Maintaining Mobility: Review of Adaptive Products, Braces and Supports for Mobility Needs of the Pregnant and Postpartum Woman

Scope of the Topic Pregnancy and Postpartum

Prevalence of Pain in Pregnancy
- Wide range reported in the literature; likely due to differences in definition and patient under reporting pain
- Low back pain and pelvic girdle pain (PGP) prevalence during pregnancy
  - 72% n=891 (Mogren 2005)
  - 68.5% n=645 (Wang 2004)
  - 40% n=855 (Ostgaard 1991)
  - 20% n=4,724 combined studies (Vleeming 2008)
- 30-50% report pain severe enough to lose time from job & refrain from social interaction (Noren 1997, Kristiansson 1996, Ostgaard 1991)
- Of those reporting pain to their physician, only 15-30% report receiving treatment for complaints (Owens 2002, Stapleton 2002)
- High levels of pain in pregnancy correlates with perceived decreased ability for functional activities and increased sick days (Cherry 1987)
- Women with pain in one pregnancy at greater risk for back pain postpartum (Ostgaard 1997, Turgut 1998)
- 20% of women experiencing severe pain during pregnancy reported they will avoid future pregnancy due to fear of LBP (Brynhildsen 1998)

Risk Factors for LBP and PGP During Pregnancy
  - History of previous back pain or SIJ pain
  - History of previous trauma to pelvis
  - Pain in prior pregnancy
- Conflicting evidence
  - High work load
  - Age
- Non risk factors
  - Time since last pregnancy
  - Weight
  - Smoking
  - Use of birth control pills

Patient Knowledge of Risk Factors/Education
- Postpartum women have a deficit of knowledge about effects of childbirth (McLennan 2005)
- Knowledge of the impact of childbirth on the pelvic floor (Dunbar 2011)

Prevalence of Musculoskeletal Dysfunctions Postpartum
- Survey of women who delivered within the past 3 months (Figeurs 2004)
  - Only 13% reported receiving any educational information from their healthcare provider regarding these symptoms
- Postpartum depressive symptoms are 3x more likely in women having back and pelvic pain than those without (Gutke 2007)
- Self-reported postpartum symptoms (Shytt 2005)
• Postpartum Self Related health (SRH) reflects general wellbeing and everyday functioning (Schytt 2007)
  ▪ SRH predicts morbidity and use of health services
  ▪ Most important contributing factors to SRH at 4-8 weeks after childbirth
    o “Physical symptoms”
    o “Emotional problems”
  ▪ Perineal pain may cause a majority of problems especially for first time mothers
• 30% - 43.2% report LBP at 6 months postpartum (Ostgaard 1997, 1992)

Implications for the Lifespan
• 37 % of women reporting back pain in pregnancy still reported back pain at 18 months postpartum (Larsen 1999)
• 8.6% suffered pelvic joint pain 2 years postpartum (Albert 2001)
• Women with high pain intensity during pregnancy have a greater risk for back pain postpartum (Ostgaard 1997, Turgut 1998)
• Link between LBP and SUI (Eliasson 2007)
  ▪ N=200 non-pregnant women with LBP
  ▪ 78% had SUI

Implications for the Clinicians
• Although incidence of PGP and LBP in pregnancy is high, relatively few patients report symptoms to physicians and few are actively receiving care
• Musculoskeletal conditions limiting function during the pregnancy often continue into the postpartum period
• Although women commonly report symptoms postpartum related to musculoskeletal dysfunction and pain, a low percentage of women receive relevant information or education on these topics
• Women with perinatal back and pelvic pain are more likely to have postpartum depressive symptoms
• Symptoms during pregnancy, birth and in the postpartum period can have an effect on the woman throughout the lifespan
• Physical therapists, as experts of the musculoskeletal system and function, are essential to provide pain relief and to optimize function during the perinatal period
• Physical therapists work with the healthcare team to coordinate safe, collaborative care for women during pregnancy, labor and delivery, and postpartum
  ▪ Role for physical therapist in exercise
    o Exercise prescription for all exercise levels during pregnancy and postpartum
    o Instruction of prenatal and postnatal exercise classes
    o Discussion regarding disease management through exercise
  ▪ Role for physical therapist in labor and delivery
    o Positioning strategies to minimize stress of preexisting musculoskeletal conditions
    o Education of patient, patient’s support group and other medical professionals
    o Postpartum cesarean management and care
• Obstetric PTs have an opportunity to educate patients, public and doctors
  ▪ Get involved in physician rounding
  ▪ Get involved in community education projects- particularly those in low socioeconomic status
Be the educator for your patients during pregnancy. What should she expect postpartum and what is not normal?

**Anatomic and Physiologic Changes During Pregnancy and Postpartum**

**Anatomic - Skeletal Changes**

- **Sacroiliac Joint (SIJ)**
  - Pelvic joints and ligaments loosen under the influence of relaxin
  - Movements increase and the sacroiliac locking mechanism becomes less effective permitting greater rotation and allowing alternations in pelvic diameters at childbirth
  - Diverts the strain of weight bearing to the ligaments with frequent SIJ strain
- **Pubic Symphysis Joint (SIJ)**
  - Defined as a unique joint consisting of a fibrocartilaginous disc sandwiched between the articular surfaces of the pubic bones (also referred to as a secondary cartilaginous joint in modern anatomical reference texts) (Becker 2010)
  - The hyaline cartilage is marked by reciprocal crests and valleys connected by fibrocartilage which makes up the interpubic disc
  - Innervated by the branches of the iliohypogastric, ilioinguinal and pudendal nerves
  - Softening of the pubic symphysis and SJ joint are caused by production of relaxin and other pregnancy hormones (Standring 2008)
  - Ligaments (Standring 2008)
  - Separation of symphysis (Bjorklund 2000)
    - Normal separation: 1 mm – 5 mm
    - Average width non-pregnant female: 4.0 mm
    - Increase in pregnancy: Additional 0.5 – 7 mm
    - Average width in pregnancy without pain: 6.3 mm
    - Physiological separation is usually no greater than 10 mm
    - *Use precautions if more than 7-8 mm separation*
    - Pregnant women with symphyseal width of greater than 9.5 mm experience pain
    - Frank separation of the pubic symphysis is equal to or greater than 10mm (one centimeter): Assume ligamentous compromise
    - Urethra lies close to the pubic symphysis less than 2.5 cm (Standring 2008) as it passes through the perineal membrane. Pubic irritation can result in blood in the urine because of this close anatomical relationship
    - Average first week post partum separation: Separation is decreased by 2mm
- **Rib Cage**
  - Ribs become more mobile due to hormonal influence of articulations with the spine:
    - Subcostal angle widens
    - Ribs flare laterally
    - Rib cage increases:
      - About 2 cm transversely
      - 10-15 cm in circumference

**Diastasis Rectus Abdominis** (Boissonnault 2011, 1988)

- Diastasis rectus abdominis (DRA) is a separation of the rectus abdominis muscles due to stretching of the linea alba and can be noted along at the level of umbilicus or along the entire abdomen (Stephenson 2000)
- Causes
All donations to the SOWH Endowment for Research Excellence are tax-deductible. Please make checks payable to: The Foundation for Physical Therapy.
Changes in maternal hormones softening connective tissue
- Increased weight in pregnancy
- Increased elongation of the rectus abdominis (Gilillard 1996)
- Painless condition occurring frequently in pregnancy
- Present in 27% of women in the second trimester
- Present in 66% women in third trimester
- Present in 30% women at 8 wks postpartum
- Assessment is done during a supine hook lying curl up with abdominal palpation, measuring tape, or digital calipers to measure the distance between the contracted recti- (Boxer 1997)
- Considered significant if separation between medial borders of muscle bellies is greater than 2.0 cm (Nobel 1982)
- Significant DRA suggests impaired force closure of the abdominal muscles resulting in impaired load transfer and instability with vertical loading tasks (Lee 2007)

