Musculoskeletal Causes of Postpartum Pelvic Pain

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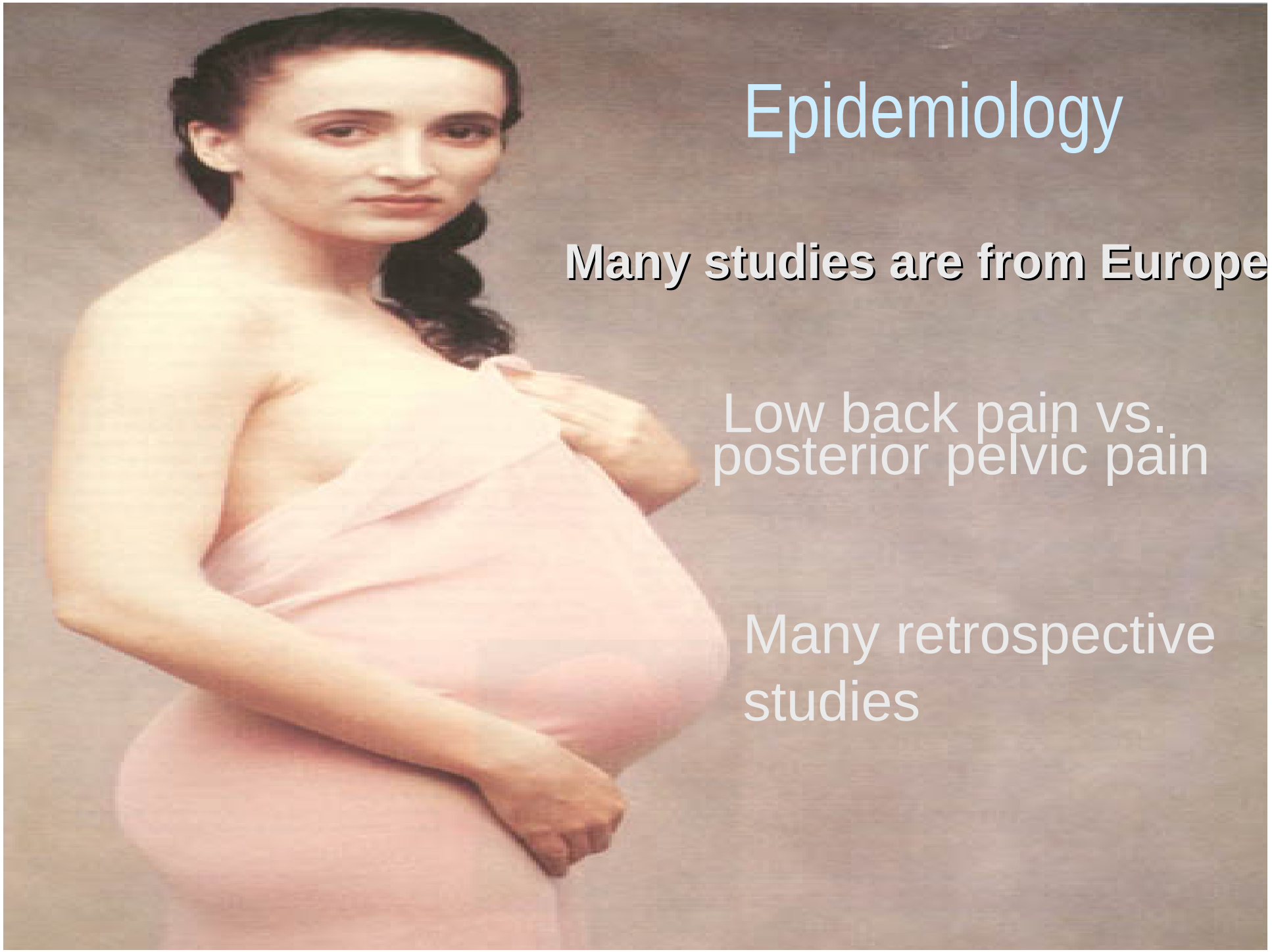
Objectives

- **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

56%	n=200, recall immediate post-partum Fast A Spine 1987
50%	n=862, prospective Berg G Obstet Gynecol 1988
49%	n=855, prospective Ostgaard H Spine 1991
68.5%	n=645, prospective Wang S Obstet Gyncol 2004
72%	n=891, prospective Mogren Spine 2005
76%	n=200, prospective Kristiansson P Spine 1996
80%	n=1531, retrospective recalled pain during pregnancy Stapleton D Aust NZ J Obstet Gynaecol 2002

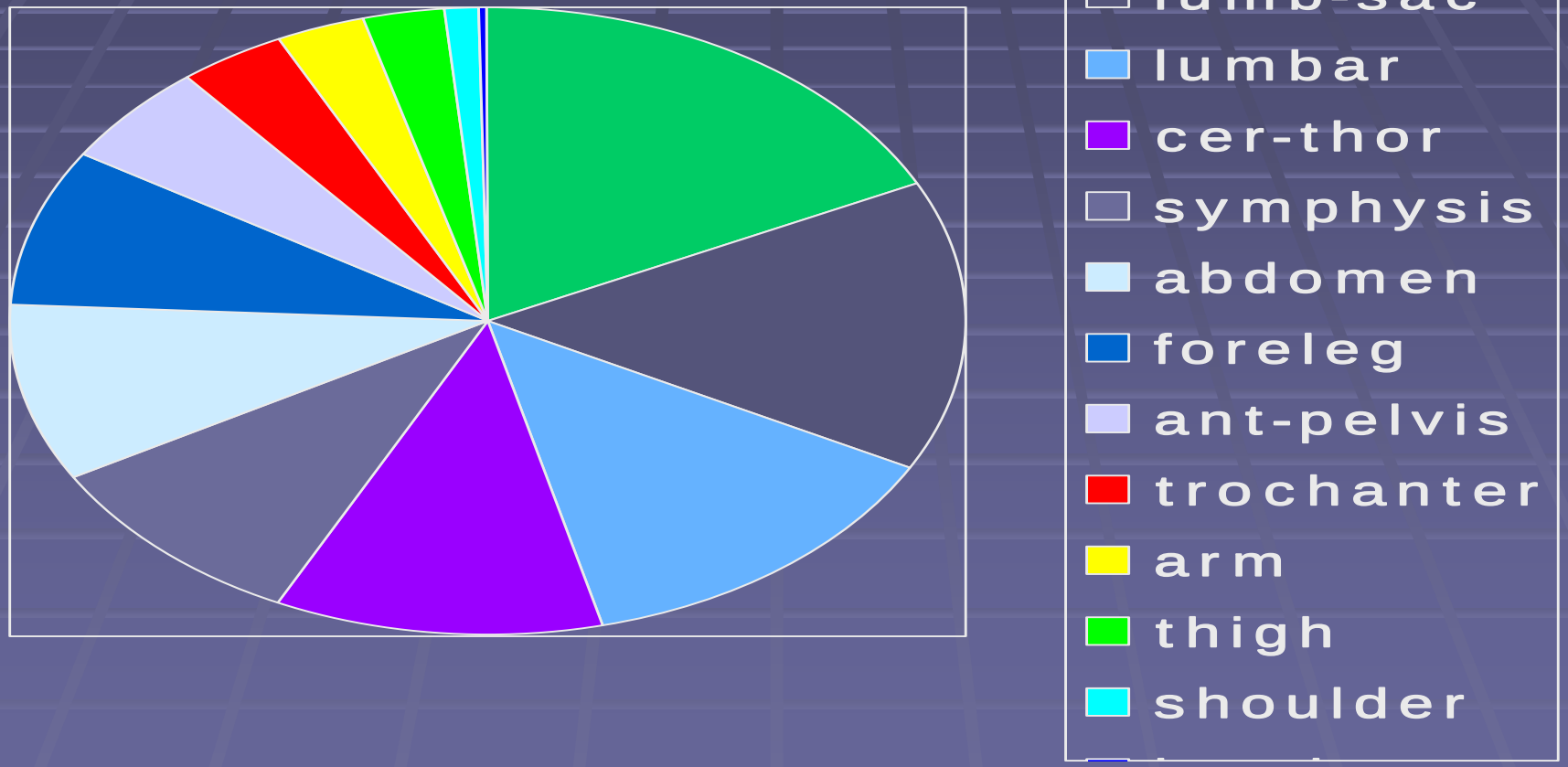
Implications of a Common Prevalence

- **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**
- **Under treatment : 15-30% report being treated for pain** (Fung 1993, Owens 2002, Stapleton 2002, Skaggs prelim)
- **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

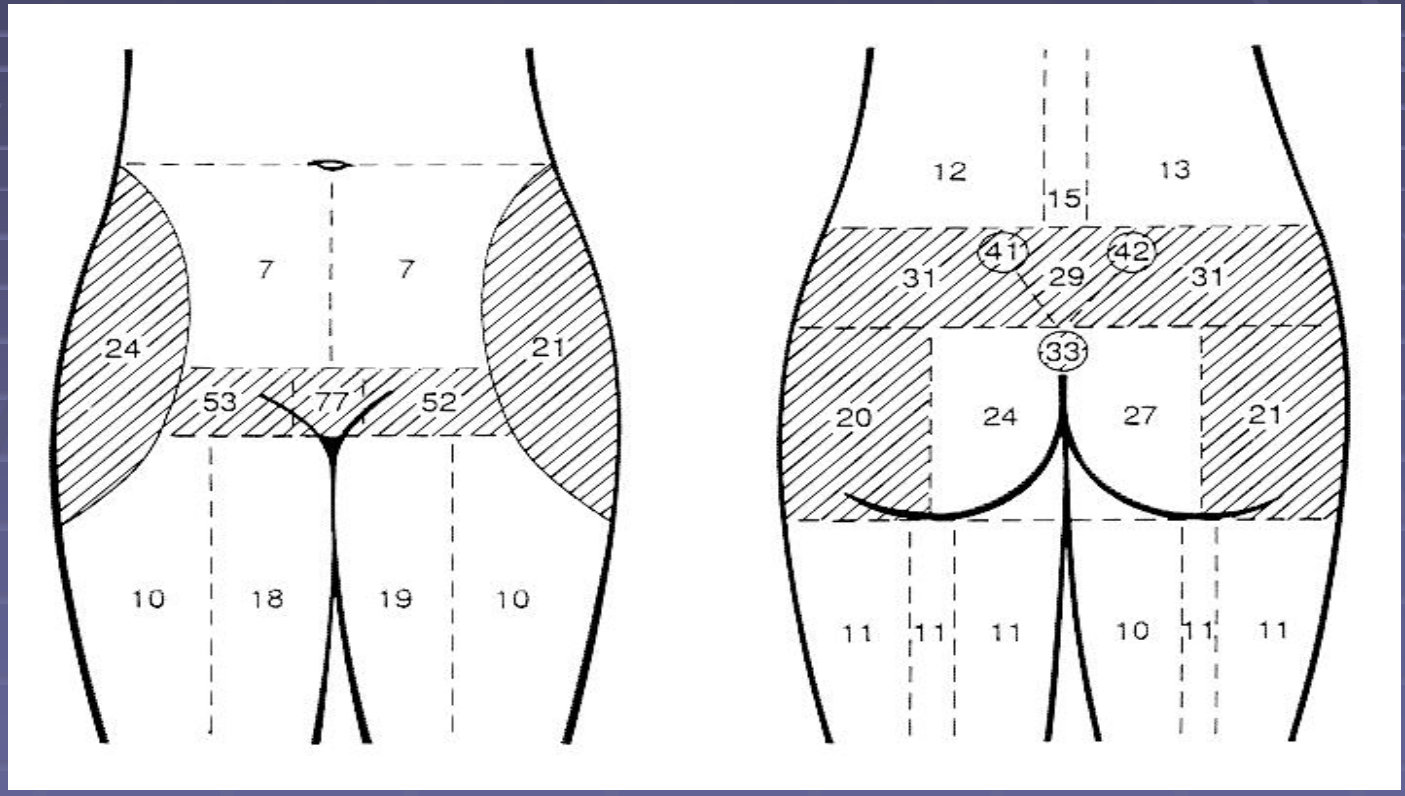
- **68% with moderate to severe pain continue to have pain after pregnancy** (Stapleton 2002)
- **52% of women with LBP & Pelvic pain during pregnancy developed pelvic floor pain** (Pool-Goudzwaard 2005)
- **5% of all pregnant women found to report pain 3 yrs later** (Noren 2002)

