Musculoskeletal Causes of Postpartum Pelvic Pain

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Objectives

- Identify musculoskeletal pain generators in the female pelvis in the differential diagnosis of pelvic pain in the peripartum period
- Understand specific physical examination techniques in evaluation of pelvic pain
- Describe evidence based rehabilitation interventions for treatment of peripartum pelvic pain
Epidemiology

Many studies are from Europe

Low back pain vs. posterior pelvic pain

Many retrospective studies
## Common Problem: Prevalence

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Study Details</th>
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<tbody>
<tr>
<td>56%</td>
<td>n=200, recall immediate post-partum</td>
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<tr>
<td>50%</td>
<td>n=862, prospective</td>
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<tr>
<td>49%</td>
<td>n=855, prospective</td>
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<tr>
<td>68.5%</td>
<td>n=645, prospective</td>
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<tr>
<td>72%</td>
<td>n=891, prospective</td>
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<tr>
<td>76%</td>
<td>n=200, prospective</td>
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<tr>
<td>80%</td>
<td>n=1531, retrospective</td>
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Implications of a Common Prevalence

- 30-50% with severe pain lose time from job & reduced social interactions (Noren 1997, Kristiannson 1996)
- Majority of $ spent on social health problem in Scandinavia (Noren 1997)
- Under reporting
- 30% use prescribed and non-prescribed medications during pregnancy (Stapleton 2002, Skaggs prelim)
- 20% with severe pain avoided future pregnancy due to fear of LBP (Brynhildsen 1998)
Long-term Implications

- 68% with moderate to severe pain continue to have pain after pregnancy (Stapleton 2002)
- 52% of women with LBP & Pelvic pain during pregnancy developed pelvic floor pain (Pool-Goudzwaard 2005)
- 5% of all pregnant women found to report pain 3 yrs later (Noren 2002)
Distribution of Location of Pain

- sacrum
- lumb-sac
- lumbar
- cer-thor
- symphysis
- abdomen
- foreleg
- ant-pelvis
- trochanter
- arm
- thigh
- shoulder
Pelvic Pain or Low Back Pain

- Gutke A, Spine 2006
  - 313 women 12-18 weeks pregnant
    - Questionnaires & physical exam by same P.T.
  - 194 had pain
  - 54% had pelvic girdle pain
  - 17% had lumbar pain
  - 29% had both
  - Those with both were the most functionally impaired, higher pain intensity scores, & lower health status
Classification of Pregnancy-related Pelvic Joint Pain (PPPP)

- 2 studies
- 1460 women
- 2269 women
- Objectively assessed
- 20.1% and 23.7% with PPPP
- daily pain from the pelvic joints

- Albert H. 2000
- Albert HB et al. Incidence of Four Syndromes of Pregnancy Related Pelvic Joint Pain. SPINE 27,( 24) 2831–2834

- classified pelvic girdle pain in pregnancy into 4 distinct groups
- pelvic girdle syndrome 6% (daily pain in all three joints)
- symphysisiolysis 2.3%
- one sided SI syndrome 5.5%
- double sided SI syndrome 6.3%
- miscellaneous group 1.6%: daily report of pelvic joint pain but inconsistent objective findings
Serum Relaxin in Normal Pregnancy

A. MacLennan, et.al. 1986 (Lancet)
The Hormone Controversy: Relaxin

Studies showing correlation with pain

MacLennan Lancet 1986
Kristiansson Am J Obstet Gynecol 1996
Kristiansson Am J Obstet Gynecol 1999

Studies showing no correlation

Schauberger Am J Obstet Gynecol 1996
Joint Laxity as a Predictor?