Ligaments (Standring 2008)
- Broad Ligament
- Round Ligament

Postural Changes in Pregnancy
- Progressive alterations in body shape and weight
- Changes in center of gravity
- Wider base of support
- Effect of relaxin on connective tissue and underlying fascia of breasts and ligament with increased weight of breasts leads to increased strain on pectoral muscles, increased thoracic kyphosis and nerve compression of the brachial plexus
- Changes in Balance
  - Center of gravity moves forward secondary to enlarging breasts and uterus
  - Butler (2006) studied the changes that occur in balance during pregnancy and post partum
  - Data suggests there is decreased postural stability in 2nd and 3rd trimester lasting up to 6-8 weeks postpartum
  - Increased reliance on visual input during this time
- Kyphotic-lordotic posture in pregnancy (Stephenson 2000)
- Postural Control in Pregnancy (Drife 2009)
  - Increased sway in second and third trimesters with static standing, compared to nonpregnant women
  - Increased sway in all trimesters with eyes closed: increased reliance on visual input for balance in pregnancy
  - Change in balance strategy from ankle to hip strategy with reduced base of support
  - Exercises with varying visual input and bases of support may be beneficial to address postural control in pregnancy
- Significant posture changes between 1st and third trimester include:
  - Increased lumbar lordosis, increased anterior pelvic tilt, and increased posterior head position (Franklin 1998)
  - No significant relationship found between back pain intensity and changes in posture
  - Can cause stretch to round ligament contributing to pain and posture changes
Observational Postural Findings Associated Low Back Disorders (Non-Pregnant)

<table>
<thead>
<tr>
<th>Structure</th>
<th>Observational Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herniated disc</td>
<td>Flattened back</td>
</tr>
<tr>
<td>Radiographic instability</td>
<td>Excessive lordosis</td>
</tr>
<tr>
<td>Sacroiliac dysfunction</td>
<td>Flattened back</td>
</tr>
<tr>
<td>Degenerative disc disease</td>
<td>Hypertrophic supraspinous ligament</td>
</tr>
<tr>
<td>Spinal stenosis</td>
<td>Flattened back</td>
</tr>
<tr>
<td>Facet impingement</td>
<td>Flexed back, usually unilateral</td>
</tr>
<tr>
<td>Nerve root adhesion</td>
<td>Bad posture, avoids forward flexion</td>
</tr>
</tbody>
</table>

*Adapted from Cook C. Orthopedic Manual Therapy: an Evidence-Based Approach. 2007; Table 11.14: 366*

- Considerations are to be made on how postural changes that occur during pregnancy may affect:
  - A woman with an existing (pre-pregnancy) low back disorder
  - A woman’s predisposition for low back disorders during pregnancy

**Postural Recommendations in Pregnancy**

- **Optimal Posture**
  - Neutral pelvis or slight anterior pelvic tilt
  - Pubic bone in same plane / aligned with ASIS and xyphoid process
  - No excessive gluteus maximus, erector spinae, rhomboid, abdominal oblique muscle activity.
- **Avoid asymmetric postures**
  - Asymmetric laxity of the sacroiliac joints is predictive of pelvic girdle pain (Damen 2001)

**Lower Quarter Biomechanics**

- Hip, foot, and ankle biomechanics
- Conventional thinking: over pronation can cause hip internal rotation and a drop of the iliac crest on that side
  - Can cause overstretch of the piriformis, sacral rotation
  - Stresses medial knee ligaments
  - Stresses foot intrinsics
- No relationship between pronation and LE internal rotation (Reishi 1999)
  - Hypothesis is that the problem is with the hip abductors – weakness in these muscles can result in hip IR and stress to the medial knee and foot intrinsics (Powers 2008)
    - Strengthening foot intrinsics, posterior tibialis, and gluteus medius and maximus can help
    - Best exercises are triplanar with emphasis on control of femoral rotation and adduction
      - Example: quadruped position – lift leg into ER, abduction, and extension
    - Combination of strengthening and motor control
    - Consider orthotics

**Physiological Changes**

- **Hormonal Changes** (Decherney 2007, Blackburn 2007) and metabolic changes may predispose women to musculoskeletal dysfunctions
- **Relaxin:** Secreted by the corpus luteum during pregnancy
No evidence of increased levels of relaxin correlating with pelvic or symphysis pain during pregnancy (Petersen 1994, Bjorklund 2000)

- Relaxin has been shown to limit collagen production and reorganization, while stimulating increased collagen degradation. (Samuel 2005)
- Prevents fibrogenesis, and reduces established scarring
  - Main function: prepare for delivery
  - Widens symphysis pubis
  - Increased mobility of SI synchondroses
- Relaxin effects linea alba which can lead to diastasis recti
- Concentration values during pregnancy (Petersen 1995)
  - Peak value at 12th week
  - Declines until 17th week
  - Stable at 50% of peak there after
- Relaxes ligaments and connective tissue throughout the body, causes increase in joint laxity
- Decreases to pre-pregnancy levels 3 days postpartum

Comparing and Contrasting Selected Musculoskeletal Dysfunctions in Pregnancy and Related Bracing and Adaptive Equipment Recommendations

Introduction
- Select examples of common musculoskeletal dysfunctions and considerations for choosing equipment and bracing
  - Spine
  - Pelvic Girdle
    - SIJ
    - Pubic Symphysis
  - Extremities
    - Hand
    - Knee
    - Feet
- Not all-inclusive list of special populations – more diagnoses covered in-depth in Section on Women’s Health “Fundamental Topics in Pregnancy and Postpartum” and “Advanced Topics in Pregnancy and Postpartum” course (www.womenshealthapta.org)
- Consider evidence based examinations and musculoskeletal diagnosis’s

Low Back Pain
Overview
- Generally defined as pain between 12th rib and gluteal fold (Vleeming 2008)
- Ruling out Lumbar Spine with examination of lumbar, lumbopelvic or pelvic pain should first rule out the lumbar spine (Vleeming 2008)
- Regardless of order of tests, which may be performed based on positional needs
- General order of lumbar exam:
  - Standing: Posture, gait, symmetry of landmarks, trunk ROM, repeated motions
    - Trunk ROM may be limited naturally by pregnant abdomen
  - Seated: Slump sit test, reflexes, dermatomes, myotomes
• Lying: SLR / other neutral tension testing, additional motions / posture testing, additional strength testing

• Literature Reports Describing Observations, Measures, Examination Testing, and Classification of Lumbar-Generated (non-PGP) LBP

• Classifying Patients with Pain of Lumbar Origin into Intervention Groups (Hicks 2005, Hayes 2009)

• Traditionally, diagnosis of lumbar pain involves identifying a structural fault followed by interventions aimed to correct the fault
  ▪ Difficult due to inability to identify structural fault in most patients with LBP
  ▪ Ignores the potential for structural “faults” that may not actually be pathological or pain-inducing

• Alternative method: Classifying patients into subgroups with similar clinical characteristics to guide diagnosis and intervention

• Intervention-based classification systems are described in the noted literature/texts and include:
  o McKenzie Institute (McKenzie 1998)
  o Treatment-Based Classification (Delitto 1995)
  o Movement System Impairments (Sahrmann 2002)

Examination for Spinal Nerve Root Involvement (“Disc Derangement”) (Cook 2007)

• Centralization Phenomenon
  ▪ Liberally defined as:
    o Reduction of radiating or referred pain from the spine
    o Pain is resolved or reduces from a distal to proximal region in a controlled predictable pattern with the application of (Aina 2004):
      • Movement
      • Mobilization
      • Manipulation
  ▪ Centralizing behavior is 94% sensitive (Bogduk 1997)
    ▪ Thus - if the test is not positive, disc syndrome is likely not present
  ▪ 52% specific for the presence of disc syndrome
    ▪ Thus - If test is negative, it is moderately unlikely that disc syndrome present

• Use of repeated movements
  ▪ Useful to determine the irritability of a patient
  ▪ Helps to identify the directional preference of their movements
    o “Directional preference” reflects the preference of repeated movement in one direction that will improve pain and the limitation of range
    o Movement in the opposite direction will cause signs and symptoms to worsen (Cook 2007)

Tests for Nerve Root Irritation (Traditionally, Disc Involvement)

• Active Physiological Flexion (or Repeated Flexion) (Cook 2007)
• Active Extension-Repeated Movements (or Repeated Extension) (Cook 2007)
• Active Side Flexion / “Side Glide” with Repeated Motions (Cook 2007)

Quadrant Facet Provocation Testing (Facet Joint Irritation) (Cook 2007)

Neural Tension Tests

• Three criteria to avoid false positive with neural tension testing:
  o Findings must be asymmetrical between symptomatic and normal side
o Pain produced from exam should be the same as reported symptomatic pain
o Movement of a distal or proximal area that engages tension of the nerve root should increase symptoms

