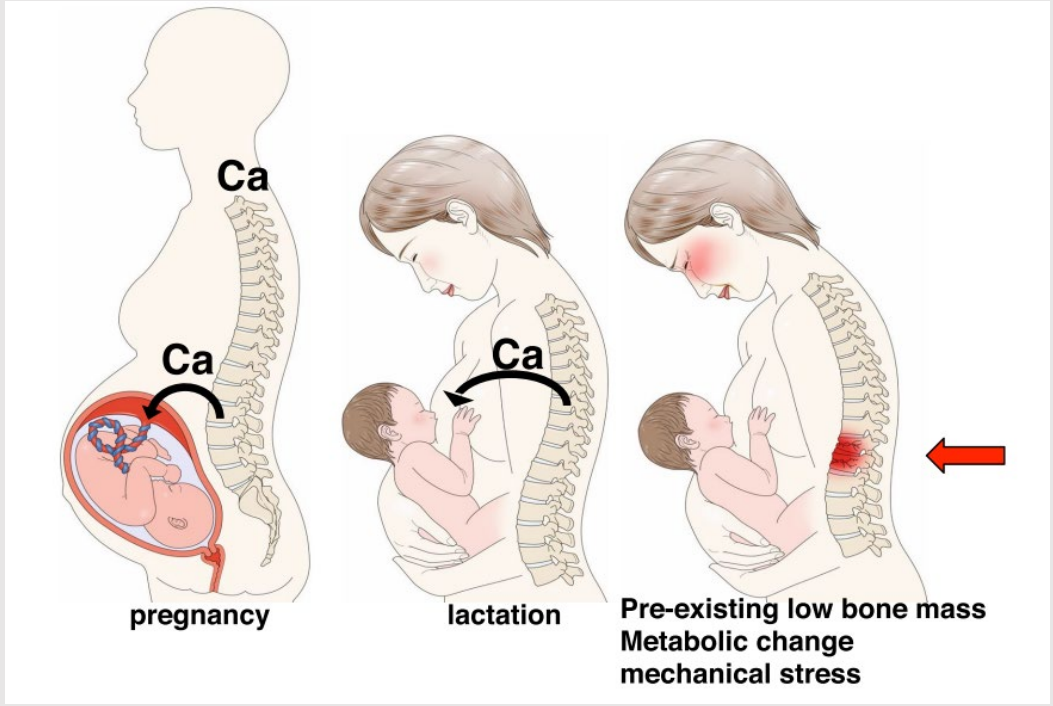
Remaining Gait changes[5]

- Remaining gait changes up to 4 months
  - Increase hip flexion
    - Clinically may be reduced due to abdomen impacting hip flexion and pain from lifting the leg
  - Increase hip extensor & abductor moments
  - Increase stance time, step length, step width

Breastfeeding[12]

- Lactation supplies infant with calcium

- Lactation:
  → Increases parathyroid hormone
    → Increases osteoclast activity
      → Reduction in mother BMD



Postpartum Depression[20]

- Can begin within 4 weeks after delivery
- Significant if depressive symptoms persist
  - Most of the day every day for roughly 2 weeks
- Gold standard for Screening = Edinburgh Postnatal Depression Scale
  - Score of 10 or more -> depressive symptoms present
  - IMMEDIATE referral = positive response to suicidal ideation (item 10)
  - https://med.stanford.edu/content/dam/sm/ppc/documents/DBP/EDPS_text_added.pdf

Low Back Pain

Prevalence of Pregnancy-related Low Back Pain(PLBP)[3,7,8]

- Negative impacts on:
  - Activities of daily living (ADLs)
  - Sleep
  - Social life
  - Sex life
  - Work
  - Mental health

- Roughly 50% of women experience LBP

https://www.shutterstock.com/search/back-pain-pregnancy

LBP[3,5,6,8]

- Unclear etiology; however, these are possible contributing factors
  - Postural changes
  - Muscle fatigue
  - Hormonal changes
  - Abnormal loads placed through the lumbar spine due to postural changes
  - Increased mass leading to musculoskeletal (MSK) imbalances

Difference between PGP and PLBP[21]