Distribution of Location of Pain



Kristiansson P Spine 1996

Mens JM, *Spine*, 1996



Pelvic Pain or Low Back Pain

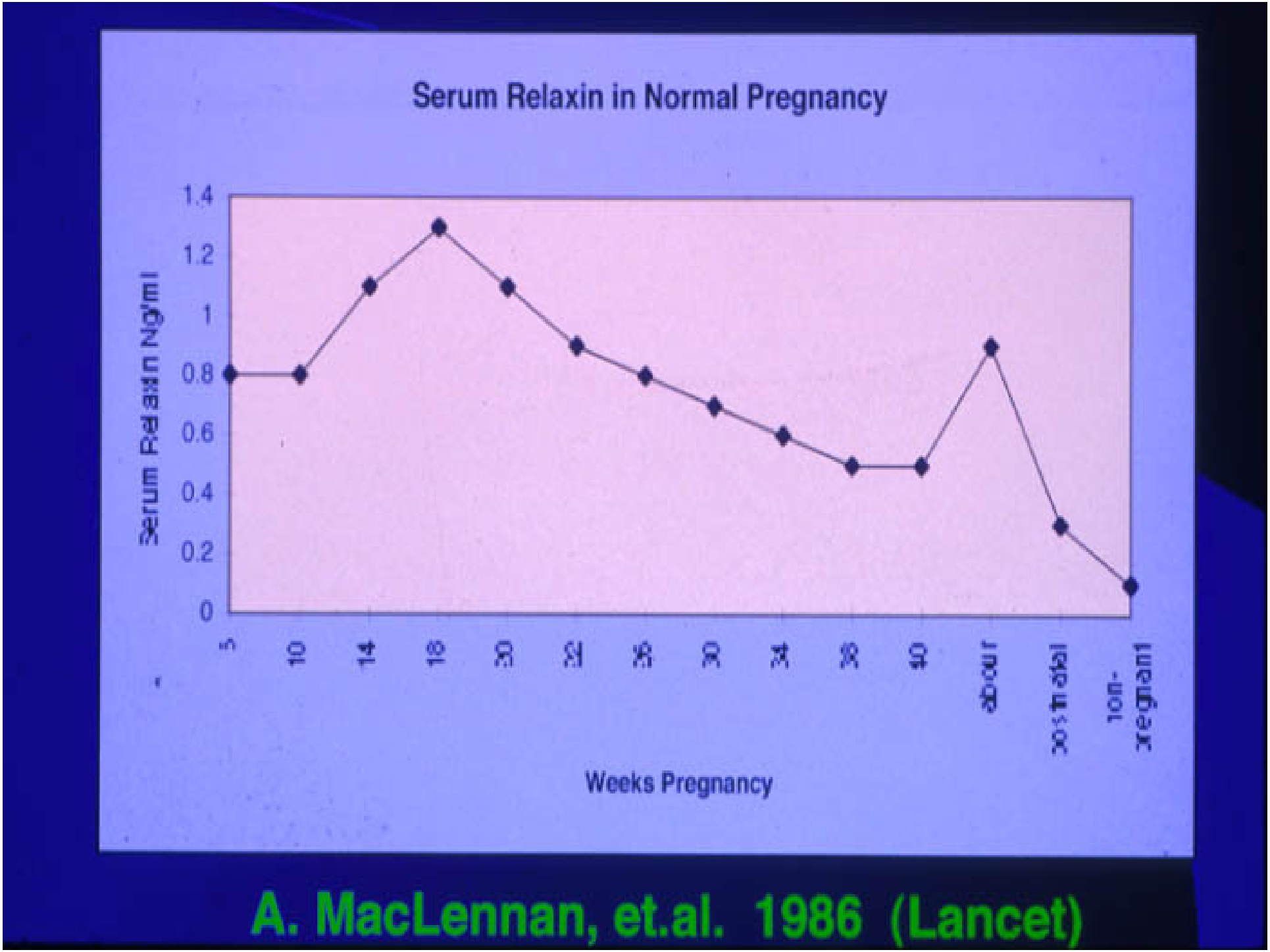
- **Gutke A, Spine 2006**
  - **313 women 12-18 weeks pregnant**
    - **Questionnaires & physical exam by same P.T.**
  - **194 had pain**
  - **54% had pelvic girdle pain**
  - **17% had lumbar pain**
  - **29% had both**
  - **Those with both were the most functionally impaired, higher pain intensity 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)
- symphysiolysis 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



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

Hansen Acta Obstet Gynecol Scand 1996

Schauberger Am J Obstet Gynecol 1996

Joint Laxity as a Predictor?

- Damen L, *Spine*, 2002
  - 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
  - Howell CJ, *BMJ*, 2002
    - 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
- Nilsson-Wikmar *Physiother Res Int* 2003
  - No difference in pain intensity in the above groups
  - Those with pain on provocative testing had greater daily activity movement-related impairments
- Noren L, *Eur Spine J, 2002*
  - 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

- Morgen, *Eur Spine*, 2006
  - 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**

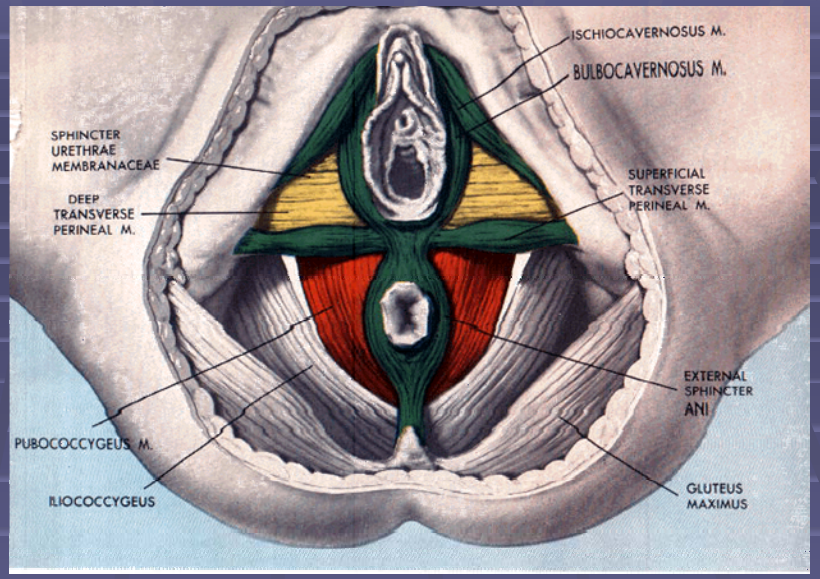
Clinical History

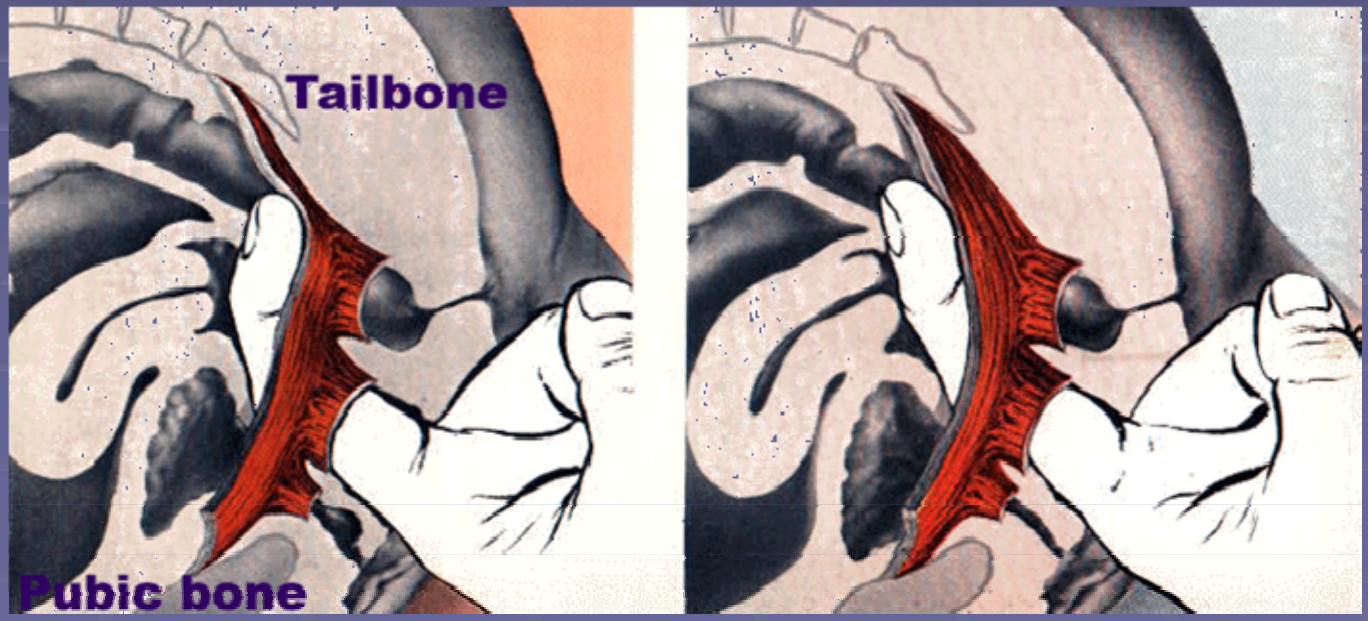
- LBP
- posterior pelvic pain
- groin pain
- LE pain/numbness/tingling
- pelvic floor pain
- c/o of giveaway weakness in posterior pe
- pain with legs crossed, transitional motio
- pain increases with speed of walking
- pain increases with stairs
- night time pain