- Straight Leg Raise (SLR) (Brieg 1979, Cook 2007)
- Slump Sit Test (Philip 1989)
- Femoral Nerve Stretch Test (Estridge 1982)

**Lumbar Mobility Testing and Scales**
- Vertebral Central Posterior Anterior (CPA or “PAs”) (Cook 2007)
- Lumbar Segmental Instability Test (Hicks 2003)
- The Beighton Ligamentous Laxity Scale (Beighton LLS) (Hicks 2003)

**Pelvic Girdle Pain**

**Overview**
- Generally defined as pain between posterior iliac crests and gluteal fold, particularly in SIJ region (Vleeming 2008, Kanakaris 2011)
- Pain may radiate to posterior thigh
- Generally arises with pregnancy (between first trimester and first month post-delivery), trauma, arthritis
- Onset insidious or sudden
- Decreased tolerance/endurance with standing, walking, sitting (feels need to frequently change position or activity)
- May affect gait: “catching” or “clicking” of hip, slowed velocity, and increased horizontal pelvic rotation

**Differentiation of PGP from LBP**
- Through tests and patient history, observations, tests and measures determine diagnosis
- Some other differences have been noted that differentiate PGP from LBP specifically in postpartum women: (vanWingerden 2008)

<table>
<thead>
<tr>
<th>Pelvic Girdle Pain</th>
<th>Low Back Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static stance – pelvic tilts significantly backwards. Limited trunk ROM with maximal forward bend, with significant limitation at the hip. During initial AND final forward bend motions, lumbar motion increased.</td>
<td>No significant tilt in pelvis noted. Limited trunk ROM with maximal forward bend, but hip motion not limited. During initial forward bend motion, lumbar motion is DEcreased During final forward bend motion, lumbar motion INcreased</td>
</tr>
</tbody>
</table>

**Classifications of Pelvic Girdle Pain** (modified from Albert 2000):
- *Pelvic Girdle Syndrome* – daily pain all three pelvic joints (SIJs and PS), confirmed with pain provocation tests
- *Symphysiolyosis, or Pubic Symphyseal Pain* – daily pain in PS, confirmed by pain provocation tests to PS (not an actual lysis of joint)
- *One-sided Sacroiliac Syndrome* – daily pain one SIJ, confirmed by pain provocation tests to this SIJ
- *Double-sided Sacroiliac Syndrome* – daily pain both SIJs, confirmed by pain provocation tests to both SIJs
- *Miscellaneous PGP* – daily pain in one or more pelvic joints, but inconsistent findings between history and tests (could also include rheumatic disease)
The Section on Women’s Health is proud to announce the course schedule for 2014. We hope you will be able to take advantage of the variety of course options and locations throughout the country.

Registration for 2014 educational courses and the 2014 Fall Conference is now open on our website. [www.womenshealthapta.org/education/regional_courses/index.cfm](http://www.womenshealthapta.org/education/regional_courses/index.cfm)

For updates on courses and registration openings, please follow the Section’s Twitter and Facebook pages.

### pelvic physical therapy 1

<table>
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<tr>
<th>Date</th>
<th>Speakers</th>
<th>Location</th>
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<tbody>
<tr>
<td>January 17-19, 2014</td>
<td>Lori Mize, PT, DPT, WCS</td>
<td>Greenville, SC</td>
</tr>
<tr>
<td>March 21-23, 2014</td>
<td>Lori Mize, PT, DPT, WCS</td>
<td>Greenville, SC</td>
</tr>
<tr>
<td>June 20-22, 2014</td>
<td>Lori Mize, PT, DPT, WCS</td>
<td>Des Moines, IA</td>
</tr>
<tr>
<td>July 11-13, 2014</td>
<td>Lori Mize, PT, DPT, WCS</td>
<td>Des Moines, IA</td>
</tr>
<tr>
<td>October 10-12, 2014</td>
<td>Carina Siracusa Majzun, PT, DPT</td>
<td>East Lansing, MI</td>
</tr>
<tr>
<td>November 14-16, 2014</td>
<td>Barb Settles-Huge, PT</td>
<td>Boca Raton, FL</td>
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### pelvic physical therapy 2

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<th>Location</th>
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<tr>
<td>February 28-29, 2014</td>
<td>MJ Straulhal, PT, BCB-PMD</td>
<td>Portland, OR</td>
</tr>
<tr>
<td>April 25-27, 2014</td>
<td>Barb Settles Huge, PT</td>
<td>Madison, WI</td>
</tr>
<tr>
<td>August 1-3, 2014</td>
<td>Carina Siracusa Majzun, PT, DPT</td>
<td>Towson, MD</td>
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### pelvic physical therapy 3

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<tbody>
<tr>
<td>June 27-29, 2014</td>
<td>MJ Straulhal, PT, BCIA-PMDB</td>
<td>Portland, OR</td>
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<tr>
<td>September 12-14, 2014</td>
<td>Carina Siracusa Majzun, PT, DPT</td>
<td>Rochester, NY</td>
</tr>
<tr>
<td>November 7-9, 2014</td>
<td>MJ Straulhal, PT, BCIA-PMDB</td>
<td>Madison, WI</td>
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### fundamental topics in pregnancy and postpartum physical therapy

<table>
<thead>
<tr>
<th>Date</th>
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<th>Location</th>
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<tbody>
<tr>
<td>March 28-30, 2014</td>
<td>Suzanne Badillo, PT, WCS</td>
<td>Baton Rouge, LA</td>
</tr>
<tr>
<td>May 16-18, 2014</td>
<td>Karen Litos, PT, MPT</td>
<td>East Lansing, MI</td>
</tr>
<tr>
<td>July 25-27, 2014</td>
<td>Suzanne Badillo, PT, WCS</td>
<td>Edina, MN</td>
</tr>
<tr>
<td>August 22-24, 2014</td>
<td>Susan Giglio, PT, RYT</td>
<td>Longmont, CO</td>
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### gynecologic visceral manipulation

<table>
<thead>
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<tbody>
<tr>
<td>Level 1</td>
<td>October 2-5, 2014</td>
<td>Gail Wetzler, PT</td>
<td>Bethlehem, PA</td>
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<tr>
<td>Level 2</td>
<td>November 14-16, 2014</td>
<td>Barb Settles-Huge, PT</td>
<td>Boca Raton, FL</td>
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### advanced topics in pregnancy and postpartum physical therapy

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<tr>
<th>Date</th>
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<tbody>
<tr>
<td>February 21-23, 2014</td>
<td>Susan Giglio, PT, RYT</td>
<td>St. Louis, MO</td>
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<tr>
<td>May 4-6, 2014</td>
<td>Susan Giglio, PT, RYT</td>
<td>Baltimore, MD</td>
</tr>
<tr>
<td>November 7-9, 2014</td>
<td>Susan Steffes, PT</td>
<td>Baltimore, MD</td>
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### the physical therapist in labor & delivery: advanced techniques in labor support

<table>
<thead>
<tr>
<th>Date</th>
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<th>Location</th>
</tr>
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<tbody>
<tr>
<td>October 24-26, 2014</td>
<td>Susan Steffes, PT, CD (DONA)</td>
<td>Austin, TX</td>
</tr>
</tbody>
</table>

Check website for new courses throughout the year!