- Pelvic girdle pain (PGP) = “located under the PSIS, in gluteal area, the posterior thigh, and groin (over pubic symphysis)”

- Pregnancy-related Low Back Pain (PLBP) = lumbar region above sacrum

Evaluation

Pelvic Health PSA[14]

- Pelvic health and abdominal health concerns are personal
- Difficult to discuss
- May be associated with social stigma, embarrassment, and shame

Specific Subjective Q's[20]

Pregnancy:

- How far along are you?
- Is this your first pregnancy?
- Are you carrying more than one fetus?
- Recent falls?
- Current physical activity level?
- Currently using maternity support devices?
- Prenatal care?

Postpartum:

- Did you have a vaginal delivery or c-section?
- Were there any complications with the birth?
- Is this your first birth?
- Are you experiencing urinary or fecal incontinence?
- Postpartum mood?
- Breastfeeding positions?
- Lactation status?

Objective[20]

Pregnancy & Postpartum:

- AROM
- PROM
- Strength
- Sensation
- Balance
- Posture
- Gait
- Hip, L/S, and Abdominal assessment

When to Refer[20]

- Reported urinary/fecal incontinence→ [redacted]
- Reported sexual dysfunction→ [redacted]
- Reported internal pelvic pain→ [redacted]
- Plateau in progress hip/pelvic girdle/lumbar/SIJ pain
  - [redacted]
- Depressive symptoms→ [redacted]
- Rule out stress fracture w/in first 2 weeks postpartum→ [redacted]
  - c/o: “severe pain; decreased or inability to weight bear; antalgic gait or limp; sudden onset of pain located at SIJ, buttocks, low back, or PS; or pain relieved with lying down”

Outcome Measures[21]

- Validated in pregnancy population:
  - Oswestry Disability Index (ODI)
  - Fear-Avoidance Beliefs Questionnaire-Physical Activity subscale (FABQ-PA)

- Dynamic balance test options:
  - Gait speed
  - Short Physical Performance Battery (SPPB)
  - Functional Reach test

Treatment/Interventions

LBP Interventions[3,7]

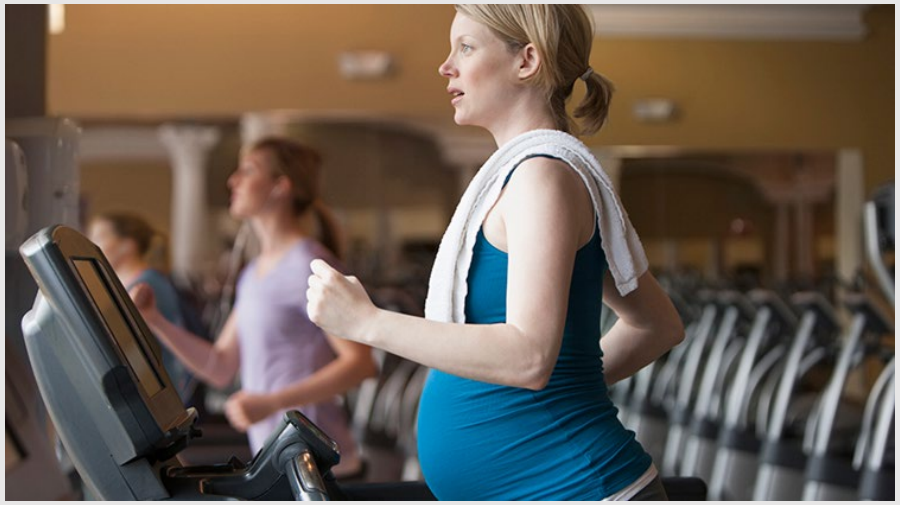
- Gold standard:
  - Physiotherapy
  - Stabilization belts
  - Meds
  - Acupuncture
  - Massage therapy
  - Rest
  - Yoga

- Benefits of Exercise:
  - Reduces pain
  - Prevent gestational diabetes, GH, PE
  - Improved QoL, depression, anxiety

https://www.aptapelvichealth.org/events/free-webinar--the-dos-and-donts-of-exercise-during-pregnancy

Exercise Prescription during Pregnancy[7]