  - 123 women
  - Prospectively measured SIJ laxity via Doppler imaging & vibration at 36 wks & 8 weeks postpartum
  - 77% positive predictive value of asymmetric laxity & pain during pregnancy & postpartum
  - 3x higher risk of pain postpartum if asymmetry noted & moderate to severe pain experienced during pregnancy
Pain After Labor

- Epidural anesthesia
    - RCT, 369 women
    - 184 received epidural
    - 185 no epidural
    - Mean time to interview was 26 mo
    - No differences in onset or duration LBP
    - No differences in ADLs or spine mobility
Postpartum

- **LBP**
  - **Ostgaard *Spine* 1992**
    - 67% (n=817) reported LBP at delivery
    - 37% reported pain 18 mo postpartum
    - 7% had “serious” LBP
    - 63% average recovery at 4.25 mo
  - **Ostgaard *Spine* 1996**
    - during pregnancy posterior pelvic pain most common
    - postpartum LBP most common
Postpartum

- Nilsson-Wikmar *Physiother Res Int* 1999
  - 119 women with pain > 2 mo postpartum
  - 27% posterior pelvic pain
  - 18% lumbar spine pain
  - 39% posterior pelvic & lumbar pain
  - 16% no pain could be provoked

  - No difference in pain intensity in the above groups
  - Those with pain on provocative testing had greater daily activity movement-related impairments

  - 231/799 reported pain during pregnancy
    - 41/231 continued to report pain 3 yrs later (5% of total population!!!!)
  - Women with both LBP & PP
Risks for Postpartum Pain

  - 72% of 891 women reported pain during pregnancy
  - 43.1% continued to report pain 6 mo postpartum
    - Earlier onset of pain during pregnancy
    - Higher maternal age
    - Higher BMI
    - Higher pain intensity scores during pregnancy
    - More women with joint hypermobility
    - Elective c-section associated with risk of pain postpartum
Postpartum

- Brynhildsen *Obstet Gynecol* 1998
  - 52 pregnant women required time off
  - 10 refrained from another pregnancy
  - 31 had similar pain with next pregnancy
  - postpartum women with pain took more sick leave
Localizing Pain

- sacroiliac joint / posterior pelvic
- lumbar segment
- hip
Clinical History

- LBP
- posterior pelvic pain
- groin pain
- LE pain/numbness/tingling
- pelvic floor pain
- c/o of giveaway weakness in posterior pelvis
- pain with legs crossed, transitional motion
- pain increases with speed of walking
- pain increases with stairs
- night time pain
Physical Exam

- **Motion Tests**
  - Modified Gillet
  - Seated/Stand Flexion
  - Hip & Lumbar ROM
  - Leg length
  - Muscle weakness
  - Muscle tightness

- **Provocative Tests**
  - PSIS & Sacral Sulcus tenderness
  - Patrick’s/Forced Faber’s
  - Gaenselen’s
  - Posterior Pelvic Provocation test/AP glide/90/90 compression
  - Sit-slump
  - Active Straight Leg Raise
Pelvic Floor Evaluation

[Diagram showing pelvic floor muscles and bony structures, labeled with anatomical terms such as 'Tailbone' and 'Pubic bone'].
Normal pelvic floor function

- **voluntary contraction**: moves ventrally and cranially during contraction
- **voluntary relaxation**: able to relax on demand, descents from ventral position
- **involuntary contraction**: takes place preceding increase in abdominal pressure
- **involuntary relaxation**: takes place when straining as in defecation

(Messelink, 2005)
Pelvic floor dysfunction

- Non-contracting/underactive pelvic floor
  - Voluntary and/or involuntary

- Non-relaxing/overactive pelvic floor
  - Voluntary and/or involuntary

- Non-contracting, non-relaxing pelvic floor
Vaginal manual muscle testing

**Modified Oxford Scale**
- 0/5 = no discernible contraction
- 1/5 = flicker
- 2/5 = weak contraction, no lifting or tightening
- 3/5 = moderate, visible lifting contraction is
- 4/5 = good, lift and squeeze
- 5/5 = 10 second squeeze
Abdominal scar tissue
Diastasis Rectus Abdominus
( DRA)
Peri-partum Rectus Diastasis

- Place two fingers in periumbilical region
- Accentuate separation with abdominal crunch
- Describe in centimeters width and length
- Biomechanical factor in pregnancy related low back/pelvic pain
Pelvic Obliquities

- Identify asymmetries of PSIS, Iliac Crest, ASIS, Pubic Symphysis, ILA, Greater Trochanter, Gluteal Folds
- Many Nomenclatures exist - Stay internally consistent
PSIS Symmetry
Iliac Crest Symmetry
Iliosacral Dysfunction