For more details on CAPP, go to [http://www.womenshealthapta.org/capp.cfm](http://www.womenshealthapta.org/capp.cfm)

For more information on Section on Women’s Health sponsored courses go to [http://www.womenshealthapta.org/education/education.cfm](http://www.womenshealthapta.org/education/education.cfm) or contact the SOWH at sowh@apta.org, or 703-610-0224.
Testing of the Pelvic Girdle

- Palpation Tests
- Functional Load Transfer Test
- Pain Provocation Tests

Palpation of the Pelvic Girdle Landmarks

- Of note although used historically, palpation of landmarks is NOT useful to determine a diagnosis for pelvic, lumbar or hip dysfunction (Albert 2009, McGrath 2006, Carmichael 1989)
- Lack of symmetry does not indicate or correlate with pelvic girdle or hip dysfunction or pain (Lederman 2010, Levangie 1999)
- Leg length measures also demonstrate poor reliability and lack correlation to pain or dysfunction (Albert 2000, Lederman 2010)
- Palpatory findings only should be used as a contribution to the Gestalt of the total exam

Functional Load Transfer Tests

- Stork Test (Hungerford 2007)
- Active Straight Leg Raise test (ASLR) (Mens 1999, 2001, 2002A)
- Modified technique for ASLR (Cook 2007, Mens 1999)

Pelvic Girdle Pain Provocation Tests

- Gaenslen’s test (Vleeming 2008)
- Posterior Pelvic Pain Provocation (P4) (Ostgaard 1994)
- Thigh Thrust (Laslett 2003)
- SIJ Anterior Distraction: Posterior Compression (Lee 2004)
- SIJ Posterior Distraction: Anterior Compression (Lee 2004)
- Patrick’s FABER Test (Vleeming 2008)

Pubic Symphysis Pain Provocation Tests

- Modified Trendelenburg (Albert 2000)
- Pubic Symphysis Palpation (Albert 2000)

Bracing and Orthoses

- Types of braces and orthotics used in pregnancy and postpartum
  - SI belts
  - Lumbar supports and Binders
  - UE splints
- Lumbar supports (Carr 2003)
  - No adverse effects of a binder on the hemodynamics of the mother or fetus were found (Beaty 1999)
  - Also useful for round ligament pain
- Types of lumbar supports and binders
  - Mother to Be
  - Stork S’port
  - Motherhood
  - Prenatal Cradle
  - Soft and Form
  - Many others on the market
- Sacroiliac belts
Studies which support the use of SI belts
- Enhanced stability due to decreased movement at the SI joint (Vleeming 1992)
- Application of a pelvic belt significantly decreases mobility of the sacroiliac joints (Mens 2006)
- Improvement of the load transfer through the pelvis as measured by the ASLR improved with SI belt (Mens 1999)
- Neither home nor in-clinic exercises had any additional value above giving a nonelastic sacroiliac belt and information (Nilsson-Wikmar 2005)

Recommended use of SI belts
- The decrease of mobility at the SIJs is larger with the belt positioned just caudal to the anterior superior iliac spines than at the level of the pubic symphysis. (Mens 2006)
- Apply SI belt in supine position
- Vleeming (1992) suggest that it is most effective if placed just above the trochanter or “to patient’s comfort”
- Does not need to be tight: if the belt does not reduce symptoms then tightening it more will probably not help more
- Systematic Review (Vleeming 2008) suggest that pelvic belts may be tested for symptomatic relief but should not be used as a single treatment; should only be applied for short periods

Types of SI belts
- Active SI Belt
- Serola
- Saunders
- Com-pressor
- IEM
- SI Lock

Postpartum Binders
- Gentle abdominal support after delivery
- Support the belly by slinging the brace under and Velcro
- Especially helpful after a C-Section
- Helps you return to your normal activities sooner

Types of Binders
- Dale abdominal binder
- Better Binder
- Loving Comfort

Can be worn during pregnancy with caution not to restrict circulation

Other supports
- Baby Hugger
  - All in one panty/support
  - Relieves pressure on the pelvic floor and decreased compression on the blood vessels returning blood from the leg; helps with varicosities
  - May also help with relieving pressure on lateral femoral cutaneous nerve
    - Meralgia Paresthetica – patient presents with numbness and burning in the anterolateral thigh without motor involvement (Ritchie 2003)

Review of Evaluation /Intervention Algorithm for Lumbopelvic Pain

Review of Bracing Algorithm
Bracing Extremities
Upper Extremities

- Carpal Tunnel Syndrome
  - Common complication of pregnancy
  - Prevalence as high as 62% of pregnant women (Ablove 2009)
  - De Quervain’s Syndrome in postpartum women
  - Related to repeated injury to the dominant wrist in flexion and ulnar deviation (Anderson 2004)

- Wrist splints
  - Splinting is a noninvasive method for helping to decrease the uncomfortable symptoms of carpal tunnel syndrome during pregnancy. (Courts 1995)
    - 48 women (82 hands) compared to 26 women with no hand symptoms
    - Rated symptoms included: Tingling, numbness, pain, weakness, wakes you up, drops things, swelling, and stiffness, grip strength and pinch strength
    - One week after splinting, there was an average increase of 5.4 pounds in grip strength and over 1 pound in each type of pinch strength (p < 0.0001).
    - Splint group:
      - Each of the eight symptoms decreased
      - At 1 month postpartum, symptoms had resolved completely for 76% of the subjects
      - Weakness had resolved for 76%; strength was improved, but was not normal.
      - “Wakes you up” symptom resolved for 93%
  - Systematic review (Borg-Stein 2005)
    - Night splints are the most recommended therapy for carpal tunnel syndrome
    - Designed to maintain neutral wrist extension and thus decrease compression on the median nerve
    - 95% of women with CTS will have resolution of symptoms 2 weeks postpartum
    - Nursing may prolong symptoms
    - >80% will get relief with thermoplastic night splint

Adaptive Equipment/Bracing Considerations for Select Special Populations

Introduction

- Select examples of two very different special populations with high risk factors and special considerations for choosing equipment/bracing
  - Obesity
  - Spinal Cord Injury

- Not all-inclusive list of special populations – many more covered in-depth in Section on Women’s Health “Advanced Topics in Pregnancy and Postpartum” course (www.womenshealthapta.org)

- Consider individual impairments and risk factors
  - Avoid making presumptions on medical diagnosis alone
  - May be able recommend similar adaptive equipment or bracing for different special populations than those covered here who face similar challenges
    - Example: Women with Guillain-Barre Syndrome may have paralysis/paresis impairments similar to women with spinal cord injuries
Obesity-Related Impairments in Pregnancy and Postpartum

Overview and Statistics

- Obesity Epidemic (Ogden 2012) (NRC-IOM 2009)
  - Fastest growing health problem in the U.S.
  - 2010 statistics:
    - No state has prevalence of obesity less than 20%
    - 36 states have prevalence at or above 25%
      - 12 of these states had prevalence at or above 30%
  - Two-thirds of U.S. women child-bearing age are classified as overweight (BMI greater than/equal to 25 kg/m²)
    - Almost one-third of these women are classified as obese (BMI greater than/equal to 30 kg/m²)

Obstetric Considerations With Obesity in Pregnancy/Postpartum (SOWH 2013)

- **Cardiovascular:** coronary artery disease, gestational hypertension, pre-eclampsia/eclampsia, pulmonary vascular disease
- **Pulmonary:** hypoxemia, obstructive sleep apnea, respiratory depression during labor and delivery
- **Digestive:** incompetent esophageal sphincter function (GERD)
- **Metabolic:** Gestational Diabetes Mellitus; various coronary, renal and cardiac diseases
- **Psychological/Social:** Depression, social stigma, less likely to seek/receive healthcare
- **Risk factors for the fetus:** Preterm birth, birth weight – large/small for gestational age, multiple neurodevelopmental disorders

Musculoskeletal Problems (Hoffman 2009)

- Obesity leads to higher incidence of osteoarthritis: 31%, compared to 16% non-obese adults
- Implicated in progression of low back pain due to mechanical stress on discs and indirect effects of atherosclerosis on blood supply to lumbar spine (Kulie 2011)
- Obesity at age 23 increases risk of LBP onset within 10 years (Lake 2011)
- Strongly linked to knee osteoarthritis due to excess load on joint, increased cartilage turnover, increased collagen type 2 degradation products and increased risk of degenerative meniscal lesions (Kulie 2011)
  - Average BMI in women diagnosed with knee OA is 24% higher than women without OA
  - For every 2 unit increase in BMI, risk of knee OA increases 36%
- Obesity linked to increased risk of developing rheumatoid arthritis (Crowson 2012)
  - Paired cohort study of medical records for 1626 women (813 with RA; 813 without RA) from 1985-2007
  - Obesity accounted for 52% of increase even after adjustment for other factors (smoking)

Mobility impairments

- Limited endurance and functional strength for ADLs
- Exercise Guidelines With Obese Pregnancy (Hopkins 2011, Mottola 2009)
  - Exercise may result in modest reduction of LGA without significant increase in SGA
    - Results in favorable long-term outcomes for infant
  - Walking has been shown to be the most popular activity during pregnancy
  - In combination with nutritional control can be effective in preventing excessive weight gain in overweight and obese women (Mottola 2009)
  - Brisk walking program may be beneficial in reducing GDM risk in obese women
○ Study comparing obese pregnant women who did not participate in vigorous exercise but did participate in brisk walking program had 34% reduced incidence of GDM compared to control group who walked at leisurely pace (Berger 2002)
○ Pilot study using a mild walking program (30% of estimated heart-rate reserve) was successful in improving glucose regulation and reducing insulin requirements in overweight women with GDM (Davenport 2008)
○ Started walking 25 minutes per session three to four times per week, building slowly by adding 2 minutes per week until 40 minutes was reached
○ Only partially successful in preventing excessive GWG (50%)