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





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)

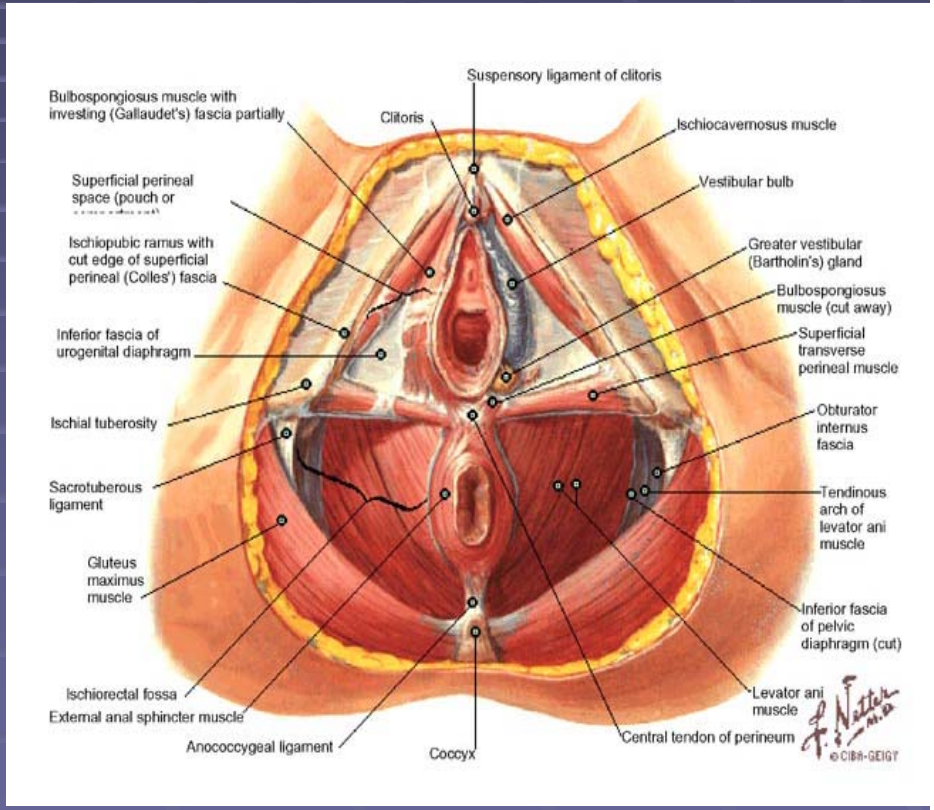
Pelvic floor dysfunction

- 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)

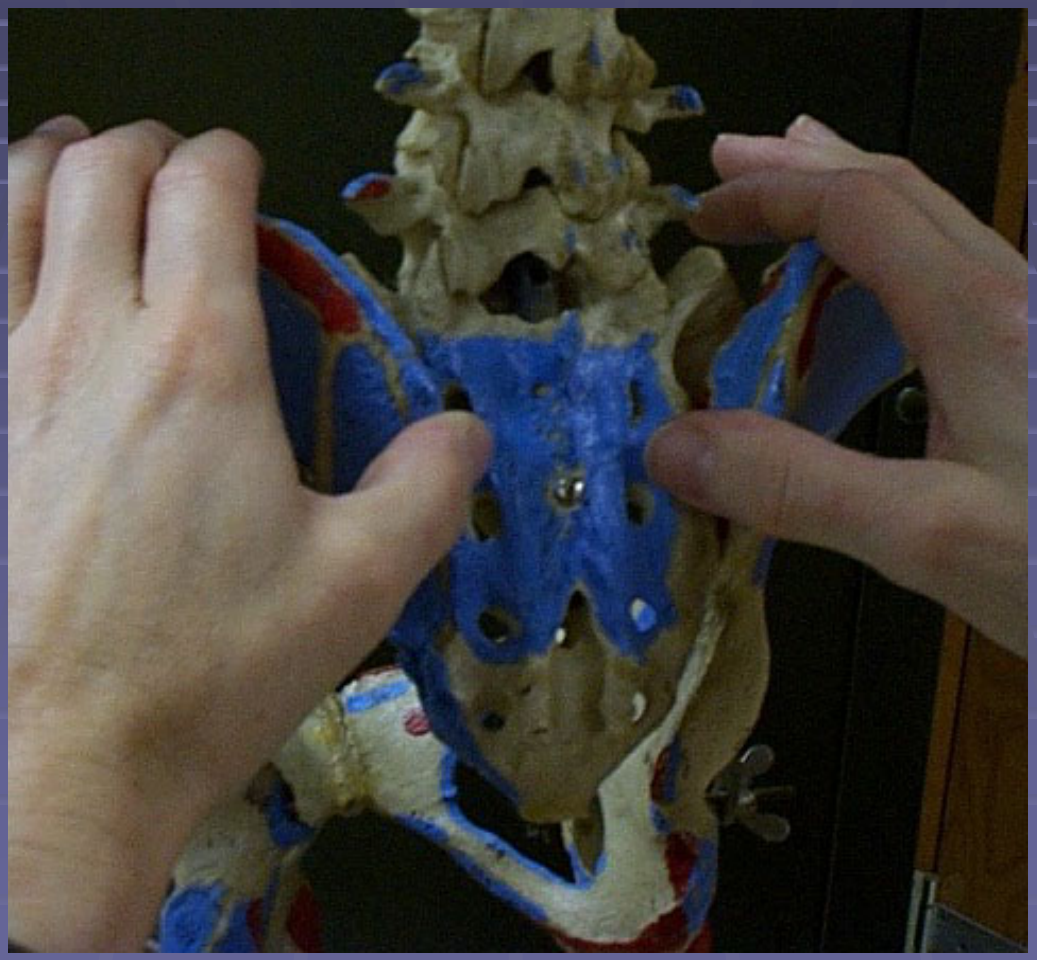
Peri-partum Rectus Diastasis

- 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

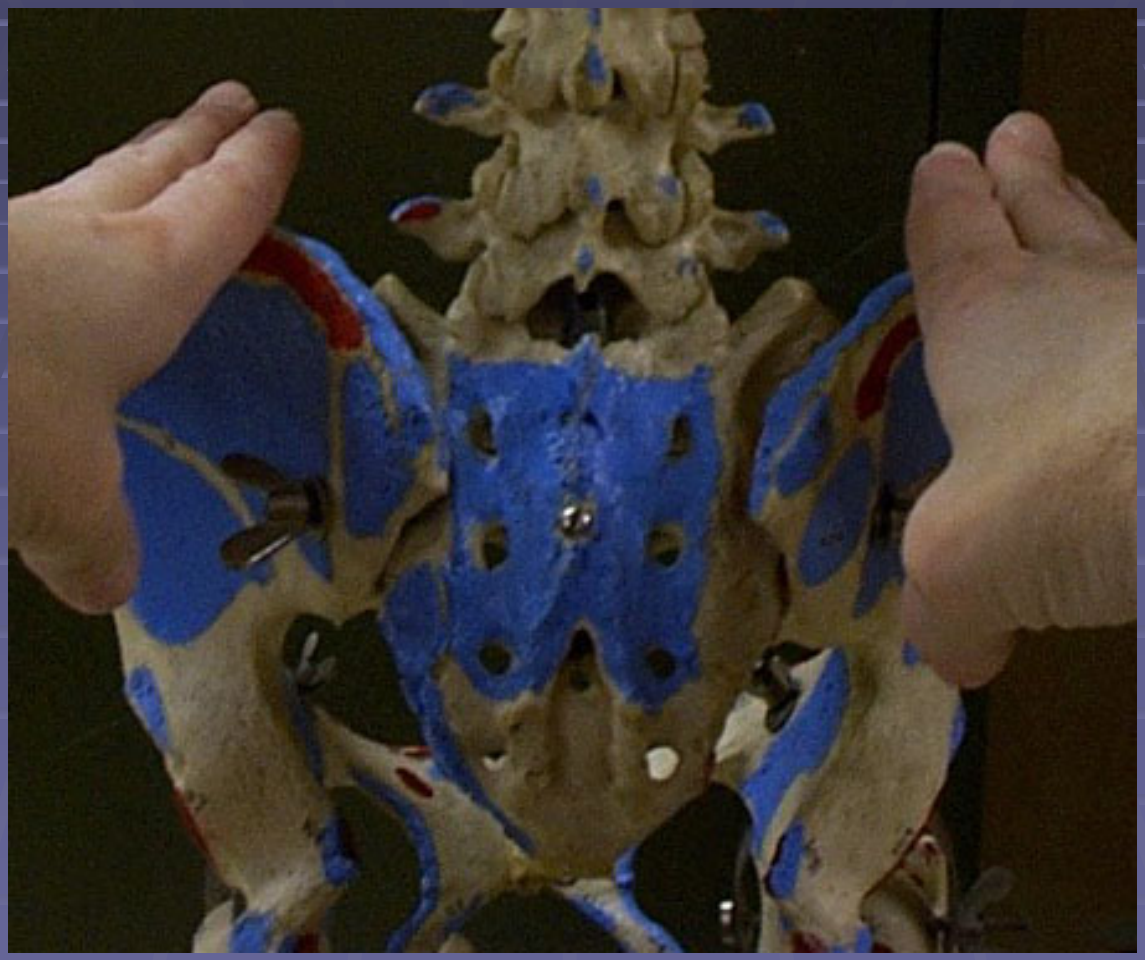
Pelvic Obliquities

- **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

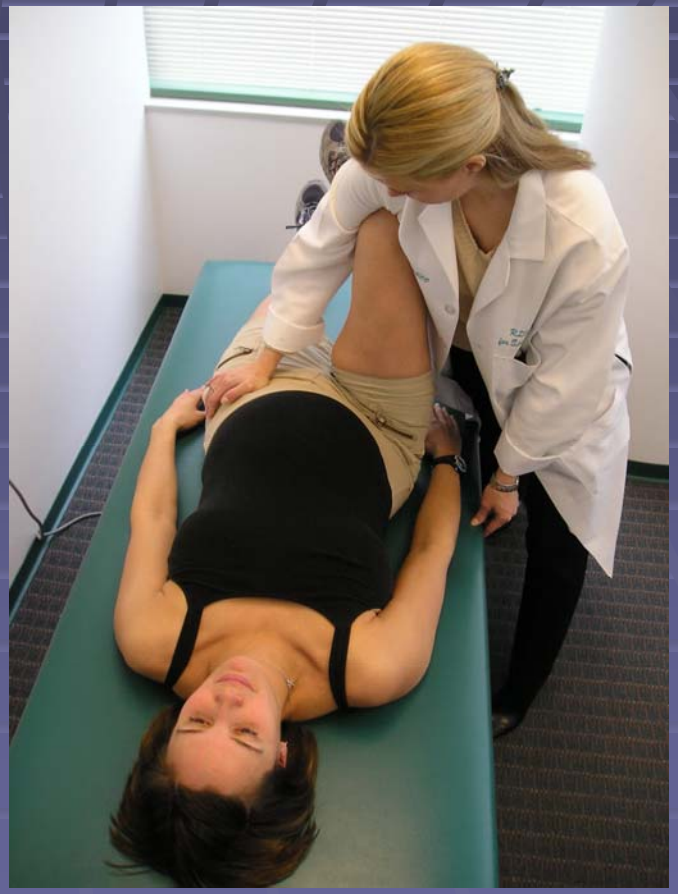
- **Forced Faber's or Patrick's test (ipsilateral pain)**