- Rotations: Anterior/Posterior
- Shears: Superior/Inferior
- Flares: In/Out
- Named for the side of pain not the side of hypomobility
- Often it is the hypermobile SIJ in pregnancy that is the dysfunctional/painful side (unlike the hypomobile SIJ in nonpregnant state)
SIJ Motion Tests

- Gillet’s test for SIJ mobility
- Often the hypermobile side is the painful or dysfunctional side
- *Damen 2002
SIJ Provocative Test

- Forced Faber’s or Patrick’s test
  (ipsilateral pain)
SIJ Provocative Test

- AP Glide or Posterior Pelvic provocation test (ipsilateral pain)
SIJ Provocative Test

- Active straight leg raise with compression
- Lifting ipsilateral leg = difficult with compression = better
Differential Diagnosis

- Sacroiliac Joint dysfunction *
- Pelvic Obliquity (asymmetry)
- Pelvic Floor Myofascial Pain/Dysfunction
- Pubic Symphysitis/Osteitis Pubis/Pubic Symphysis separation
- Hip Pathology (OA/RA/AVN/Transient Osteoporosis, Stress fracture
- Lumbar Herniated Disc/Facet arthropathy/stenosis
- Vertebral Segmental Dysfunction/ Rib Dysfunction
Myofascial pain and dysfunction

- Pelvic floor
- Abdominal muscles
  - Diastasis recti
- Hip flexors
- Hip rotators
- Scar tissue
  - Suprapubic
- LE musculature

- Weakness and deconditioning in one muscle group can lead to pain and dysfunction in another
Pelvic Pain: Sacroiliac Joint

- Most common pain diagnosis in pregnancy
- Can feel like back or buttock pain, radiating down the back of the leg, often worse with changing positions
- Leg can feel like it’s giving out
Anatomy of the Sacroiliac Joint: A True Joint

- Synovial joint, synarthrosis, and amphiarthrosis
- C-shaped or L-shaped joint
- Sacral side with thick hyaline cartilage
- Ilial side with fibrocartilage
- Primary innervation is from S1
- It moves, especially in pregnancy
SIJ pain referral patterns
Disc Herniation

- Flexion based low back pain/radiating leg pain with associated numbness/weakness
- Thorough exam is key to differentiate with SIJ dysfunction
- Patients can have SIJ dysfunction with an S1 radiculopathy
Stress Fracture

- MRI = Best test in pregnancy, CT/bone scan
- Consider if h/o female athlete triad (amenorrhea, osteopenia, eating disorder)
Pelvic Pain: HIP

- Patients complain of anterior/medial thigh pain
- Causes include OA/RA, avascular necrosis, fracture, dislocation, stress fracture of pelvis, bursitis, labral tear, congenital hip dysplasia, myofascial pain, myositis ossificans
- Exam includes range of motion testing, x-ray in non-pregnant
- In pregnancy, “hip” pain more likely SIJ pain
- Rare cause: transient osteoporosis of pregnancy, 3rd trimester, pain with weight-bearing, MRI for Dx
Labral pathology: MRI
Arthrogram Postpartum
Pelvic Pain: Pubic Symphysis

- Patients complain of anterior pelvic or pubic pain
- Concomitant pelvic obliquity
- Sonographic (or Xray) measurement of pubic symphysis width
Pelvic Pain: Pubic Symphysis

- Separation (>1 cm) not typically seen antenatally without trauma
- Most often diagnosed postpartum in traumatic L&D
- If left uncorrected, can lead to osteitis pubis/OA
Musculoskeletal Ultrasound vs. X-ray

- Sonographic (or X-ray) measurement of pubic symphysis width
- Most pregnant women with symphyseal width of more than 9.5mm experience pain
- Average width non-pregnant = 4.0mm
- Average width pregnant without pain = 6.3mm  
  (Schoellner 2001)
Pelvic Pain: Coccyx

- Coccydynia can be caused by fracture, contusion, muscle spasm (coccygeus/piriformis), referred from sacrum
- Examined via rectal exam or xray postpartum
- Xray can be normal
- Angulation
Coccygeal Ligaments