• Equipment Considerations
  ▪ ADL assessment needs: Standard walkers, commodes, and wheelchairs are not reinforced for excess weight; may need to consider ordering heavy duty durable medical equipment for home or hospital needs

Size-Friendly Products and Resources (SOWH 2013)

• Baby Carriers and Slings
  ▪ Front-Pack Carriers: In general will accommodate ‘mid-size’ parents (up to size 22/24). Do not fit ‘apple shape’ or women with large breasts well. Examples:
    ○ Baby Bjorn Carriers: www.babybjorn.com. Can be used by larger parents. Custom sizing available
    ○ Sutemi Pack Baby Carriers: www.alaboroflove.org. Fit large-busted frame; comes with waist extender option
    ○ Ergo Carriers: www.ergobaby.com. Work well with women with back issues; Easy to carry larger infants; Comes with waist extender option
    ○ Baby Trekkers: www.babytrekker.com. Heavily padded; straps form ‘X’ in back for improved weight distribution; waist strap fastens by Velcro. Can also be worn as a backpack with baby facing out.
    ○ Mei Tai Carriers: www.thebabywearer.com. Versatile from birth through toddler, front, back or hip carrier.
  ▪ Slings: Versatile, easy on back and size forgiving; several brands come in larger sizes. Examples:
    ○ The Maya Wrap: www.mayawrap.com
    ○ The Over the Shoulder Baby Holder: www.babysling.com
    ○ The Baby Bundler wraparound sling: www.babybundler.com
    ○ Wraparound Slings: www.cottoncradles.com
    ○ Custom slings: www.getattached.com
    ○ Kari-Me Baby Carriers: www.kari-me.com
    ○ New Native Tube Slings: www.newnativebaby.com
    ○ Rebozo Sling: www.rebozoway.org. Traditional sling of Mexico, 100” x 30”.
  ▪ Hip Carriers:
    ○ The Cuddle Carrier: www.cuddlecarrier.com. Best for older children; fanny-pack design that converts into a hip seat with a waist belt converting into a padded shoulder strap. Compact, double-duty design.

• Carrier Product Review Site: The Baby Wearer: www.thebabywearer.com
Nursing Products
- Maternity Bras and Nursing Pillows
  - Breast is Best: www.breastisbest.com
  - Double Blessings Nursing Pillow: www.doubleblessings.com. Nursing pillow for twins, strap fits around mother with waist measurements up to 54”.
  - My Baby’s Nest: www.mybabynest.com. Designed to fit larger-breasted women, waist belt strap fits up to 60” waist.
  - My Brest Friend: www.mybrestfriend.com. Manufacturer states it fits waists up to 60” with special extender strap.

- Maternity Support Belts
  - Mom-Ez Maternity Back Support: www.plusmaternity.com. Contoured adjustable cotton support belt with full low back support. Fits hips up to 79”
  - Reenie Belt: www.plusmaternity.com. Adjustable sacroiliac-type belt support fits up to size 2x (46” hip).
  - Belly Bra. www.bellybra.com. Combination maternity bra/support belt in sizes up to XXXL.
  - Prenatal Cradle. www.docortho.com/Prenatal-Cradle.html. Abdominal support belt with shoulder straps. Sizes up to XL (size 24+, 300-350 lbs). Also available in tall sizes for women over 5’10”.
  - Mother-To-Be support belt. www.supports4u.com. Sizes up to XXL (22-26).
  - Serola SI Belt – commercially available up to size XL, however can order larger sizes directly from company with delivery in four days. Also can order belt extenders. www.serola.net

- Miscellaneous Products
  - Birthing Ball: Natural fitness 600# Professional Burst Resistant Exercise ball http://www.amazon.com/Natural-Fitness-Professional-Resistant-Exercise/dp/B0077QJN1C/ref=cm_cr_pr_product_top
  - Hygiene: www.amplestuff.com Online store with variety of hygiene, travel and medical products
  - Tips for avoiding skin breakdown:

- Plus-Size Mom Support Websites and Blogs
  - Plus Size Birth: www.plussizebirth.com
  - The Plus-Size Pregnancy Website: www.plus-size-pregnancy.org/
  - The Plus Size Mommy: www.plussizemommy.com
  - The Well-Rounded Mama: www.wellroundedmama.blogspot.com

Note: The Section on Women’s Health does not endorse any of the following websites or products. These websites are provided as a starting point for therapists and patients seeking more information or sources of size-friendly products.
Spinal Cord Injury (SCI) in Pregnancy and Postpartum
Overview and Statistics

- **Prevalence** (Cunningham 2005, Smeltzer 2009)
  - Approximately 1.4% of U.S. population (1,275,000 people) paralyzed due to SCI (Christopher and Dana Reeve Foundation 2012)
  - Most SCIs (51%) occur in early adulthood during peak reproductive years, between ages 16-30
  - Males at greatest risk, but growing number of women living with SCI (18%)
  - Fertility is not impaired; nearly 14% of women with SCI will have at least one pregnancy after injury (Jackson 1999)
  - Women with SCI can carry a child safely to term and many can deliver naturally depending on medical status and physical limitations

- **Causes of SCI** (n = 1,275,000) (Christopher and Dana Reeve Foundation 2012)
  - Work-related accident: 28% (7% as result of injury occurring while in military)
  - MVA: 24%
  - Sporting/recreation accident: 16%
  - Fall: 9%
  - Victim of Violence: 4%
  - Birth Defect: 3%
  - Natural Disaster: 1%
  - Other: 6%

- **Types of SCI** – American Spinal Injury Association (ASIA) Impairment Scale (ASIA 2011)
  - **A = Complete**:
    - Transection of the spinal cord, profound disruption of motor or sensory innervation below level of injury
    - No sacral sparing
  - **B = Incomplete**
    - Partial damage to the spinal cord
    - Sensory but not motor function preserved below the level of the lesion
    - Includes sacral segments S4-S5
  - **C = Incomplete**
    - Motor function preserved below neurological level of lesion
    - More than half key muscles below neurological level of lesion have muscle grade less than 3
  - **D = Incomplete**
    - Motor function preserved below neurological level of lesion
    - At least 50% key muscles below lesion have muscle grade of 3 or more
  - **E = Normal**, motor and sensory function are normal

- Incomplete lesions are more common
  - May be ambulatory or use wheelchair; degree of impairment related to severity and location of injury to spinal cord
  - Incomplete SCI and related impairments (SoWH 2013)
  - Complete SCI and related impairments (SoWH 2013)

Obstetric Considerations During Pregnancy and Postpartum with SCI
• Urinary tract infections
• Anemia
• Decubitus ulcerations
• Constipation
• Respiratory system effects
• Thrombophlebitis/DVTs
• Spasticity
• Autonomic dysreflexia

Equipment Considerations
• Mobility/gait and transfer training: weight of gravid uterus may make prior level of independence more difficult
• Monitor signs/symptoms of carpal tunnel syndrome and need for treatment to decrease impairment with mobilizing wheelchair
• Wheelchair and seating recommendations
  ▪ Requires regular monitoring/modification through pregnancy and postpartum to ensure appropriate seating system as body changes
  ▪ Education regarding frequent maintenance of air pressure in seating system and tires
  ▪ Pressure relief techniques and recommended frequency of pressure relief to reduce risk of decubitus ulcers (every 15 min)
  ▪ Safety belts or trunk straps for sitting balance
• Joint protection: bracing and orthotic recommendations, taping, instruction in donning/doffing braces due to hypermobile ligaments or spasticity with pregnancy

Parenting Considerations
• Lactation
  ▪ Breastfeeding is encouraged, however women with SCI less likely to breastfeed
  ▪ Possibly decreased milk production with injuries above T6 level contributing factor (Jackson 2004)
  ▪ May need referral to lactation consultant for assistance with positioning, especially with limited mobility in upper extremities
  ▪ Can trigger Autonomic Dysreflexia if pain is associated
  ▪ Physical or occupational therapy consult for adaptive equipment; techniques for breastfeeding and infant care

• Adaptive Childcare Equipment Resource Guide (SoWH 2013, handout available online)

