

Return to Activity in Postpartum: Factors for the Physical Health Professional to Consider

What is the current practice for women to return to activity postpartum?

- Typical recommendations include starting kegels and diaphragmatic breathing 1-2 weeks after delivery
- Limit physical activity to light walks as tolerated for the first 4 weeks after giving birth and cleared to discontinue this at the routine 4-6 week postpartum check-up with a OB/GYN
- Advised to minimize heavy lifting (more than a milk jug or heavier than your baby) for the first 4-6 weeks after a cesarean section to decrease risk of hernia
- *Information provided by Sonya Williams, MD

How can we work together to provide more support for this population?

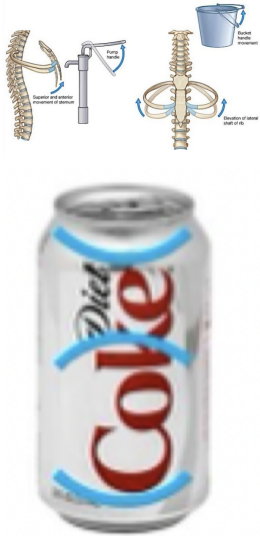
- Return to sport or high level activity is predominantly researched and considered for the male population.¹ Women returning to sport or high level activity postpartum is a relatively new occurrence.¹ Postpartum women face unique challenges when returning to high levels of activity including greater risk of pelvic floor dysfunction, breathing changes, postural changes, abdominal wall dysfunction, and fracture risk.¹ Up to 80% of women report lower activity levels at 3 months postpartum compared to their first trimester.² This could be due to a variety of reasons, indicating the need for a proactive, multidisciplinary approach to provide appropriate support for this population.¹

What is your role in supporting this population?

- Understand common musculoskeletal changes and new demands on the body during/after pregnancy
 - Breathing, postural changes, hip strength and mobility, diastasis abdominis rectus, new physical demands on the body
 - *common changes and factors chosen after consultation with Smith Christenbury, PT, DPT and Jennifer Harrington, PT, DPT, WCS, CLT
- Understand how these changes could affect a postpartum person's return to activity
- Understand exercise intervention for these changes
- Consideration of other impacting factors
- Understand when to refer to a Pelvic Health Specialist

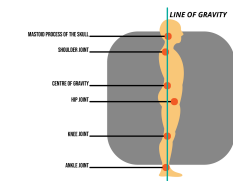
Breathing Changes- Importance for Pelvic Floor Muscle Function and Stability (Table 1)

Author(s)	What it is	Prevalence	How this affects return to activity	How to assess	Exercises/Modifications/Cueing
<p>Magee (2008)³ Massery (2013)⁴ LoMauro (2019)⁵ Hodges (2007)⁶ Smith (2006)⁷ Hagen (2014)⁸</p>	<p>3 main components: Abdominal wall movement Rib expansion Chest movement (passive exhale, active inhale)³</p> <p>Ribs move in a bucket and pump handle orientation.</p> <p>Pressure modulation involves: Laryngeal muscles Diaphragm PFM Intercostal muscles⁴</p> <p>Eccentric relaxation of PFM during inhalation with concentric contraction during exhalation⁴</p> <p>With pregnancy, reduced ribcage expansion noted</p>		<p>Poor breathing mechanics can be a cause of lumbopelvic pain more than inactivity and obesity^{3,7} Lumbopelvic pain often associated with vertical expansion³</p> <p>May affect postural stability⁴</p> <p>Closed glottis can help with static thoracic stability while open or partially open glottis is helpful for dynamic thoracic stability⁴</p> <p>Holding breath can be a natural response to lifting heavy loads,⁴ but may not be encouraged for someone who is postpartum due to risk/presence of</p>	<p>Observe without saying anything, assess in different postures, assess during movement³</p> <p>Examine rib movement during inhale and exhale via palpation</p>	<p>Aim for symmetrical 360 breathing, there is no “normal” breathing pattern. Ribcage mobility, genetics, posture, sex, BMI, self-esteem can all affect breathing pattern³</p> <p>It’s possible that PFM contraction during times of postural instability will need to be retrained.⁶ Practice breathing out with a PFM contraction then breathing in with pelvic floor relaxation.⁶ Can practice exhale with concentric lift/functional activity exertion</p> <p>Use tactile cueing for breath retraining</p> <p>Can use breathing for down training</p>