- 150-300 min/week, preferable >3 days of at least 20-30 min sessions
- Progress gradually
- Exercise intensity tailored to the individual's prior fitness level
- Clear with MD that there are no medical reasons to avoid or modify exercise prescription



https://www.choosept.com/podcast/benefits-of-aerobic-exercise-during-pregnancy-newb

Exercise during Pregnancy[7,13,21,27,34]

- Safe activities
  - Walking, stationary cycling, aerobic dancing, resistance exercise (bands, bodyweight, light-weight), stretching exercises, swimming, water aerobics, yoga
  - Continue with normal activities
- Avoid
  - Contact sports
  - Supine positioning after 1st trimester
  - Prolonged static standing
  - Activities with high fall risk (ex. outdoor bike riding)
  - Increasing core temperature of 1.5 degrees Celsius during first 45-60 days of gestation
  - Prone position after 12-16 weeks of pregnancy
  - End range stretching aka hyperextension of joints (because of the increased ligamentous laxity)
  - Pointing toes during a stretch can cause calf cramping
  - Avoid bouncing/forcing a stretch

Pregnancy Exercise: Absolute Contraindications[7,21,35]

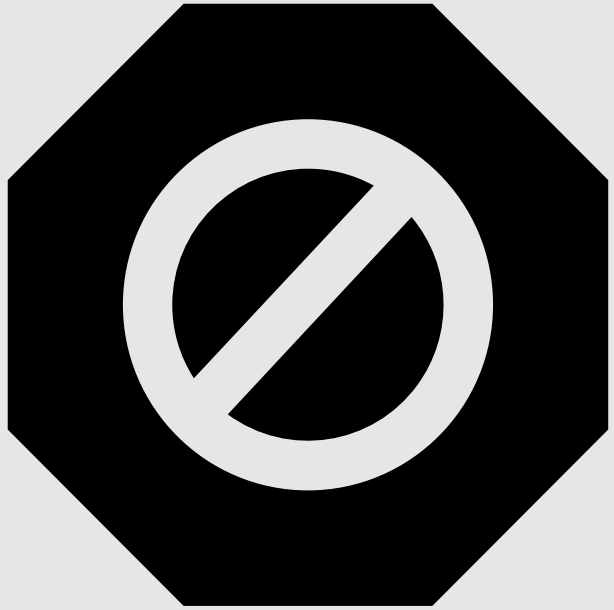
- Ruptured membrane
- Premature labor
- Unexplained persistent vaginal bleeding 2nd or 3rd trimester
- Placenta previa after 26 weeks
- Pulmonary Embolism (PE)
- Incompetent cervix
- Intrauterine growth restriction
- High order multiple pregnancies (triplets)
- Uncontrolled type 1 diabetes
- Uncontrolled hypertension
- Uncontrolled thyroid disease
- Serious cardiovascular, respiratory, or systemic disorders
- Preeclampsia/pregnancy-induced hypertension

Pregnancy Exercise: Relative Contraindications[7,21]

- Recurrent pregnancy loss
- History of spontaneous PTB
- Twin pregnancy after 28 weeks
- Gestational Hypertension or mild/moderate cardiovascular or respiratory disease
- Symptomatic anemia
- Malnutrition
- Uncontrolled hypertension
- Seizure disorder
- Hyperthyroidism
- Eating disorders
- Other significant medical conditions
- Severe anemia
- Unevaluated maternal cardiac arrhythmia
- Chronic bronchitis
- Poorly controlled type 1 diabetes
- Extreme morbid obesity or extreme underweight

When to STOP Exercise during Pregnancy[7,21]

- Vaginal bleeding
- Abdominal pain
- Regular uterine contractions
- Amniotic fluid leakage
- Persistent excessive SOB
- Headache
- Severe chest pain
- Muscle weakness
- Calf pain
- Dizziness or faint
- Decreased fetal movement



Prenatal exercise[8]

- Not preventive for LBP during pregnancy or postpartum
- Decreases pain severity of LBP during pregnancy

Exercise Postpartum[14,20,36]