- Primary attached to the sacrum via the coccygeal ligaments, anterior and posterior
- Anococcygeal ligament
  - External anal sphincter - support lower end of the rectum
- The tip of the coccyx can move up to 30% anteriorly and up to 1cm laterally
Pelvic Pain: Pelvic Floor

- Associated with pelvic obliquity
- Internal/vaginal and rectal exam
- Dyspareunia
Pelvic Joint Pain and Pelvic Floor Dysfunction

- Pelvic floor dysfunction occurred in 52% of all patients with pregnancy-related low back and pelvic pain.
- Increased activity level.
- Loss of motor control.
- In PLBP patients relative to healthy subjects, significantly higher rest tone, less activity during coughing, increased activity during pushing, shorter endurance time.
Postpartum Lower Extremity Nerve Injury

- 7.7/100,000 – 18.9/10,000 retrospective
- Wong A, Obstet Gynecol 2003
  - Prospective study 6145 live births
  - Incidence with labor 1.2%
  - Significant correlation
    - Nulliparous
    - Pushing time
    - Semi fowler pushing time
    - Thigh flexion 90 degrees
Postpartum Nerve Injuries
(PATIENTS WITH LABOR)

- 23 LAT FEM CUT
  - 2 bilateral
- 19 FEM
  - 14 mixed
  - 5 sensory
- N=55
Red Flags

- Progressive night time pain
- Progressive lower extremity numbness, tingling, paresthesia
- Reduced lower extremity reflex
- Bowel and bladder incontinence
- Lower extremity weakness
- Severe groin pain with hip range of motion and weight bearing
Diagnostic Testing

- MR Imaging
- Plain xray
- CT
- Bone Scan
- Musculoskeletal Ultrasound
Prevention
Education & Exercise During Pregnancy

Noren Spine 1997

- intervention group given education & PT
- less sick days compared to controls
  (30.4 vs. 53.6 days/women)
- savings of $53,412/pt in 1990
Treatment During & After Pregnancy

- Stuge Spine 2003
  - 17 studies, 9 met review criteria, 3 of high quality
    - 3 high quality studies
      - General exercise showed no significant difference in pain
    - 3 low quality studies
      - Physical therapy and acupuncture lowered pain and reduced sick leave
Education & Exercise During Pregnancy

Kihlstrand Acta Obstet Gynecol Scand 1999

water-gymnastics group reported less intense LBP & fewer sick days than controls (982 vs 1484 total days)
Treatment – Pain Management

- **Elden 2005 – Effects of Acupuncture and Stabilizing exercise as adjunctive treatment, both constitute efficient complements to standard treatment, acupuncture slightly superior**

- **Garashasbia 2005 – Prospective randomized study, those in exercise group had significantly reduced LBP during the second half of pregnancy**
Treatment After Pregnancy

- **Stuge Spine 2004**
- **81 women with LBP/posterior pelvic pain onset during pregnancy or within 3 weeks of delivery**
- Randomized to specific stabilization (resisted core) program or PT without a specific program
  - 70% specific tx grp received mobilization
  - Avg 11 treatment sessions
  - 1 yr f/u
- Specific treatment group had lower pain intensity & disability, higher quality of life, & improvement on physical tests
Goals for Rehabilitation

Address Biomechanical factors

Pelvic joint
Motor control
Awareness
Function
“Core” muscles: Deep stabilizers
Contribution of pelvic floor muscles to stiffness of the pelvic ring

- SI joints of females are more mobile than males
- Simulated tension in the pelvic floor muscles increased the stiffness of the SI joints by 8.5% in females, not in males
- Simulated tension caused a backward rotation of the sacrum
- In females, pelvic floor muscles have the capacity to increase stiffness of the pelvic ring

Pool-Goudzwaard AL 2004
Transversus abdominus and SIJ stiffness

- Independent transversus abdominis contraction decreased sacroiliac joint laxity to a significantly greater degree than the general abdominal exercise pattern (P < 0.0260).
- This decrease in laxity is larger than that caused by a bracing action using all the lateral abdominal muscles.