Parenting with a Disability

Demographics/Research (Through the Looking Glass 2010: www.throughthelookingglass.org)
• In 2000, about 21% of children under age 18 (15 mil) in U.S. lives with at least one parent with a disability (U.S. Census Bureau, 2004)
• Although research on disabled parents is very scarce, significant progress has been made in the past 25 years through the work of Through the Looking Glass (TLG) Website: www.lookingglass.org
  ▪ Community-based organization supporting the rights and needs of persons with disabilities living independently
  ▪ Provides information, referrals, publications, training, and consultations regarding parenting with a disability
• First National Center on Parents with Disabilities, funded by the National Institute of Disability and Rehabilitation Research (NIDRR)

• Mother-baby interaction and basic infant care (Kirschbaum 1988)
  – 1985-88: Videotaped mother-baby interactions to explore tasks such as feeding, dressing, bathing, lifting, diapering
  – Mutual adaptation between mother and baby was documented
    - Example: Through a series of strategies to cue the baby of the lift (e.g., positioning, tugging on clothing), the 1-month-old baby of a mother with paraplegia would help his mom lift him by flexing his legs and head on her lap, remaining still until the mother completed the lift
    - Mothers with hemiplegia report their babies knew to approach them on their stronger side
    - Conclusion: mothers with disabilities can naturally adapt to baby care, and they can facilitate their baby’s adaptation

• Adaptive equipment and adaptive techniques can help prevent back or repetitive stress injuries and alleviate depression associated with exacerbations of the disability postpartum (Tuleja 1999, Kirschner 2010)
  – Equipment must be safe for mom and baby, as deemed by a skilled rehabilitation professional

• Impact of a mother’s disability on the family
  – Predictors of problems with parenting for disabled parents did not differ from those of nondisabled parents, such as history of abuse in the mother’s family (Kirschbaum 2002)
  – No significant difference between children of disabled parents and those of able-bodied parents in regard to self-esteem, gender roles, family functioning, individual adjustment, and attitudes toward parents. (Mazur 2006, Alexander 2002)
  – Parents with intellectual or psychiatric disabilities are especially vulnerable to discrimination, lack of appropriate services, and loss of their children (Preston 2010)
    - 40-60% out of home placement rates for US parents with intellectual disabilities
    - In some cases held to higher standard of parenting than non-disabled parents

Challenges for Parents with Disabilities
• National Survey of Parents with Disabilities (Preston 2010,Toms-Barker 1997)
  – 1,175 parents with disabilities were surveyed on their needs, experiences, and barriers
  – Findings:
    - Parents with disabilities face social barriers
      - 87% - lack of accessible transportation
      - 69% - lack of accessible housing
      - 50% did not know how to find adaptive equipment
      - A majority of respondents felt adaptive equipment would improve their independence, efficiency, stress, and fatigue
      - 48% reported difficulty in affording adaptive equipment

Role of the Therapist
• Part of multi-disciplinary team that may include obstetrician, social workers, psychologists, pediatricians, physiatrists, occupational therapists, and patient’s personal support system (family, peers, church, etc.)
  – Referral to therapy early in pregnancy important – some adaptive equipment can take time to make/order
No Time Or Money To Travel?
Scrambling to Get Your CEU's?
TRY OUR HOME STUDY MODULES
Now Available!

- Physical Therapist Management of Patients with Chronic Pelvic Pain
- Medical Management and Physical Therapy Management of High-Risk Pregnancy
- EMG Homestudy
- Physical Therapy in Obstetrics
- Physical Therapy for Osteoporosis: Prevention and Management
- Anatomy and Physiology of Intra-abdominal Pressure

For more information, go to the Section on Women's Health website at www.womenshealthapta.org or call 703-610-0224.
• Assist in identifying and locating commercially available equipment that works for the specific needs of the patient/client
  ▪ Adaptive baby care equipment and clothing resources
  ▪ Childproofing devices with accessibility for parent
  ▪ Identify safety needs in the home
• Training with safe baby care techniques/activities
• Caregiver training on how to assist disabled mother effectively
• Plan ahead for upcoming developmental changes of baby
• Offer guidance on local resources to create a home to promote the child’s well-being throughout the child’s developmental stages
• Adaptive equipment
  ▪ Identify individual strengths and barriers for childcare activities.
  ▪ Focus on safety, energy conservation, ergonomics, and parent-child comfort
  ▪ Work with rehabilitation engineers for safe adaptation of commercial products to fit the needs of the patient
  ▪ Considerations: Crib access, bathtubs, changing tables
• Mobility considerations
  ▪ Ambulation safety; Adaptive equipment for w/c, walkers, etc.
  ▪ Carrying equipment:
    ▪ Questions to ask with front packs, slings, strollers (Rogers 2006)
      ▪ How easy is it to get baby in/out of carrier?
      ▪ Will carrier work when baby is older?
      ▪ How easy is it to put on/off or put baby in/out?
      ▪ Possible to use when baby gains weight?
      ▪ Are fasteners easy to manipulate?
      ▪ How does carrying baby in front of body affect balance when walking?
      ▪ How will it affect balance when baby is heavier?
    ▪ Stroller
      ▪ Commercially sold strollers often too low to transfer baby comfortably
      ▪ Questions to consider (Rogers 2006)
        ▪ Heavy enough to support your weight without rolling away if you have to lean forward?
        ▪ Lightweight enough to push easily, take in/out of car?
        ▪ Does it have a brake to use while putting baby in/out?
        ▪ Ease of brake?
        ▪ How well does it turn? Uneven surfaces?
        ▪ Can you maintain your balance?
        ▪ Easy to store?
        ▪ Can it be used to carry your packages?
    ▪ Other types of carriers
      ▪ Baby lifter/carrier
      ▪ Newborn carrier (in wheelchair)
      ▪ Toddler carrier
• Other parenting considerations
  ▪ Breastfeeding
    ▪ Hands free pump: Medela bra with attached pump
Nursing pillows
Feeding table on wheelchair
- Dressing baby: snaps can be very difficult – use zippers, Velcro, larger size clothes

- Identify and access available resources and help/support for childcare
  - Postpartum doula
  - Family, friends
  - Community, church

- Adaptive Childcare Equipment Resource Guide (SoWH 2013)
  - Can be used for many populations with either permanent disabilities or temporary impairments

Other Parenting Resources  (SoWH 2013)
- Adaptive Equipment Guides
  - Ricability.org: Detailed product comparison guides for a variety of infant and baby equipment  http://www.ricability.org.uk/consumer_reports/parenting/

- Websites for More Information/Resources on Parenting with a Disability
  - Through the Looking Glass: http://lookingglass.org/index.php
  - Parents with Disabilities Online: http://www.disabledparents.net/
  - Family Village: A Global Community of Disability-Related Resources: http://www.familyvillage.wisc.edu/
  - National Women’s Health Information Center: http://www.womenshealth.gov/illness-disability/

- Rehab Engineering and Construction Resources
  - Rehabilitation Institute of Chicago – Rehab Engineering Department www.ric.org
  - National Rehabilitation Hospital – Rehab Engineering Service www.nrhrehab.org
  - Local university engineering programs – Students in need of final projects

- Books

- Organization Websites Specific to Disability
  - Arthritis/Connective Tissue
    - Arthritis Foundation: www.arthritis.org
    - National Institute of Arthritis and Musculoskeletal and Skin Diseases: www.niams.nih.gov
  - Epilepsy
    - Epilepsy Foundation: www.epilepsyfoundation.org

- Multiple Sclerosis
  - National Multiple Sclerosis Society: www.nationalmssociety.org
Dwarfism/Little People:
- Little People of America: http://www.lpaonline.org

Spinal Cord Injury/Paralysis
- Spinal Cord Injury Information Network: www.spinalcord.uab.edu
- Christopher & Dana Reeve Foundation: www.christopherreeve.org

CVA/Stroke

Note: Websites listed are not endorsed by the Section on Women’s Health and this list is not a complete list of available resources. It is provided as a starting point for therapists or patients seeking information about parenting with a disability.