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

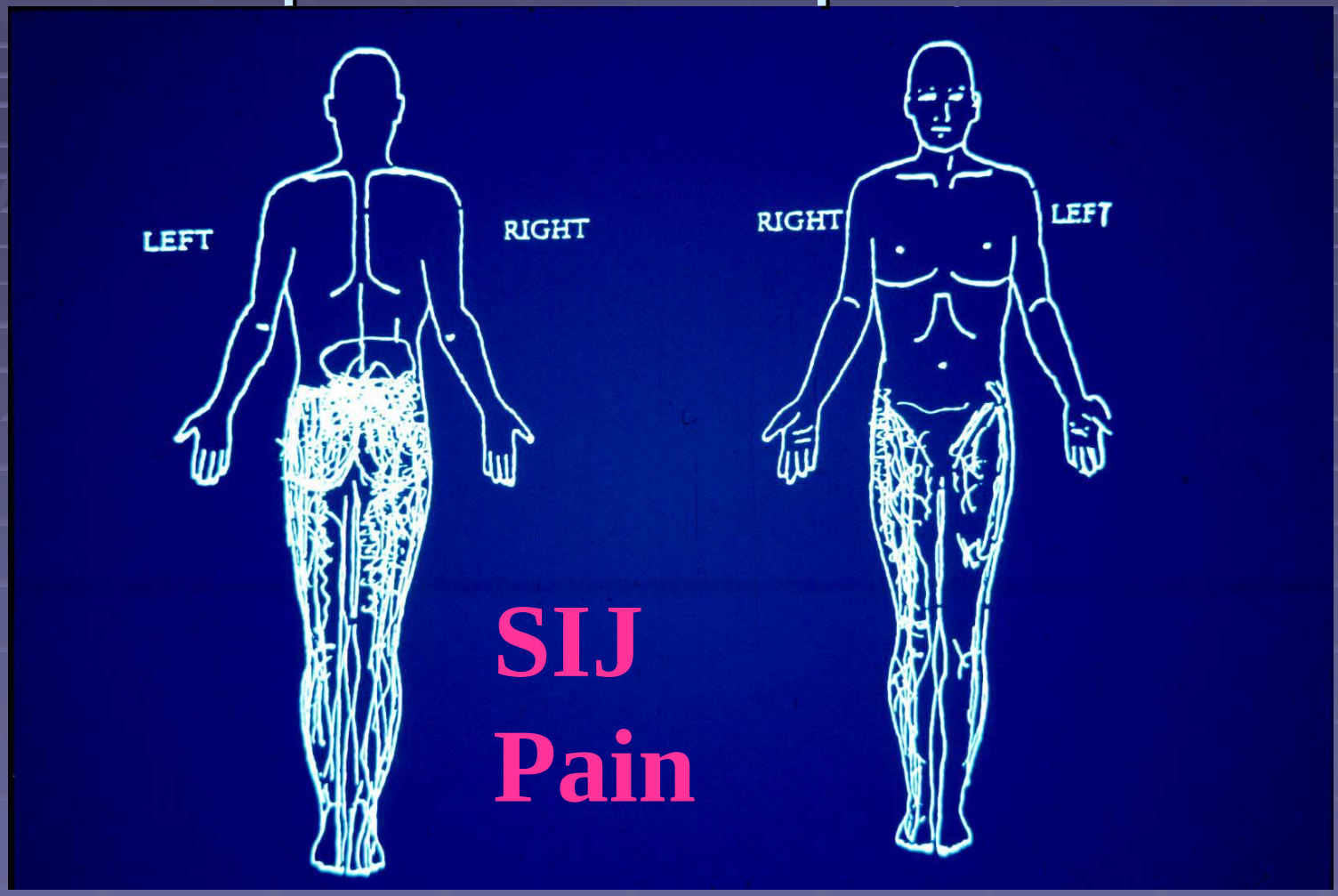
Pelvic Pain: Sacroiliac Joint

- 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

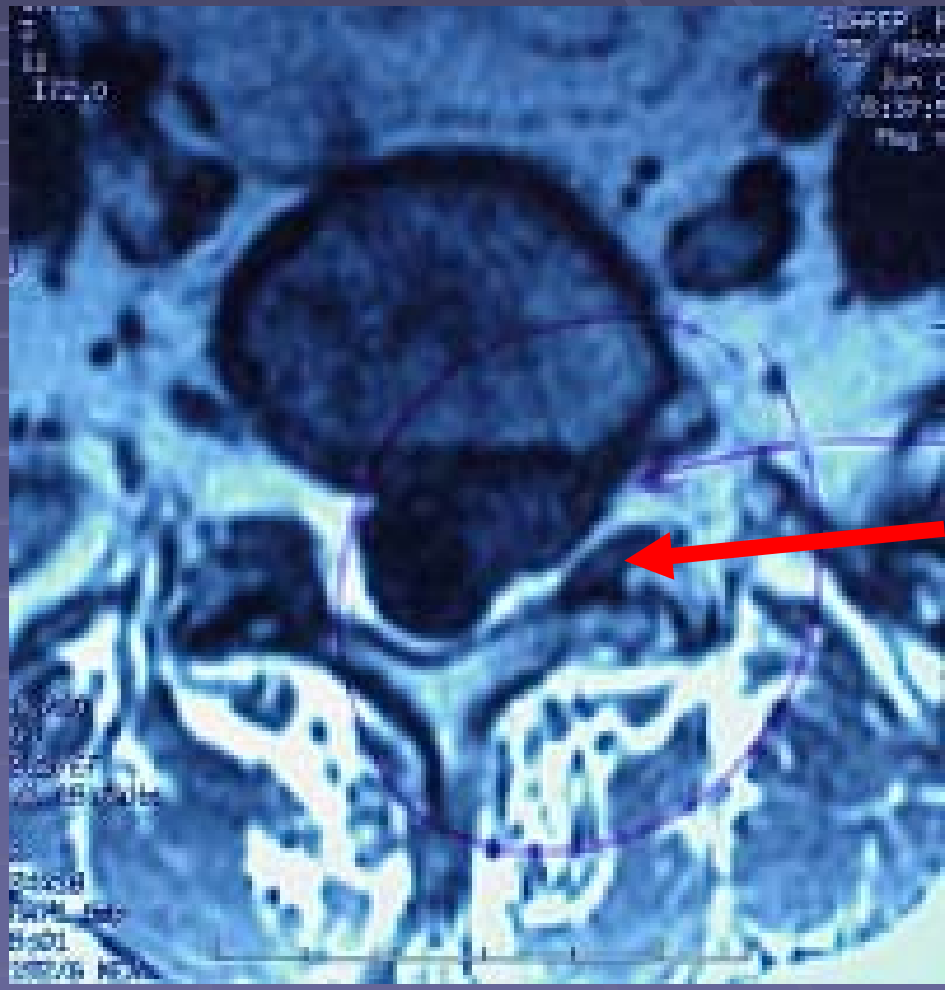
- **Synovial joint, synarthrosis, and amphiarthrosis**
- **C-shaped or L-shaped joint**
- **Sacral side with thick hyaline cartilage**
- **Ilial side with fibrocartilage**
- **Primary innervation is from S1**
- **It moves, especially in pregnancy**

SIJ pain referral patterns



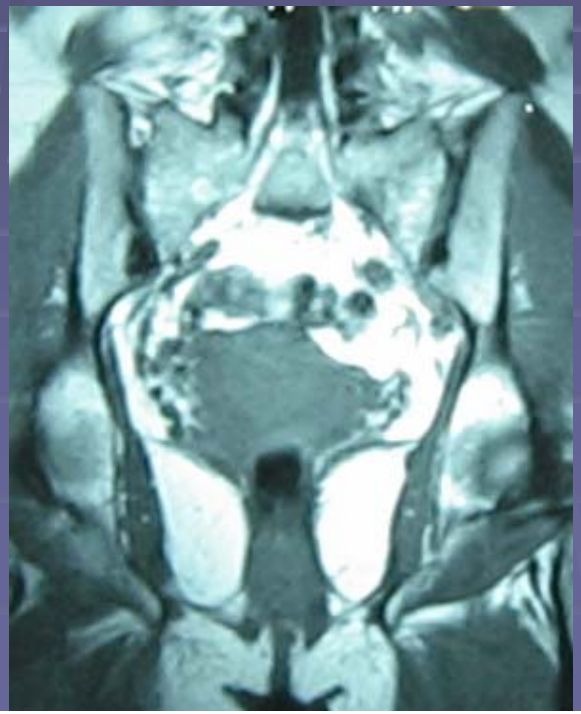
Disc Herniation

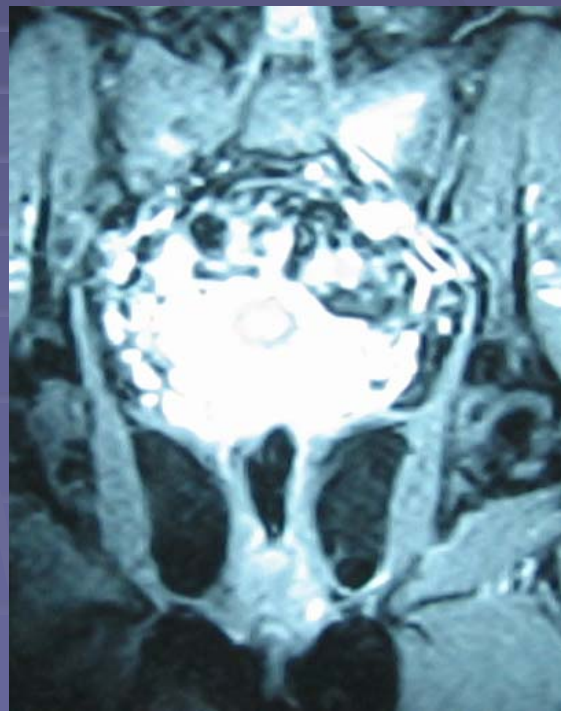
- Flexion based low back pain/radiating leg pain with associated numbness/weakness
- Thorough exam is key to differentiate with SIJ dysfunction
- Patients can have SIJ dysfunction with an S1 radiculopathy