- Return to activity antepartum activity = 6 weeks postpartum
- May take up to 12 months to return to pre-pregnancy state
- Some may experience difficulty returning to activity
  - Physical discomfort/pain
  - Social isolation
  - Financial barrier
  - Difficulty prioritizing exercise
  - Low energy levels
  - Depressive symptoms

- Proposed Return to Activity Postpartum Protocol on next slide

Stage	Goals	Example Criterion
First Trimester	• Discuss musculoskeletal changes • Discuss physiological changes associated with pregnancy • Introduce transverse abdominis control in association with proper diaphragmatic breathing • Instruction in Rate of Perceived Exertion (RPE) • Establish guidelines and develop exercise prescription • Discuss warning signs and contraindications for exercise during pregnancy	• Medical clearance for exercise • Independence in RPE ratings • Ability to appropriately contract and relax transverse abdominis without breath holding
Second Trimester	• Encourage safe exercise and mobility • Develop postural strength and endurance • Review warning signs and contraindications for exercise during pregnancy	• Medical clearance for exercise • Awareness and independence of appropriate standing and sitting postures
Third Trimester	• Improve coordination in relaxation of the pelvic floor musculature to allow for delivery while maintaining adequate facilitation for continence • Continue focus on postural strength and endurance • Education regarding potential birth positions as desired	• Medical clearance for exercise • Ability to contract and relax pelvic floor musculature without breath holding • Awareness of options regarding birthing positions both with and without epidural intervention
Postpartum Weeks 0-2	• Encourage safe and appropriate movement to facilitate healing • Limit subjective pain levels associated with the expected decrease in activity after delivery • Instruct and incorporate proper body mechanics for handling of newborn	• Anterior/posterior pelvic tilting to assist with postural restoration • Appropriate performance of diaphragmatic breath • Light standing open kinematic chain (OKC) movements to mimic walking
Postpartum Weeks 3-4	• Slowly improve coordination with pelvic floor and transverse abdominis musculature in association with proper diaphragmatic breathing • Initiate a short duration (<15 minutes) walking program with frequency increasing as desired with increasing frequency and duration as tolerated	• Transversus abdominis sets – 20x5s holds in supine, side-lying, and quadruped • Bridges – double leg 30x5s • 10 minutes of asymptomatic walking • Pelvic floor contract/relax – short holds (<5s)
Postpartum Weeks 5-6	• Increase walking program duration (<30 minutes) so long as symptoms are not noted during or after performance • Incorporate functional movements required of the athlete for activities of daily living	• Muscular endurance tasks i.e. repetitions of 15-30 with weights <10 lbs (baby can often be used as “weight” for functional performance) • Pelvic floor contract/relax – long holds (10s)

Maternity Support Garments[6,30,31,32]

- Types: panties/briefs, belts or girdles, cradle, torso support
  - Serola SIJ belt -> SIJ/pelvic girdle pain
  - Belly Bandit = good abdominal support
- Selection based on individual needs, comfort, and garment structure
- Safe, low-cost, accessible

Maternity Support Garments cont.[6]