Take Home Message
- A majority of parents with disabilities surveyed reported adaptive equipment would improve their independence, efficiency, stress, and fatigue (Toms-Barker 1997)
- PTs are in a position to assist patients with permanent disabilities or temporary impairments with identifying, recommending and locating adaptive equipment/bracing to:
  - Promote patient autonomy to the extent possible with childcare
  - Improve safety with ADLs and childcare tasks
  - Reduce pain during activities
  - Improve quality of life and promote parent-child bonding

References

**Scope of the Topic**


**Anatomical Physiological Changes**


Musculoskeletal


Sahrmann S. *Diagnosis and Treatment of Movement Impairment Syndromes.* St. Louis: Mosby. 2002


**Obesity**


**Spinal Cord Injury**


**Parenting with a Disability**


2014 Women’s Health Resource Directory

- A great resource to learn about products for your patients
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or contact Sarah Haag, PT, DPT, WCS • (815) 274-2073 • financialdev@womenshealthapta.org


Appendix E: Evaluation Algorithm for Lumbopelvic Pain

First question to answer: Does this patient belong in my clinic? Red flags, yellow flags may indicate referral needed. (Refer to Differential Diagnosis module.)

If NO to red flags or yellow flags, then:

Second question: Am I able to classify the patient into an appropriate intervention group (one of the LBP classifications or PGP diagnosis) based on patient history and examination? (Hicks 2005, Hayes 2009, Vleeming 2008)

If NO, then referral may still be warranted.
If YES, then proceed.

Red flag indicates referral needed?

NO


YES

Make referral; follow up as appropriate.

Repeated physiologic movements cause peripheralization or centralization? (McKenzie 1998)

N

Further lumbar testing positive? SLR, slump sit, segmental tests, dermatomes, reflexes, myotomes

NO

Likely lumbar involvement; address lumbar spine first (Vleeming 2008). If no improvement, evaluate pelvic girdle. If no further improvement or progressive neurologic change, refer for MRI.

YES


Pelvic girdle examination tests positive (including FABER with posterior pelvic pain)? (Vleeming 2008)

NO

Likely PGP. Address pelvic girdle (next page). If no improvement, pelvic floor exam (external or rectal) for PFM dysfunction. If no improvement and continued anterior pain with FABER, positive PPPT, or severe pain with WB, referral to rule out bony pathology (Fitzgerald 2008, Adams 1997, Borgerding 2007).

YES

Address pelvic girdle (next page). If no improvement, pelvic floor exam (external or rectal) for PFM dysfunction. If no improvement and continued anterior pain with FABER, positive PPPT, or severe pain with WB, referral to rule out bony pathology (Fitzgerald 2008, Adams 1997, Borgerding 2007).


NO

Address hip; if no improvement, referral to r/o bony pathology or intraarticular joint pathology. (Fitzgerald 2008)

YES

Refer back to physician; follow up as appropriate.
## Appendix E: Bracing Algorithm

<table>
<thead>
<tr>
<th>Clinical Problem</th>
<th>Recommended Bracing</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacroiliac pain eased with compression (ASLR test)</td>
<td>Sacroiliac Belt</td>
<td>Serola, Saunders, Compressor, IEM, S-I Lock, SI-Lock Maternity (has abdominal support) Hip Brace</td>
</tr>
<tr>
<td>Lumbar pain from weak abdominal support</td>
<td>Maternity lumbosacral support; Abdominal binder</td>
<td>Motherhood Ultimate Maternity Belt, Abdominal Binder, Mother to Be, Baby Hugger, Prenatal Cradle, Mom-Ez, Stork S’port, Better Binder, Soft Form Maternity Support Belt</td>
</tr>
<tr>
<td>Round ligament Pain</td>
<td>Abdominal binder; maternity support</td>
<td>Abdominal binders: Mother to Be, Baby Hugger, Prenatal Cradle, Mom-Ez, Stork S’port, Better Binder</td>
</tr>
<tr>
<td>Pubic symphysis pain</td>
<td>SI belt worn low &amp;/or abdominal supports as listed above. Try either, pain relief may be patient-dependent</td>
<td>Serola, Saunders, Compressor, IEM, S-I Lock, SI-Lock maternity</td>
</tr>
<tr>
<td>Vulvar varicosities</td>
<td>Perineal supporter</td>
<td>V2 support, Femme Jock</td>
</tr>
<tr>
<td>Varicose veins/LE swelling</td>
<td>Compression hose/support stockings</td>
<td>Jobst, Futuro, Sigvaris, Gabrialla, etc</td>
</tr>
<tr>
<td>Foot pain</td>
<td>Orthoses, Heel lifts/cups</td>
<td></td>
</tr>
<tr>
<td>Carpal tunnel</td>
<td>Wrist splints</td>
<td></td>
</tr>
<tr>
<td>Postural correction</td>
<td>Rigid tape; Kinesiology tape; Good fitting bra</td>
<td>Leukotape, McConnell tape, Kinesiotape, Spidertech tape, Rock tape</td>
</tr>
<tr>
<td>Diastasis rectus abdominis</td>
<td>Postpartum abdominal binder</td>
<td>3 panel AlphaBrace, Jeunique, Gabrialla, Belly Bandit, Tupler Diastasis Rehab Splint, Better Binder</td>
</tr>
</tbody>
</table>
### Appendix B: Adaptive Childcare Equipment Resource Guide for Parents with Disabilities

<table>
<thead>
<tr>
<th>Parenting Problem</th>
<th>Possible Solutions</th>
<th>Commercially Available Equipment/Sources</th>
<th>Comments/Tips</th>
</tr>
</thead>
</table>
| General positioning, transfers and mobility challenges | - Practice with equipment/positioning using weighted life—size baby doll or baby—size sack of potatoes  
- Swap positions/change arms if fatigued  
- Use UE/pillow support under infant/baby carriers for more support if needed  
- Consider individual parental capabilities and challenges in choosing proper equipment — One size definitely does NOT fit all | - Ricability.org: Online equipment consumer buying guides and comparisons for use by persons with disabilities covering commercial baby carriers, high chairs, strollers (pushchairs), safety gates, bottle warmers and sterilizers  
www.ricability.org.uk  
- Babywearer.com: Online resource with commercial baby carrier comparison chart of price, ease of use, comfort, etc. Also comparison chart of age—appropriate carriers, product reviews, instructions for safe use, forums, more.  
www.thebabywearer.com | - Seek consults as needed from PT, OT, Social Work, Lactation Consultant, Rehab Engineers, others  
- Look for commercially available equipment that can be modified as cost—effective alternative to custom  
- Gradually build up endurance for activities  
- Support infants in carriers with bending  
- Check straps and buckles regularly  
- Make sure all equipment is safe, provides good support  
- Never leave baby unattended in carrier  
- Refer to OBF Course Manual: Biomechanical Strategies |
| Breastfeeding                          | - Bean—shaped nursing pillow  
- Lap table for w/c  
- Front Sling  
- Alternative positioning (sidelying, football hold, cradle hold) | Nursing pillows: Boppy, My Brest Friend, many available options  
Lap Tables: Standard w/c trays available through home medical equipment companies  
Slings: Maya Wrap, Baby Bundler, Huggababy, many available options  
www.thebabywearer.com | - Lactation Consultant/OT  
- Consider slings with head support; easy fasteners  
- Consider pillow or wedge (facing parent) under front—lying sling to keep baby from sliding off lap  
- Alternative burping strategies if unable to hold on shoulder: Apply gentle moving pressure on baby’s belly in supported sitting position |
| Dressing and changing infant          | - Infant clothing with full length openings, ribbed necks, large arm holes  
- Velcro or magnetic closures  
- Slip on booties/shoes  
- Use adjustable height continuous work surface to avoid lifting  
- Keep diapers, wipes, etc on lower accessible shelves  
- Reachers/tongs for hard—to reach babycare items  
- Mobiles that dangle above changing surface to capture toddler’s interest, less resistance with dressing/diaper changes | Clothing:  
- Rock Me Baby Clothes www.rockmeusa.com  
- Magnetic closure infant wear: Magnificent Baby: www.magnificentbaby.com  
- Limited commercial availability of Velcro clothing for infants  
- Velcro shoes available at Target, Walmart, many other large department, shoe and children’s stores  
- Disposable diapers and Velcro diaper covers  
Changing table/accessories:  
- Combo bassinet, changing table, playpen (i.e. Joovy Home Playyard) www.rightstart.com  
- JJ Cole Diaper & Wipes caddy  
www.rightstart.com | - Avoid clothing with set—in sleeves, buttons and fasteners  
- When adapting readily available baby clothes, use soft baby Velcro available at sewing stores to avoid chafing  
- Can adapt wheeled serving tables, tea wagons, sturdy desk or table for changing/dressing/bath tables  
- Make sure changing pads are secured to solid surface of safely positioned on bed; Use safety straps — can use Velcro instead of buckle  
- Children can eventually be taught to help: Lifting bottom for diaper changes; climb up changing table  
- Consider using level work surfaces while seated (desk/table top) to avoid bending/lifting |
### Appendix B: Adaptive Childcare Equipment Resource Guide for Parents with Disabilities