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, xray 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

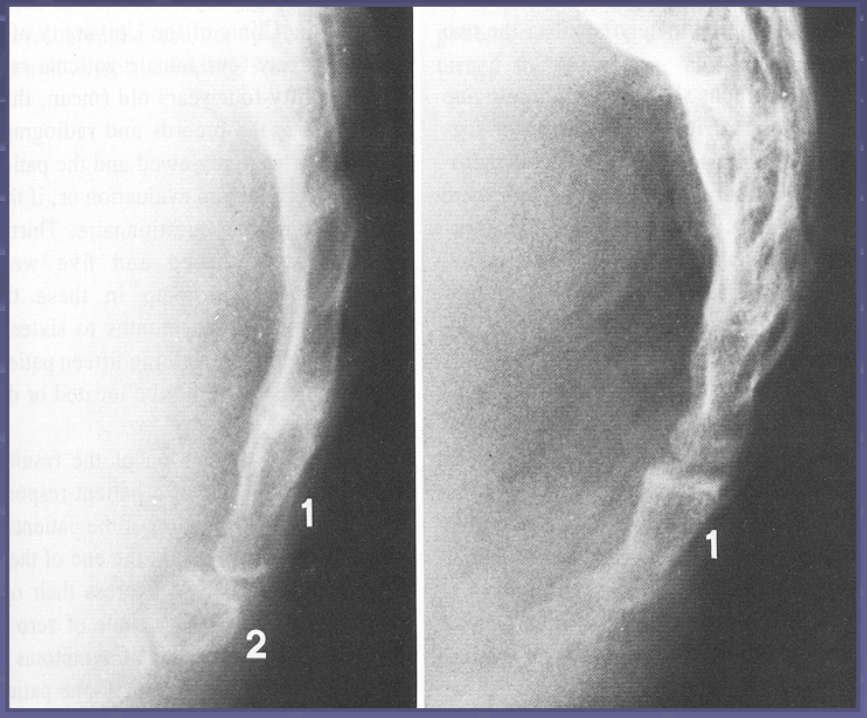
- **Separation (>1 cm) not typically seen antenatally without trauma**
- **Most often diagnosed postpartum in traumatic L&D**
- **If left uncorrected, can lead to osteitis pubis/OA**

Musculoskeletal Ultrasound vs. X-ray

- Sonographic (or Xray) 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)

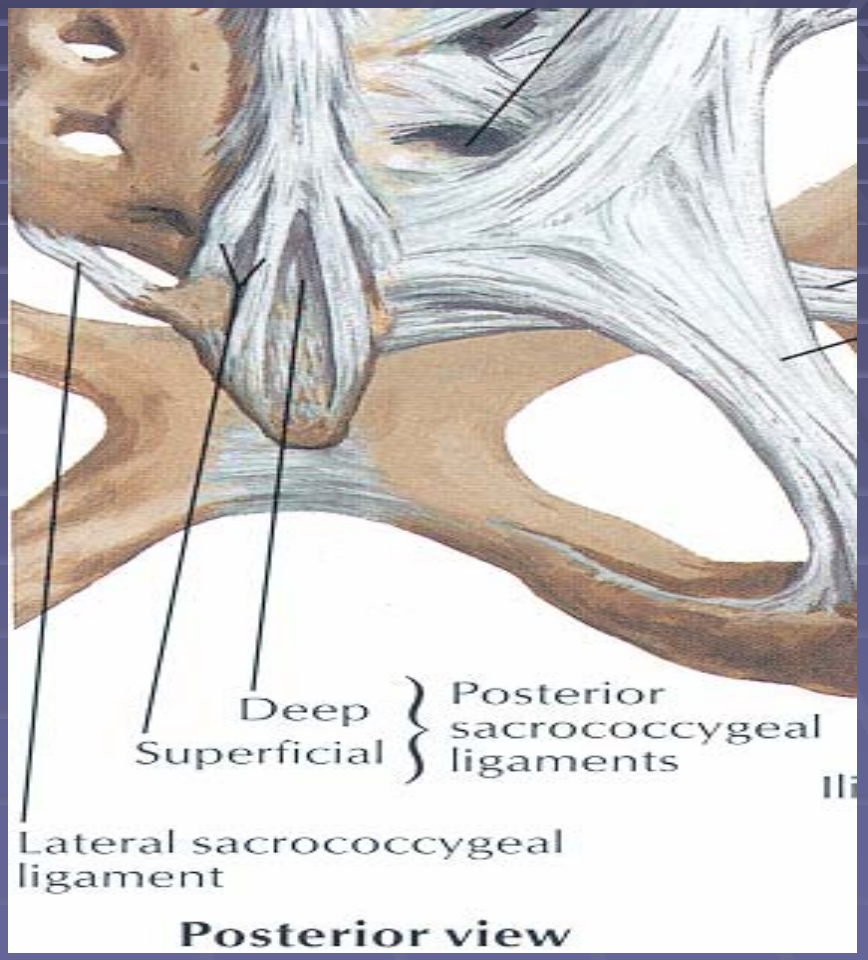
Pelvic Pain: Coccyx



- 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

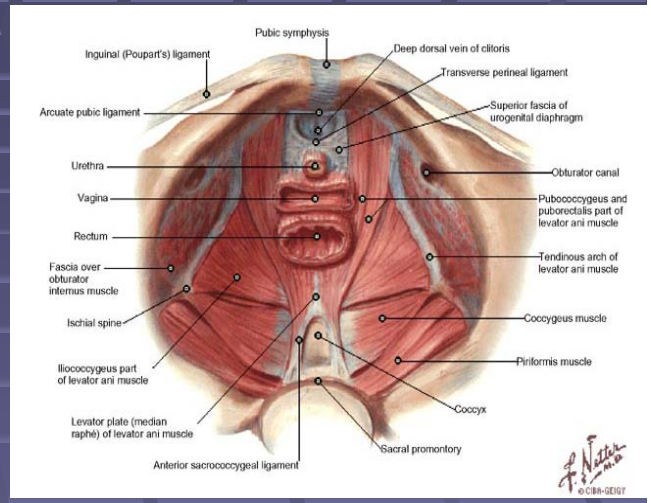


Pelvic Pain: Pelvic Floor

- **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

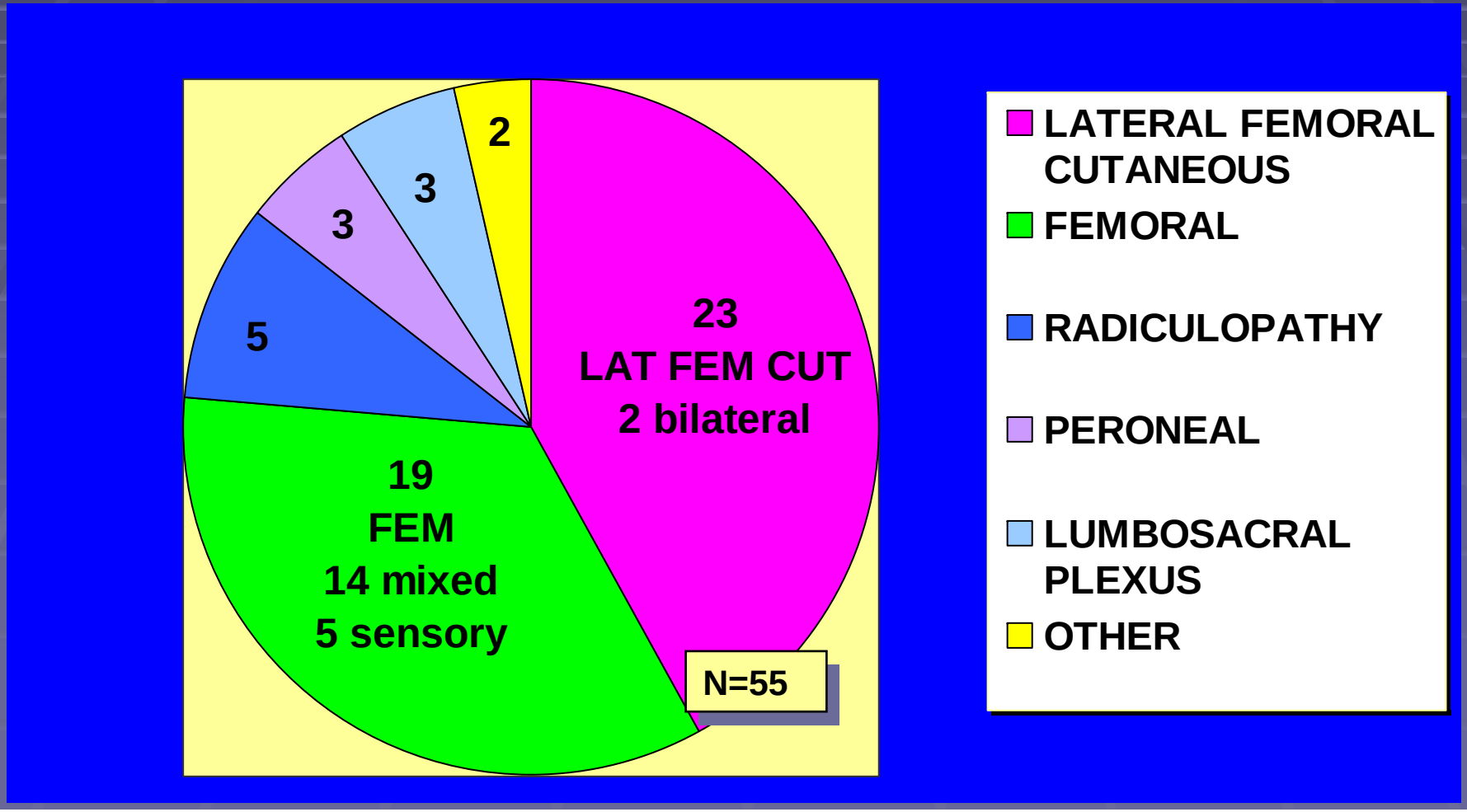


- increased activity level
- loss of motor control
- in PLBP patients relative to healthy subjects. significantly higher rest tone, less activity during coughing, increased activity during pushing shorter endurance time
- measured with intravaginal palpation and EMG. (Pool-Goudzwaard AL, et al 2005)