	<p>potentially due to upward bucket handle shift causing shortening on the intercostal muscles⁵</p>		<p>pelvic organ prolapse</p> <p>Poor breathing mechanics can result in increased intra-abdominal pressure potentially exacerbating any symptoms of prolapse, pelvic pain, and diastasis rectus abdominis^{8,9}</p>		<p>(exhale 2x inhale activates the vagus nerve)</p>
	 <p>The image contains three distinct visual elements. At the top, there are two anatomical diagrams of the thoracic spine. The left diagram shows a 'Bucket handle shift' where the vertebrae are tilted laterally, with a label 'Counterclockwise rotation of vertebrae'. The right diagram shows a 'Sawtooth shift' where the vertebrae are tilted anteriorly, with a label 'Clockwise rotation of vertebrae'. A blue bucket is positioned above the sawtooth diagram. Below these diagrams is a photograph of a silver can of Diet Coke, oriented vertically.</p>				

Common Postural Changes (Table 2)

Author(s)	What it is	Prevalence	How this affects return to activity	How to assess	Exercises/Modifications/Cueing
<p>Biviá-Roig (2018)¹⁰</p> <p>Okanishi (2012)¹¹</p> <p>Magee (2014)¹²</p> <p>Conder (2019)¹³</p> <p>Vaughn and Brown (2007)¹⁴</p> <p>Park (2016)¹⁵</p> <p>Han (2016)¹⁶</p>	<p>Postural changes often occur due to an adaptive response by the body in response to the increased anterior load during pregnancy (30% increase in abdominal mass).¹⁰ Additionally, hormonal changes such as increase in relaxin and progesterone can cause ligamentous laxity resulting in movement and postural changes.¹³</p> <p>Anterior pelvic tilt-increased lumbar lordosis, increased thoracic kyphosis, increased cervical curvature, protracted shoulders, hyperextended knees, ankle plantar flexion¹⁰</p> <p>Posterior pelvic tilt-</p>		<p>Can be related to low back pain or pelvic girdle pain(50-70% prevalence of low back pain during pregnancy) - even significant postural changes not always consistent with presence of pain and vice versa^{10,11}</p> <p>Can be correlated with urinary incontinence due to less optimal load transfer causing abnormal tensile and compressive forces¹¹</p>	<p>Plumb Line: Through external auditory meatus Midway through tip of shoulder Through lumbar vertebrae Slightly posterior to hip joint Slightly anterior to axis of the knee joint Slightly anterior to the lateral malleolus¹²</p>	<p>Increased thoracic kyphosis: Prone back extension, scapular adduction, cervical retraction, t-spine foam rolling on floor or wall, kneeling thoracic extension ro cat/cow, boat pose, 90/90 lat and pec stretch¹⁴ -significantly reduced kyphosis in those with increased angle and increased extensor strength in all participants.¹⁴</p> <p>Increased anterior pelvic tilt and lumbar lordosis: target hamstring strength, TrA activation, stretch iliopsoas and rectus femoris (half-kneeling stretch)¹⁵ -stretch 3x30 sec</p> <p>Increased posterior pelvic tilt and decreased lumbar lordosis: target glute strength, hamstring</p>

	<p>decreased lumbar lordosis ¹¹</p> <p>“Typical” postural changes during pregnancy and postpartum vary tremendously among studies. ¹³</p> <p>Consider posture during breastfeeding/carrying child/carrying equipment and the need to strengthen the posterior chain for support in this position.</p>				<p>stretching ¹⁶</p> <p>Teach proper form with lifting from ground to hip height. Practice with a long-lever arm. Consider more comfortable alignment for holding baby</p>
				 <p>17</p>	

Hip Strength for Pelvic Floor Function (Table 3)

Author(s)	What it is	Prevalence	How this affects return to activity	How to assess	Exercises/Modifications/Cueing
Hwang (2021) ¹⁸ Marques (2020) ¹⁹	The gluteus muscles, adductors, and hip		Strengthening pelvic floor muscles, gluteus	Manual muscle testing Handheld	Gluteus medius and maximus: contralateral lunge,

<p>Foster (2021)²⁰</p> <p>Boren (2011)²¹</p> <p>Aghakesguzadeh (2021)²²</p>	<p>external rotators facilitate synergistic contractions with the pelvic floor muscles and share fascial attachments with the pelvic floor muscles.¹⁸ Because of this, strength and mobility of these muscles impact pelvic floor muscle function.¹⁸</p> <p>Hip external rotation and hip abduction strength were significantly lower in patients with pelvic floor dysfunction compared to controls.²⁰ There was no significant difference in pelvic floor muscle strength.²⁰ Kegels aren't always the answer!</p>		<p>maximus, gluteus medius, and hip adductor muscles showed a significant decrease in stress urinary incontinence frequency when compared to just pelvic floor strengthening alone.¹⁹</p>	<p>dynamometer</p> <p>Single leg squat: Stand on one leg, squat to touch buttocks to 47cm box, extend to return to starting position²¹</p> <p>Lateral step up: stand on edge of 15 cm step, slowly lower heel to floor then return to start position²¹</p>	<p>side plank with hip abduction, single leg deadlift, and single leg squat showed the most activity via surface EMG²¹</p> <p>External rotators: lateral rotation in standing and sidelying, resisted side stepping, hip extension with lateral rotation in prone, forward lunge, single leg deadlift, step up/down from 20 cm step, wall squat to 60 degrees showed significant increase in hip external rotation strength²²</p>
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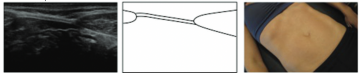
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Diastasis Rectus Abdominis (Table 4)