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<td><strong>Bathing infant</strong></td>
<td>• Bath inserts and supports that fit in/over standard tub&lt;br&gt;• Freestanding baby bath tubs that can be placed on low table&lt;br&gt;• Infant bathtubs that fit in sink&lt;br&gt;• Hand held shower/sink sprayer&lt;br&gt;• Hand grips that suction to edge of tub&lt;br&gt;• Baby visor to keep soap/water out of eyes</td>
<td>• First Year’s Infant to Toddler Tub with Sling – fits single to double sinks; mesh sling &amp; foam pads; upright backrest <a href="http://www.toysrus.com">www.toysrus.com</a>&lt;br&gt;• Primo Baby Bath – unique anatomical shape keeps baby in place; won’t slip under water <a href="http://www.primobaby.com">www.primobaby.com</a>&lt;br&gt;• Puj Tub – soft foldable bath tub that fits any standard sink <a href="http://www.target.com">www.target.com</a>&lt;br&gt;• Lil Rinser Bath Visor – easy to apply, has handle to remove <a href="http://www.diapers.com">www.diapers.com</a></td>
<td>• Inflatable bath inserts are option to avoid lifting, carrying and/or emptying a heavy plastic baby tub full of water – Most require babies be able to sit unsupported&lt;br&gt;• Consider using table or desk for seated height bathing surface to avoid need for bending/lifting</td>
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<tr>
<td><strong>Lifting infant in/out of bed</strong></td>
<td>• Cribs with castors allow easy relocation next to parent’s bed&lt;br&gt;• For w/c users, need room below crib for w/c footrests&lt;br&gt;• Cribs with swinging side or end rail&lt;br&gt;• Portable cribs with bassinet attachments for easy reaching</td>
<td>• Arm’s Reach Mini Co- Sleeper Bassinet <a href="http://www.rightstart.com">www.rightstart.com</a>&lt;br&gt;• Chico Lullaby LX Playard <a href="http://www.rightstart.com">www.rightstart.com</a>&lt;br&gt;• Babee Tenda Safety Convertible Crib – sidetall for w/c accessibility <a href="http://www.babeetenda.com">www.babeetenda.com</a></td>
<td>• Crib/cot height can be lowered by cutting legs; raised by adding bed blocks or castors&lt;br&gt;• Some cribs have foot-operated mechanism that can be reached with one hand from seated position in w/c&lt;br&gt;• Consider using pram for first few months instead of crib for easy portability</td>
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<tr>
<td><strong>Feeding infant</strong></td>
<td>• Easy—to use Velcro harness for securing infant/toddler in high chair&lt;br&gt;• Wheeled highchairs with adjustable trays that lift up, over the back, or out of the way instead of requiring removal&lt;br&gt;• Clean up: plastic sheet or newspaper under high chair; bibs with elastic or ribbed neck</td>
<td>• <a href="http://www.ricability.org.uk">www.ricability.org.uk</a> for reviews of commercially available high chairs and bottle warmers/sterilizers&lt;br&gt;• Graco DuoDiner Convertible High Chair – multiple positions; 5—way tray; compact <a href="http://www.onestephead.com">www.onestephead.com</a>&lt;br&gt;• Oversized Vinyl Splat Mat <a href="http://www.onestephead.com">www.onestephead.com</a>&lt;br&gt;• mISwivel Adjustable Feeding Chair for Babies – 3—in—1 swivel chair converts from reclining infant seat to high chair <a href="http://www.onestephead.com">www.onestephead.com</a>&lt;br&gt;• Babee Tenda Feeding table—large tray; wheeled; versatile <a href="http://www.babeetenda.com">www.babeetenda.com</a></td>
<td>• Consider height, weight, stability, and manageability in choosing high chair&lt;br&gt;• Baby chair seats that attach to tables may be too heavy for parents to maneuver&lt;br&gt;• General tips for positioning/seating: nonslip surfaces; lap trays; equipment mounts, blocks for chair feet; alternatives to high chairs include cushions/positioning pillows, bolsters, rolled towel, sand or bean bag</td>
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<td>Carrying and Transporting</td>
<td>- Use of prams/carriers/strollers&lt;br&gt;- Use of harness to strap baby securely to parent's body while in w/c&lt;br&gt;- Castors on base of playpen to enable relocation w/o lifting child</td>
<td>- <a href="http://www.ricability.org.uk">www.ricability.org.uk</a> for reviews of commercially available strollers and carriers&lt;br&gt;- <a href="http://www.thebabywearer.com/index.php?page=bwposchart">http://www.thebabywearer.com/index.php?page=bwposchart</a> for comparison chart of commercially available baby carriers&lt;br&gt;- Baby B’Air – lap harness <a href="http://www.babybair.com">www.babybair.com</a></td>
<td>- Keep equipment at waist or w/c height to minimize need to bend and lift&lt;br&gt;- W/C adaptive baby seats are not available commercially – refer to Appendix A: Website Resources for customizing adaptive equipment</td>
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<tr>
<td>Toddler Mobility and Playtime</td>
<td>- Playpens with solid floors to prevent toddlers from moving them; gates with manageable latches to prevent need for lifting&lt;br&gt;- Commercial ‘play yards’&lt;br&gt;- Harnesses with manageable fasteners/Velcro straps to secure child in high chair, stroller, swing, parent’s lap&lt;br&gt;- Safety gates&lt;br&gt;- Long—handled reachers for picking up toys&lt;br&gt;- Easy access toy boxes on castors that children can assist putting toys back into when finished playing</td>
<td>- <a href="http://www.ricability.org.uk">www.ricability.org.uk</a> for reviews of commercially available safety gates, high chairs, strollers&lt;br&gt;- Friendly Toys Little Playzone – portable, different configurations <a href="http://www.rightstart.com">www.rightstart.com</a></td>
<td>- Section off ‘safe area’ in house where child can play&lt;br&gt;- Some parents leave harness on child all the time to use to lift from floor, playpen and crib; others leave various harnesses strapped to different equipment&lt;br&gt;- Harness leaves parent’s arms free&lt;br&gt;- Harnesses can be lengthened to allow child to walk beside parent in w/c&lt;br&gt;   If parent is too fatigued to play, consider playgroups, more sedentary play activities (reading, puzzles), family support, alternatives (I am very tired right now, but will play with you tonight for extra special long time)&lt;br&gt;- Energy conservation with tasks: schedule activities for efficiency with location; fewer steps</td>
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<tr>
<td>Safety</td>
<td>- Gates at front and back doors, possibly one into kitchen&lt;br&gt;- Teach verbal cues and behavior modification to avoid dangerous areas in the home (stove, outlets, etc)&lt;br&gt;- Intercom systems</td>
<td>- <a href="http://www.ricability.org.uk">www.ricability.org.uk</a> for reviews of commercially available safety gates&lt;br&gt;- Baby Monitors – many styles commercially available on market; some audio only, some audio and visual monitors&lt;br&gt;- Baby/toddler shoes with squeakers that alert parent when child is moving <a href="http://www.pipsqueakers.com">www.pipsqueakers.com</a></td>
<td>- Countertops lowered to w/c height are also more accessible to toddlers&lt;br&gt;- Babyproof home as any parent should: electric outlets, stairs, cupboards, medicines, etc&lt;br&gt;- Many safety gates available on the market – Look for ease of opening/latching, width (wide enough for w/c, likely side—opening), sturdiness; type of opening (side, 1—way, 2—way, front)&lt;br&gt;- Practice routes/methods of transporting child safely out of house in case of emergency</td>
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<td>Parents with Memory or Intellectual Impairments</td>
<td>• Memory assistive device for parents with cognitive deficits to prompt for basic details of infant care</td>
<td>• Itzbeen Baby Care Timer – 4 buttons to track baby changing, feeding, napping, waking, etc. Has extra button that can be customized. <a href="http://www.itzbeen.com">www.itzbeen.com</a></td>
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*Note: The Section on Women’s Health does not endorse any of the products or websites listed above.*

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