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)

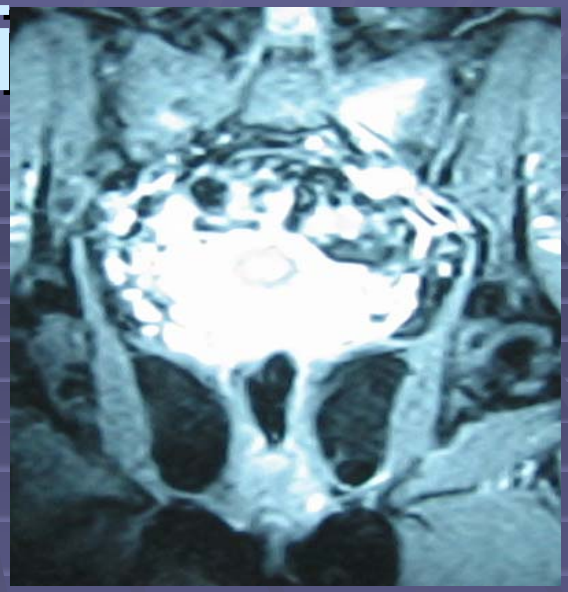


Red Flags

- 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 Testi

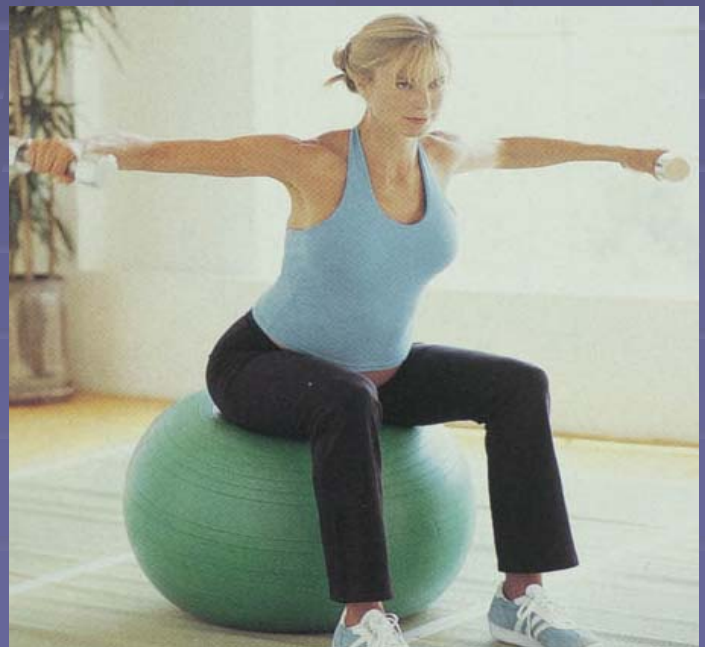
- MR Imaging
- Plain xray
- CT
- Bone Scan
- Musculoskeletal Ultrasound



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



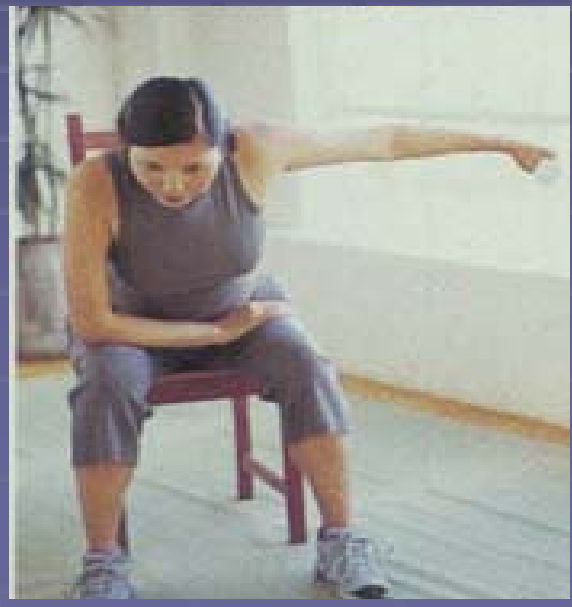
Treatment During & After Pregnancy

- **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 accupuncture 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)

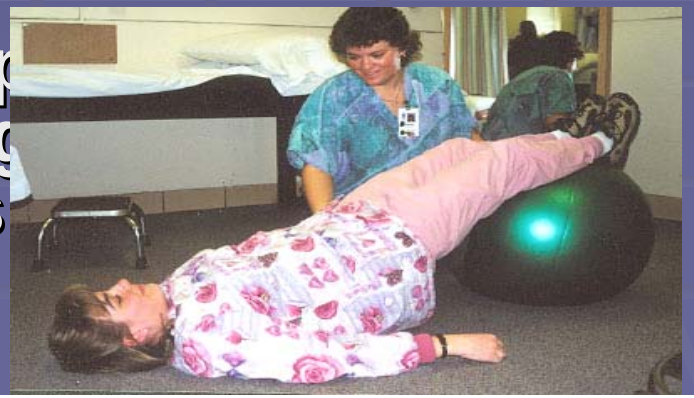


Treatment – Pain Management

- **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 intensity & disability, hig & improvement on phys



Goals for Rehabilitation

<u>Address Biomechanical factors</u>

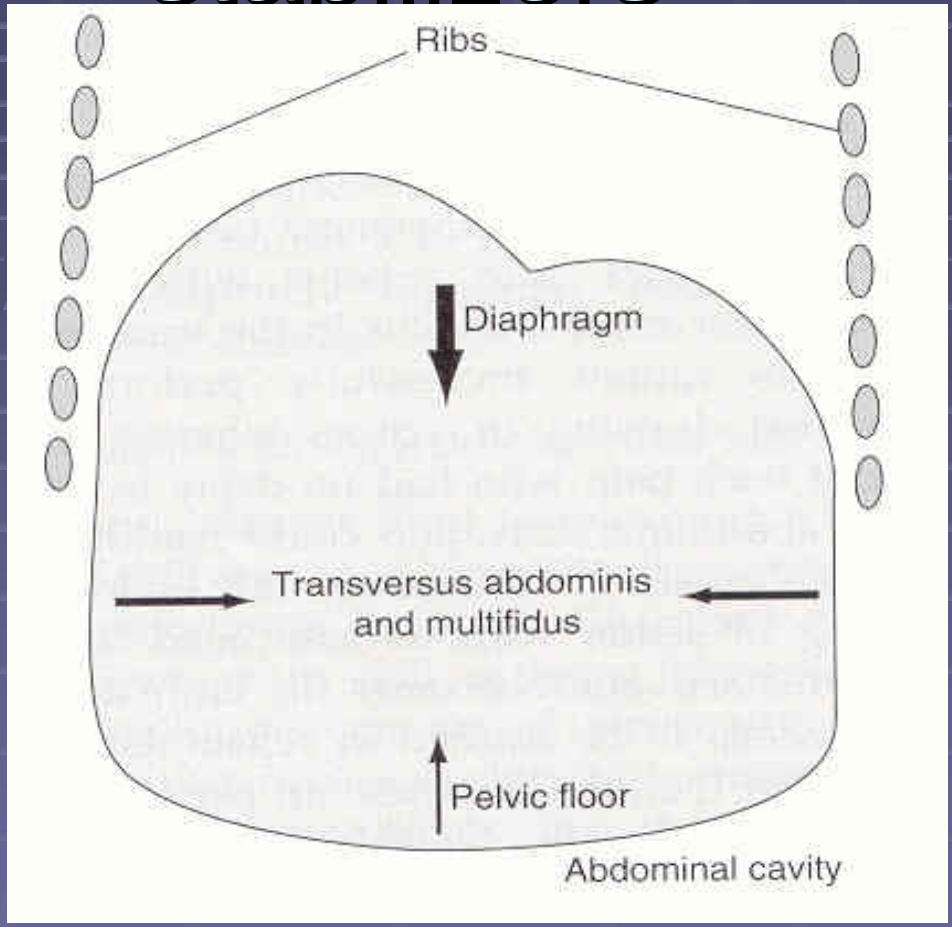
Pelvic joint

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

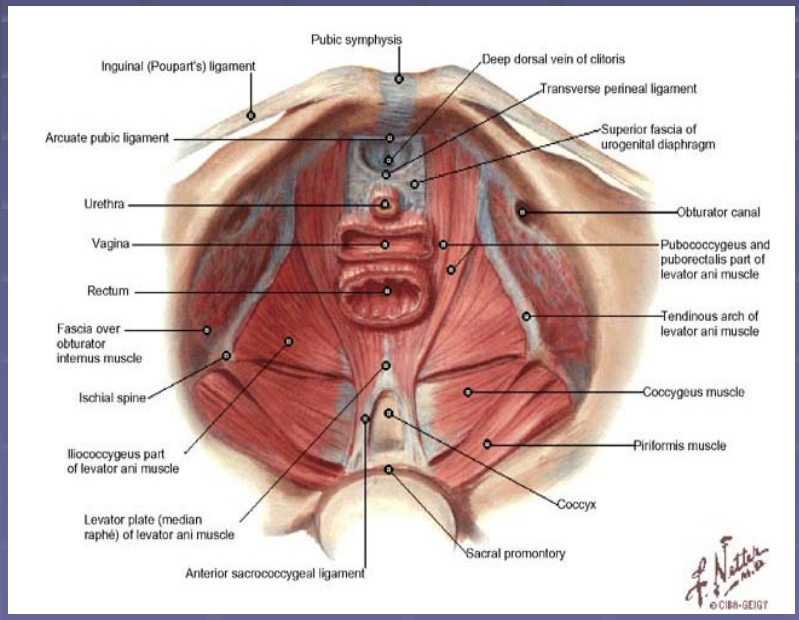
- **Co-activation is the normal recruitment pattern**
- **Pelvic floor muscles (PFM) contract first (mediated by central nervous system)**
- **Transversus Abdominus (TrA) contraction is initiated and enhanced by active PFM contraction**
- **TrA contraction corresponds with voluntary urethral closure**
- **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