Author(s)	What it is	Prevalence	How this affects return to activity	How to assess	Exercises/Modifications/Cueing
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<p>Lee and Hodges (2016)⁹</p> <p>Sperstad (2016)²³</p> <p>Mota (2012)²⁴</p> <p>Spitznagle (2007)²⁵</p> <p>Irion and Irion (2009)²⁶</p> <p>Thabet and Alshehri (2019)²⁷</p>	<p>Linea alba (LA) is the collagenous connection between the right and left rectus abdominis (RA).⁹ The distance between the RA widens by 3rd trimester.⁹</p> <p>DRA is when the RA distance exceeds normal values.⁹</p>	<ul style="list-style-type: none"> - 33.1% at 21 weeks pregnant - 60% at 6 weeks postpartum²³ - 45.4% at 6 months postpartum 32.6% at 12 months postpartum²³ <p>The risk for diastasis recti was twice as high for women reporting heavy lifting 20x a week or more than those that reported less heavy lifting²³</p>	<p>The integrity of the abdominal wall is essential for proper transfer of forces during lumbopelvic movement.⁹ Decreased LA tension can cause decreased support of internal contents.⁹ Improper activation on the abdominal muscles and high intra abdominal pressure can make DRA worse.⁹</p> <p>Women with/without DRA during pregnancy show the same incidence of lumbopelvic pain.²³ This indicates DRA itself may not be the cause of pain.</p> <p>May be associated with other pelvic dysfunctions such as incontinence and pelvic organ prolapse.²⁵ These are support related dysfunctions.²⁵</p>	<p>Palpate linea alba at rest (above and below umbilicus)⁹</p> <ul style="list-style-type: none"> - tension/bogginess? - Can you separate the rectus? <p>Observe linea alba during curl-up⁹</p> <ul style="list-style-type: none"> - Doming, invagination? - More or less tension? - Easier/harder to separate? - Activation of obliques and TrA) <p>Observe active straight leg raise and single leg stance</p> <p>Observe with cues for TrA, PFM activation, and breathing</p> <p>>22 mm at 30 mm above umbilicus or >15 mm under xiphoid process⁹</p> <p>Finger widths can be used for measuring and re-testing with sufficient reliability.²⁴ Typical finger width is 16-20 mm</p>	<p>Activating the TrA prior to RA activation can allow better transfer of forces through the LA.⁹ Note this may not decrease the RA distance, but creating the tension in the LA can be important for functional control and stability.⁹</p> <p>Can passively realign the RA with hands or binder or towel while activating TrA. Note: abdominal binder is not recommended for those with pelvic organ prolapse due to increased intra-abdominal pressure.</p> <p>Abdominal exercise progression is key.⁹ Let's avoid blanket statements like "no crunches with DRA." It all depends on the person and what level they are at currently.</p> <p>Ex: Hook Lying, passively approximate RA, posterior pelvic tilt, raise head until RA contraction is felt, hold 3-5 seconds, repeat 50x/day → add alternating lower extremity extension → flex one hip to 90, extend knee and lower to floor, heel slide back to</p>
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					<p>start position → alternating marching hips to 90 → hips flexed at 90, alternate leg extension with heel hovering just above the floor → straight leg raise ²⁶</p> <p>*Progress when 20 reps of preceding exercise can be performed without discomfort and with good form</p> <p>3 sets of 20 repetitions 3x/week for 8 weeks of abdominal exercise program with abdominal bracing, diaphragmatic breathing, pelvic floor + TrA contraction, plank ²⁷</p> <p>Progress to functional exercise.</p>
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						<p>B. Automatic curl-up</p>  <p>C. TA curl-up</p> 
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Published in the *British Journal of Sports Medicine* - A guide for multidisciplinary teams. Patients/clients may move forward or back in each “R” depending on their individual needs¹