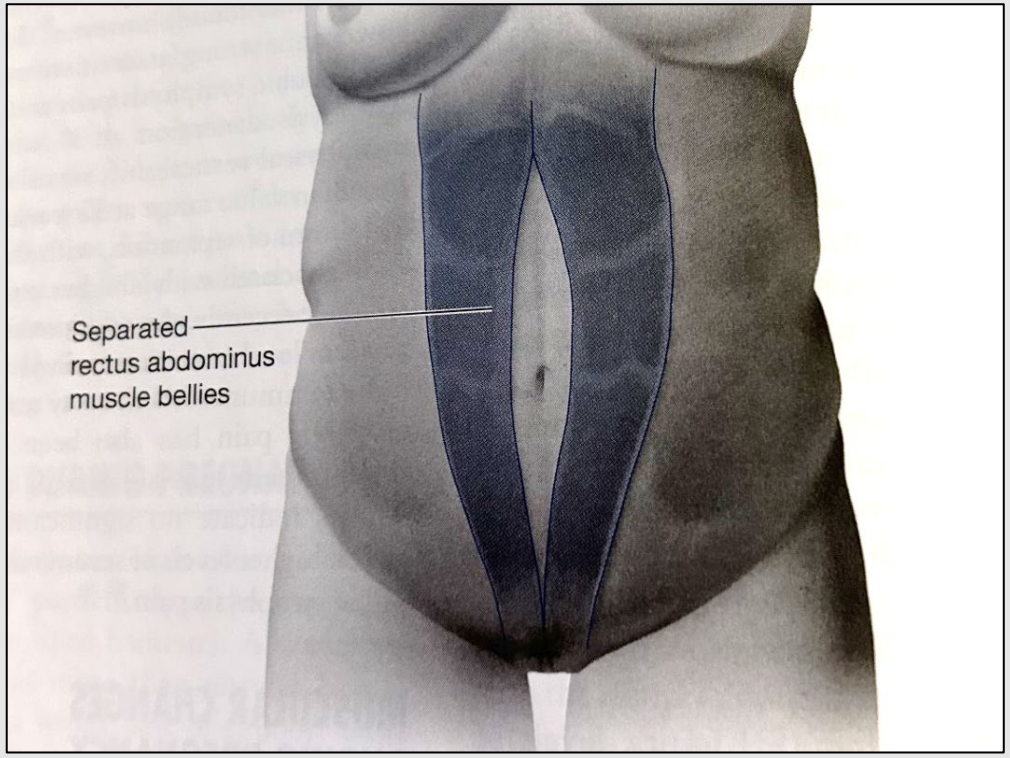
Potential beneficial effects:

- Compression
- Improved proprioception
- Limit spinal motion
- Stabilization of L/S and/or pelvis
- Decrease loading
- Stimulate the action of muscles
- Pain reduction
- Improved mobility
- Falls reduction

Diastasis Recti Abdominis

Diastasis Recti Abdominis (DRA)[14,15,16,17,18,21,27]

- **Definition:** Separation of rectus abdominis along linea alba; absence of hernia sac
- **Prevalence:** 60% at 6 weeks postpartum
- **Incidence:** 66% in 3rd trimester
- **Risk factors:**
  - Number of pregnancies
  - BMI
  - Diabetes
  - Cesarean section
  - Carrying larger baby



DRA cont.[15,16,17,18,27]

- Unknown etiology
- Physiologic Changes
  - Increased stress placed on linea alba due to growth of abdomen
  - 38 weeks gestation -> 115% increase in abdominal muscle length
  - Rectus abdominis fibers more transversely oriented below umbilicus→ resist tensile stress
  - Most common = at the umbilicus or above the umbilicus

- Significant separation→
  - core instability, LBP, pelvic floor disorders, constipation

DRA cont.[14,18]

- Recovery:
  - Most women spontaneously recover after childbirth
  - ½ of women with DRA recover 6 months postpartum
  - Greatest recovery within first 2 months postpartum

DRA Assessment[15,16,20]

Measuring inter-recti distance (IRD)

- Via ultrasound, caliper, or palpation
- Ultrasound, CT or MRI = most accurate
- No diagnostic cut-off point
- 2cm (~2 finger widths) or greater separation = clinically significant

Finger Width Method[14,17]

- Most common method
- Position: supine, cue to engage core via partial sit-up (head and shoulder clear table)
- 2 finger widths = significant

https://www.youtube.com/watch?v=mHY6CSSosNE

Interventions Ideas[14,15]

- Exercise
  - Ex. TRA and PFM exercises
- Manual therapy
- Biofeedback
- Taping
- Binding
- Therapeutic modalities
- Avoid activities that promote coning

DRA and Exercise[14]

- Inconclusive evidence for best exercise for DRA treatment
- Abdominal exercises more effective than no exercise in IRD reduction

https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.apta.org%2Ffor-educators%2Fcurriculum-resources%2Fpelvic-health&psig=AOvVaw10VwdkNqEMMr3v_OfUeQCJ&ust=1706126950622000&source=images&cd=vfe&opi=89978449&ved=0CBUQjhxqFwoTCPC65ryo9IMDFQAAAAAdAAAAABAD

Questions?

kelly_dunlap@med.unc.edu

Feedback Form:

https://qualtricsxmsr97m575q.qualtrics.com/jfe/form/SV_eV6nCUXViVPrJPg

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