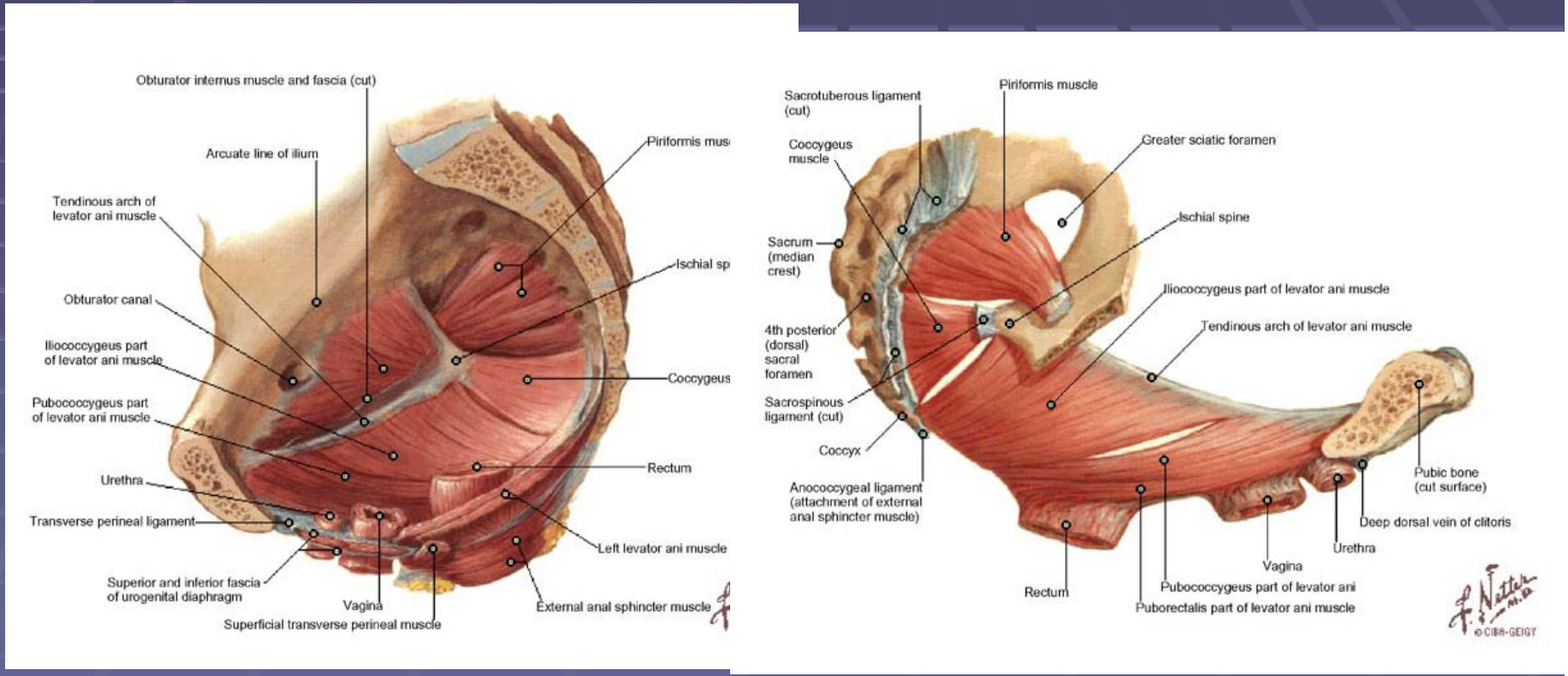
Pelvic Joint Pain and Pelvic Floor Dysfunction