6 Rs	Description
1. Ready (prenatal—early postpartum)	Ready the athlete for anticipated whole-systems, biopsychosocial changes* by proactively educating them about perinatal health considerations during the transition into pregnancy and motherhood (eg, weight gain, pelvic floor function, perinatal mental health). Aim to maintain exercise throughout pregnancy (where it is safe to do so for the mother and baby), limit deconditioning and optimise postpartum recovery with forward planning.
2. Review (6–8 weeks)	Review and evaluate the postpartum athlete and address acute musculoskeletal and pelvic health rehabilitation needs. Screen for whole-systems, biopsychosocial considerations*
3. Restore (8–16 weeks)	Restore physical and psychological well-being depending on individual needs and prepare the perinatal athlete for returning to structured training environments. Include pelvic floor rehabilitation and other relevant whole-systems, biopsychosocial considerations.*
4. Recondition (16 weeks+)	Recondition the perinatal athlete for their required physical and psychological sporting demands. Commence graded exposure towards individual-specific training load requirements. Revisit whole-systems, biopsychosocial considerations* and monitor symptoms as training increases.
5. Return	Return-to-sport through an individualised, evidence-informed and guided exposure to the competitive environment and re-evaluate regularly.
6. Refine	Refine whole-systems, biopsychosocial strategies* (eg, optimise sleep quality, monitor for signs of relative energy deficiency syndrome) to enhance athlete training and competition availability, retaining the athlete in their sport and optimising performance.

Nb. The timescales presented are suggestions to guide multidisciplinary teams supporting perinatal athletes. They should be modified as necessary based on individual rehabilitation needs.

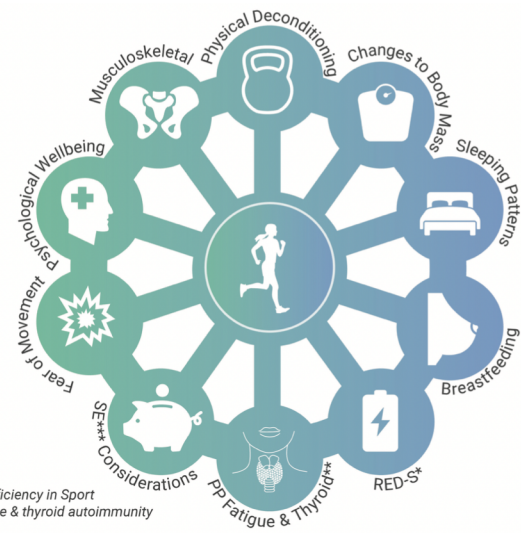
*Whole-systems, biopsychosocial considerations—childbirth-related trauma (eg, abdominal wall dysfunction, pelvic floor dysfunction or post-traumatic stress); menstrual health; breast health (eg, review breast support particularly in the breastfeeding athlete); energy balance (eg, relative energy deficiency in sport); psychological well-being (eg, perinatal mental health); fear of movement; and sleep (eg, sleep routine and quality).

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Other Factors to Consider with Postpartum Return to Activity

- Return to activity postpartum is complex. Recognize that more factors play into this process than just the musculoskeletal changes that were discussed in this presentation. Fear of movement, psychological well-being, and socioeconomic status play a huge role.²⁹ It is also important to consider what “activity” means for the individual. Are they returning to a construction job, starting exercise for the first time, a team sport, etc...
- Physical deconditioning²⁹
 - Reduction in cardiovascular fitness, muscle mass, strength, and endurance

- Consider pre-pregnancy physical conditioning, biomechanical changes, birth experience, and postpartum mood disorder affecting 1 in 8 people
- Postpartum is a period of reconditioning that should be done progressively and specific to the patient. We risk over-training if volume or intensity is increased too quickly
- Changes to body mass²⁹
 - On average, body mass increases by 11-16 kg during pregnancy and 3.2 kg postpartum
 - Obesity in the postpartum period is becoming more common and is correlated with incidence of postpartum pain, musculoskeletal injury, and pelvic floor dysfunction
- Sleep²⁹
 - Loss or disruption is related to increased stress, altered metabolism, decreased immune response, impaired cognition, low energy, anxiety, depression
 - Muscle related impact includes reduced protein synthesis, impaired muscle growth, and decreased maximal strength
 - Consider the person's sleep quality and quantity when prescribing exercise frequency, duration, and intensity. Less may be indicated in the early postpartum period and up to 1-year postpartum
- Breastfeeding²⁹
 - Ligamentous laxity that is present during pregnancy remains throughout the breastfeeding period and potential up to 3 months after
 - Consider screening for hypermobility with the Beighton Score
 - If positive, emphasize stability exercises to prevent injury
 - High caloric cost required by breastfeeding, need for adequate nutrition and fluid intake to breastfeed alone and especially with breastfeeding + exercise
 - Exercise during breast feeding has not been associated with decreased milk supply
- Socioeconomic status²⁹
 - Consider if they will be able to access recommendations and resources they make
 - Consider the benefits of constructing a no-cost home exercise program as many parents will not be able to leave their children for an exercise program
 - Consider the value of client/patient education
- Relative energy deficiency and postpartum fatigue²⁹
- Heightened risk of all mentioned conditions due to the COVID-19 pandemic²⁹
- Cesarean section
 - Scar could cause decreased mobility and be painful due to the superficial branch of the ilioinguinal nerve