Richardson CA 2002
Co-Activation of Transversus Abdominus and Pelvic Floor

- Co-activation is the normal recruitment pattern
- Pelvic floor muscles (PFM) contract first (mediated by central nervous system)
- Transversus Abdominus (TrA) contraction is initiated and enhanced by active PFM contraction
- TrA contraction corresponds with voluntary urethral closure
- Quality of PFM and TrA contraction can be directly affected by position of the spine; neutral spine relates to maximal TrA activity
- Pelvic joint pain and perhaps hip pain adversely affect contraction

Sapsford RR, Hodges 2001
Pelvic Joint Pain and Pelvic Floor Dysfunction

- pelvic floor dysfunction occurred in 52% of all patients with pregnancy related low back and pelvic pain

Pool-Goudzwaard AL, et al, 2005
Connections to lumbar spine and hip
Pubococcygeus must stretch 3.26 times its normal length during vaginal delivery

(Delancey, 2003)
10% Result in Denervated Levator Ani (Delancey 2003)
Functional Rehabilitation
Manual Therapy and Self mobilization
Promote postural alignment
Symmetrical body mechanics
(no bending and twisting)
Pelvic Floor Muscle Training

Pregnancy
- Not just “Kegel’s”
- Endurance / tonic
- Quick flick / phasic
- Eccentric
- Behavioral
- Functional training

Postpartum
- Biofeedback
- Electrical Stimulation
- Weighted cones
- Pressure biofeedback / manometry
Realtime ultrasound

(Bø K, Sherburn M.. 2005)
Pelvic Pain

- External musculoskeletal
  - Lumbo-pelvic-hip
- Pelvic floor musculoskeletal
  - Muscles
  - coccyx
  - “downtraining”
- Manual therapy
Manual Therapy to pelvic floor muscles
sEMG biofeedback
Treatment

- Ergonomic education
  - work
  - ADLs
  - exercise routine
  - Labor positioning
  - breastfeeding
  - childcare
Sacroiliac Joint Belt

- Provides a sense of stability via joint approximation
- Facilitates motor control of core stabilizing muscles
- Can be used in SIJ or pubic symphysis pain any time in the peripartum period
- SIJ belt reduced rotation by 19%
  Vleeming Am J Obstet Gynecol 1992
SIJ belt

- Mens 2006
- Application of pelvic belt in high position decreased SIJ laxity to a sig greater degree than the low position $p = .0006$
AAP (2001) Pain Medication Use in Lactation

- NSAIDS – Ibuprofen – at full dose, no known sign or symptom reported in infant, Naprosyn, clinoril, feldene can accumulate in the infant with prolonged use, COX II not well studied
- Prednisone – no known sign or symptom reported in infant
- Morphine, Codeine, hydrocodone – considered safe
- Meperidine (demerol) – not preferred b/c of long half-life in infants
- TCAs – qHS dose best, minimal effect to infant, still rec use with caution
- SSRIS – Zoloft/Paxil best choices, Prozac safe in pregnancy, controversial in breastfeeding
- Gabapentin – not classified
Injectable Medications

- **Betadine** - avoid
  - **Hypothyroid** - Postellon 1982 JAMA, Danziger 1987 Arch Dis Chil, Delange et al 1988 Arch Dis Chil

- **Contrast** - o.k.
  - **Amount in breast milk** - minimal
    - FitzJohn et al 1982 Br J Radiol, Nielsen et al 1987 Acta Radiol,
  - **Bioavailability** - nil
    - Hale 2004 Clin Ob Gyn
Glucocorticoids

- Breast Feeding
  - American Academy of Pediatrics Committee on drugs 1989 Pediatrics
    - Prednisone
      - Pregnancy 20mg/day Ito 2000 NEJM
    - Prednisolone - 80mg/day Ost et al 1985 J Ped,
      Greenberger et al 1993 J Ped
Interventional Spine Recommendations - Post-Partum

- Cleanse with isopropyl alcohol
- Fluoroscopically guided injections preferable to US or MRI - equipment, training/experience, cost and time
- Contrast, Local anesthetic, glucocorticoid - no issue
In Conclusion

- LBP & pelvic pain common during the peripartum period may be the initiation of chronic pelvic pain
- Women seldom offered specific education or treatment
- Pelvic Joint Pain is the most common etiology
- Current frontline treatment is rehabilitation/physical therapy