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

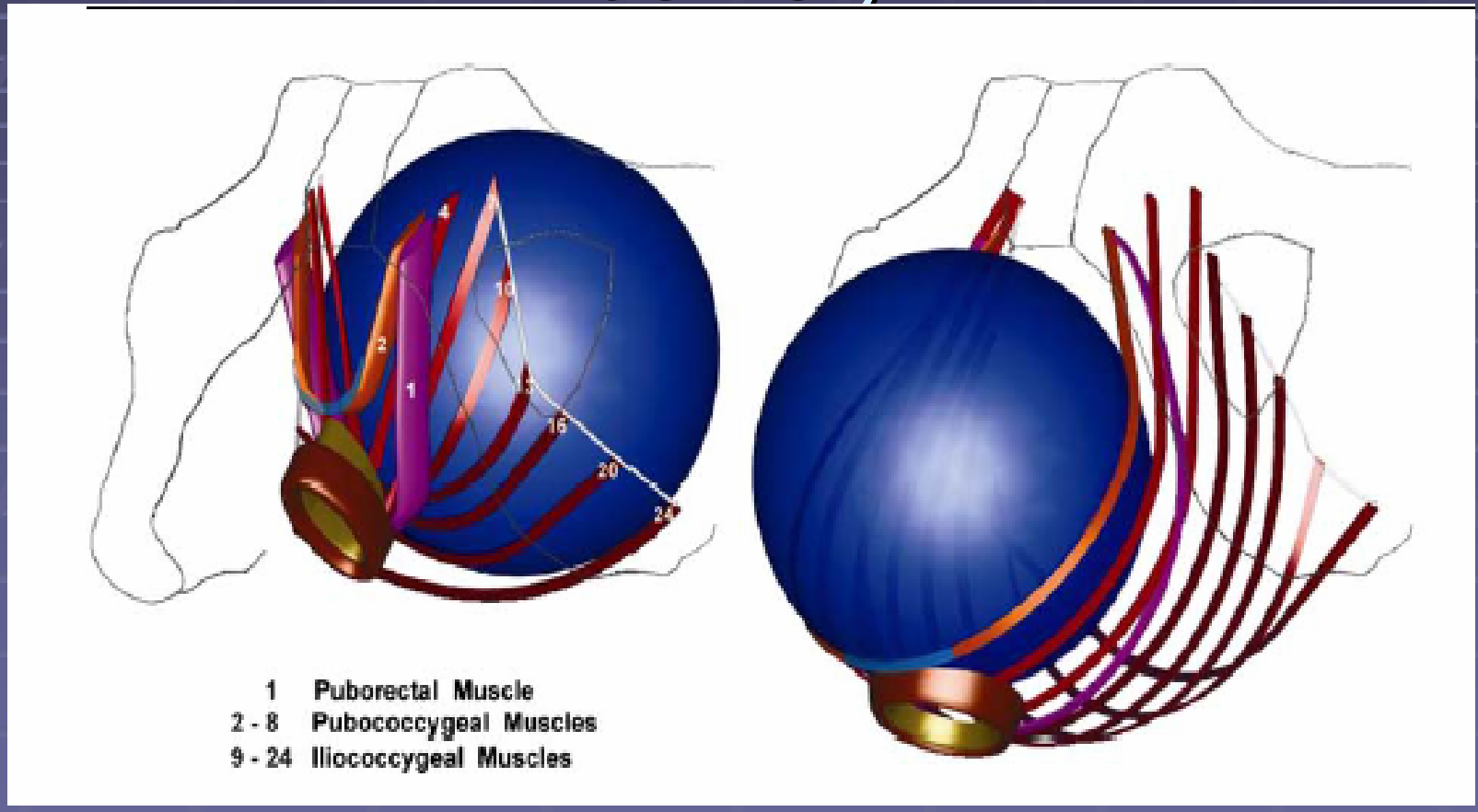
Pool-Goudzwaard AL, et al, 2005



Connections to lumbar spine and hip

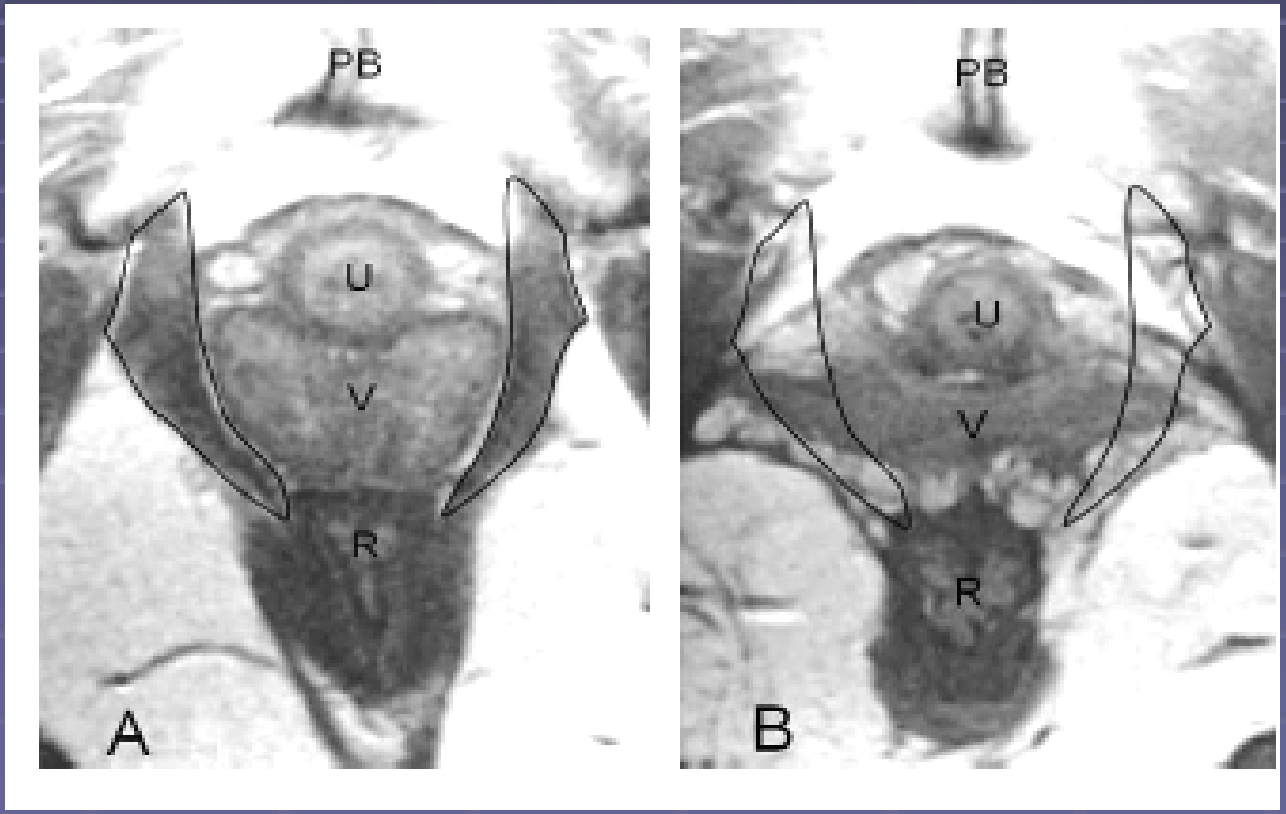


Pubococcygeus must stretch 3.26 times its normal length during vaginal delivery

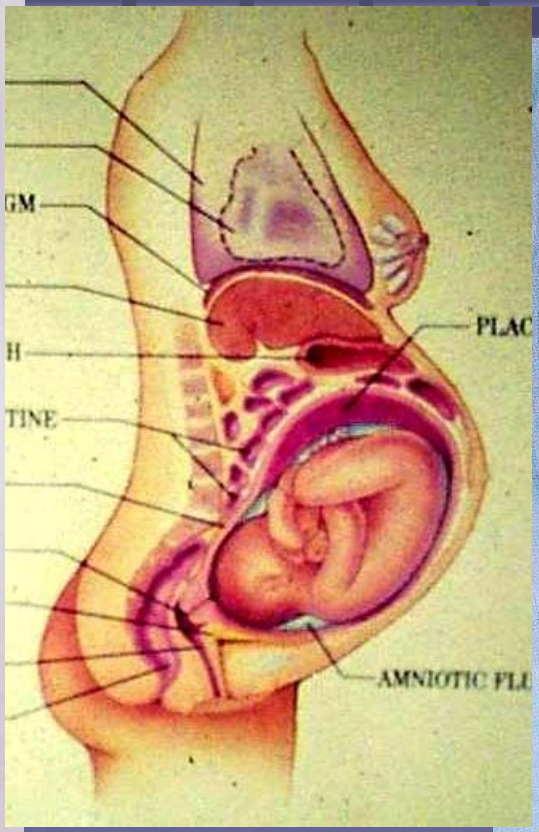


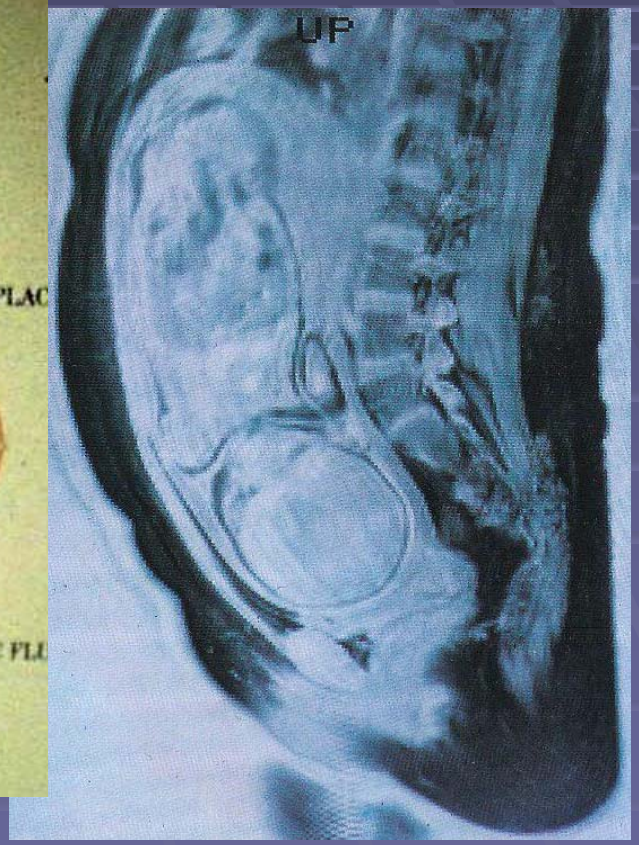
(Delancey, 2003)

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

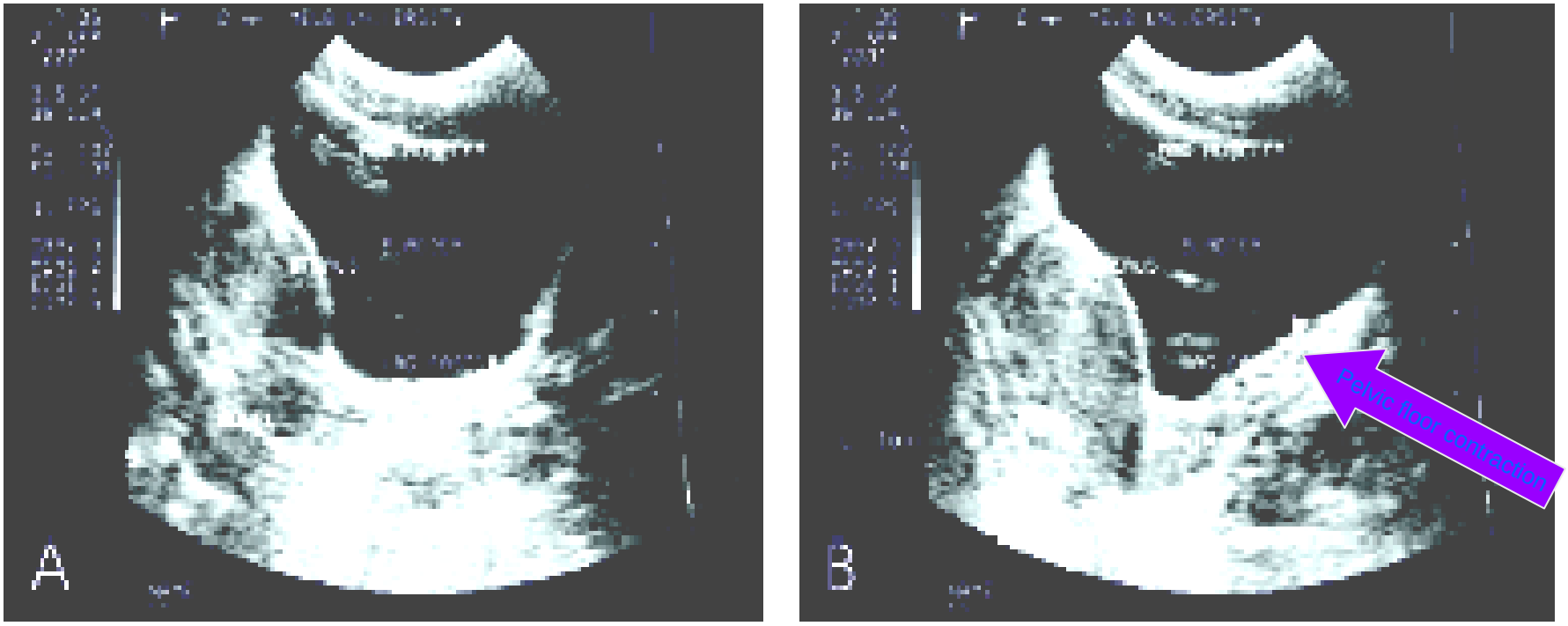


Figure 4.
Ultrasonography applied suprapubically. Sagittal midline view of pelvic floor relaxed (A) and fully contracted (B), with pelvic floor displacement marked.

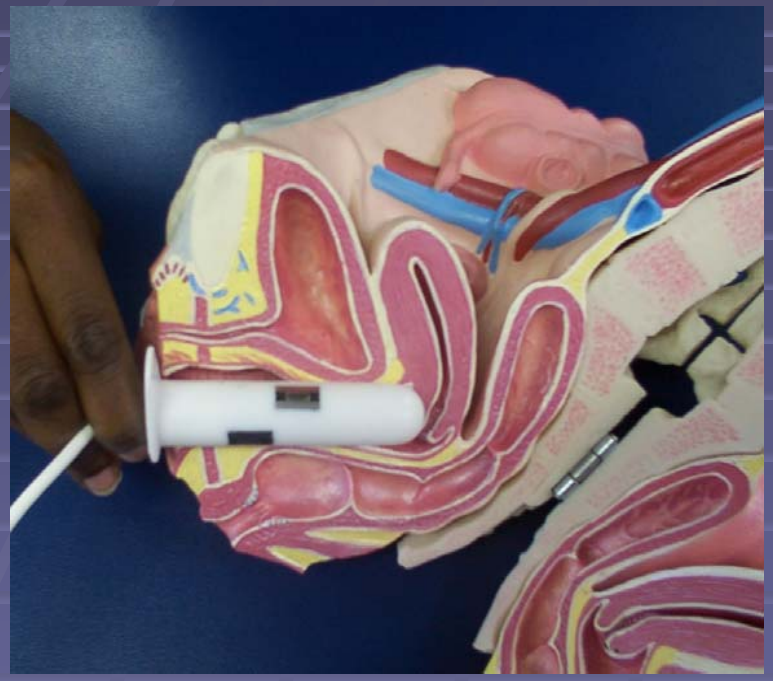
(Bø K, Sherburn M.. 2005)

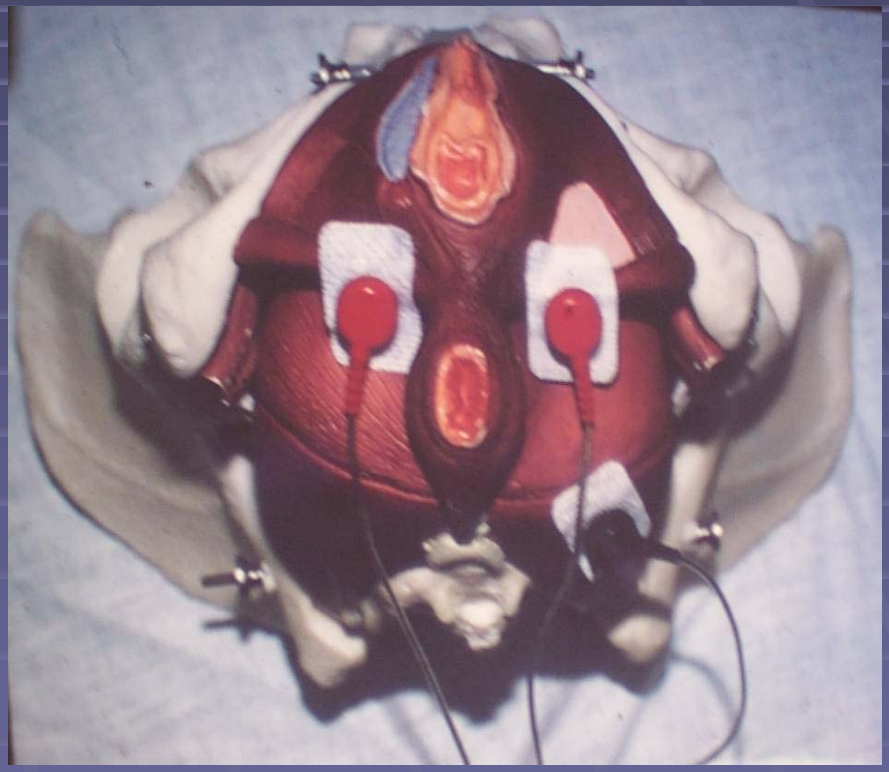
Pelvic Pain

- 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 peri-partum period
- SIJ belt reduced rotation by 19% Vleeming Am J Obstet Gynecol 1992

SIJ Belt

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