*Relative Energy Deficiency in Sport
 **Postpartum fatigue & thyroid autoimmunity
 ***Socioeconomic

Return to Activity Postpartum: When to Refer to a Pelvic Health Specialist (Table 5)

Author	Condition	Symptoms	Risk factors	Aim/Evidence that PFPT works
Hagen (2014) ⁸	Pelvic organ prolapse	Vaginal, bladder, bowel, back, abdominal, sexual dysfunction ⁸ “Feeling something coming down” “Discomfort worse when standing or at end of day” “Abdominal pain when standing” “Lower back heaviness” “Strain to empty bladder/feels like it isn’t empty” ⁸	Increased risk associated with increased age, increased parity, obesity, heavy lifting, family history, constipation, hypermobility ⁸	<u>Aim:</u> improve PFM strength, endurance, coordination, increase structural support of the organ ⁸ <u>Evidence:</u> women reported significantly greater reduction in symptoms after 1:1 sessions with a pelvic floor specialized PT, odds of having surgery were decreased, improvement of prolapse stage reported by gynecologists ⁸
Morkved (2014) ³⁰ Woodley (2017) ³¹	Urinary (UI) and fecal incontinence (FI), urinary frequency or urgency	Unintentional loss of urinary or fecal matter, intense urge to urinate, frequent urge to urinate 32-64% of people experience UI ³⁰ 80% of young elite athletes experience UI ³⁰	Pregnancy, childbirth, perineal tearing ³⁰	<u>Aim:</u> decrease frequency of symptoms during all activity, improve PFM strength, endurance, coordination, increase structural support <u>Evidence:</u> significant reduction in symptoms and frequency of UI with up to 1 year lasting

		20% of postpartum women experience FI up to 1 year after birth.		results after working with a PFPT ³⁰ Clinically important difference reported for postpartum treatment of FI by a PFPT ³¹
Lee and Hodges (2016) ⁹ Thabet and Alshehri (2019) ²⁷	Diastasis rectus abdominis	Some people may not gain optimal LA tension with TrA contraction and could have unrelenting coning		<u>Aim:</u> improve tension of LA to support abdominal contents and to improve force transfer, improve function. Not necessarily narrow LA distance ⁹ <u>Evidence:</u> statistically significant decrease in inter-rectus distance and significant improvement of quality of life in a physical therapist-led deep core stability strengthening program ²⁷
Ferreira and Albuquerque-Sendí (2013) ³² Ghaderi (2019) ³³	Lumbopelvic pain ³² and dyspareunia ³³	Any low back and pelvic pain not resolved with traditional physical therapy, pain with activities of daily living	Pelvic floor injury during vaginal birth, depression, anxiety, abuse, PFM weakness, postural changes, poor body mechanics, change in body mass, poor breathing mechanics, DRA, history of lumbopelvic pain, hypermobility	<u>Aim:</u> decrease pain, improve function <u>Evidence:</u> Limitations in activities, posterior pelvic pain provocation test, Oswestry Disability Questionnaire, pain, Health Related Quality of Life, and physical functioning show

			etc...	<p>statistically significant improvement in physical therapy treated groups for lumbopelvic pain compared to controls.³²</p> <p>Mean PFM strength, PFM endurance, mean Female sexual Function Index score, and mean pain scale was statistically significant in 32 women treated with electrotherapy, manual therapy, and PFM exercise.³³</p>
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Other complaints to consider for pelvic health referral: mention of trouble bladder/bowel emptying, chronic constipation, multiple pregnancies, 3rd or 4th degree perineal tear

**Also consider referral to MD/NP/PA/Urogyn/OB-GYN/etc... as needed*

How to refer to a pelvic health specialist:

- <https://aptapelvichealth.org/>
 - “Find a PT” at the top
- <https://pelvicguru.com/>
 - “Find a Pelvic Health Professional” (*all types of professionals*)

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