Pelvic Girdle Mobility Deficits

ICD-9-CM code: 846.1 Sprain of sacroiliac ligament

ICF codes: Activities and Participation Domain code: d4106 Shifting the body’s centre of gravity (Adjusting of moving the weight of the body from one position to another while sitting, standing or lying, such as moving from one foot to another while standing.)

Body Structure code: s76003 Sacral vertebral column

Body Functions code: b7201 Mobility of pelvis

Common Historical Findings:
- Unilateral sacroiliac, buttock, and/or groin pain
- Symptoms worsen with lower extremity weight bearing and weight shifting activities
- Onset related to fall onto buttock; misstep or abrupt weight bearing onto straightened leg; pregnancy, or child-bearing strain

Common Impairment Findings - Related to the Reported Activity Limitation or Participation Restrictions:
- Restricted innominate mobility (e.g., positive march test)
- Asymmetrical bony landmarks, (e.g., Posterior Superior Iliac Spines –PSIS's; Anterior Superior Iliac Spines- ASIS's)
- Symptom reproduction with palpation of sacroiliac ligaments (e.g., long posterior sacroiliac ligaments, short posterior sacroiliac ligaments; sacrotuberous ligaments)

Physical Examination Procedures:

Performance Cues:
The march test is utilized to examine the active mobility of the innominate bone (PSIS) relative to the sacrum (S1-S2 area) via full active hip flexion while standing
Palpate the inferior aspect of the left PSIS and the most prominent S1 or S2 spinous process when assessing left innominate mobility
Allow the patient to touch the tabletop for balance assist
“Lift your left knee toward your chest and now your right knee”
Ensure that enough active flexion occurs to recruit motion in to the innominate
Palpate the inferior aspect of the right PSIS and the most prominent S1 or S2 spinous process when assessing right innominate mobility

Performance Cues:
"Center" Patient on the table
Gently "lift" and lower pelvis
Stand on same side of table as your dominant eye
Align thumbs symmetrically on the same part of the inferior aspect of the PSIS (the inferior "foothill") with the patient prone
Palpation of the posterior SI ligaments (described below) at this time speeds the evaluation
Palpate the ASIS's with the patient supine using similar tactics

Performance Cues:
Palpate directly inferior to the prominence of the PSIS
Determine symptom response
Tenderness is associated with innominate functioning toward end range of anterior rotation

![Short Posterior Sacroiliac Ligament](image)

**Performance Cues:**
Palpate directly medial to the PSIS
Determine symptom response
If low level of symptoms - deep palpation is required to "clear" the SI ligaments
Tenderness is associated with most SIJ movement dysfunctions

![Sacrotuberous Ligament](image)

**Performance Cues:**
Palpate approximately one inch from coccyx- inferior and medial to gluteus maximus – pressure in direction laterally and superiorly (toward iliac crest)
Determine symptom response
Determine tautness of ligament compared to exact location and amount of pressure given to opposite side
Tenderness and tautness associated with innominate functioning toward end range of posterior rotation
Pelvic Girdle Mobility Deficits: Description, Etiology, Stages, and Intervention Strategies

The below description is consistent with descriptions of clinical patterns associated with the vernacular term “Sacroiliac Ligament Strain”

Description: Dysfunction of the movement and stability of the innominate bones relative to the sacrum resulting from and/or producing a strain of the sacroiliac ligaments.

Etiology: Sacroiliac ligament sprains result from stresses imparted to either the sacrum or the innominates. Stresses imparted to the sacrum commonly originate from lumbar spine bending, twisting, or lifting movements as well as the stresses associated with some spinal postures such as prolonged slump sitting. Stresses imparted to the innominates commonly originate from falls onto the ischial tuberosity or from forces transmitted through the legs to the innominates such as stepping off a curb or into a hole and landing with a straightened leg. Additionally, sacroiliac ligaments are commonly strained during pregnancy and childbirth. The hormone relaxin, which is secreted to relax the pelvic girdle ligaments in preparation for childbirth, makes women especially vulnerable to sacroiliac ligament sprains.

Acute Stage / Severe Condition: Physical Examinations Findings (Key Impairments)

ICF Body Functions code: b7201.3 SEVERE impairment of mobility of pelvis

- Low back pain unilateral/bilateral region of the posterior-superior iliac spine with/without buttock/groin pain, but usually not below the knee
- Asymmetrical position of one posterior, superior iliac spine (PSIS) relative to the contralateral PSIS and/or asymmetrical position of one anterior, superior iliac spine (ASIS) relative to the contralateral ASIS
- Restricted innominate motion relative to the sacrum – as measured by either the March Test or the Forward Bending Test
- Pain with end range hip motions that stress the involved sacroiliac ligament. For example, end range hip flexion will cause innominate posterior rotation and place stress on the ipsilateral sacrotuberous ligament – or – end range hip extension will cause innominate anterior rotation and place stress on the ipsilateral long, posterior sacroiliac ligament.
- Passive movements to the innominate that stress the involved ligament will provoke the patient’s reported symptoms. (Passive movements commonly tested are innominate anterior rotation, posterior rotation, external rotation, internal rotation, superior translation, and inferior translation.)
- Provocatory palpation of the involved ligament will reproduce the patient’s reported symptoms. (Three sacroiliac ligaments are easily palpated. These are the long posterior sacroiliac ligament, the short posterior sacroiliac ligament and the sacrotuberous ligament.)
The presence of four of five variables in the present in the clinical examination increased the likelihood of success with manipulation from 45% to 95%.

- Duration of symptoms less than 16 days
- Fear-avoidance belief questionnaire work scale score less than 19
- At least one hip with greater than 35 degree of IR ROM (when measured prone lying)
- Hypomobility in the lumbar spine with posterior-to-anterior glides
- No symptoms distal to the knee

**Sub Acute Stage / Moderate Condition:** Physical Examinations Findings (Key Impairments)

*ICF Body Functions code: b7201.2* MODERATE impairment of mobility of pelvis

- Improved symmetry of the PSIS’s and ASIS’s is commonly associated with improving symptomatology
- Improved innominate active mobility is commonly associated with improving symptomatology
- As the strain is relieved from the involved ligament, it becomes less tender to provocative palpation

**Settled Stage / Mild Condition:** Physical Examinations Findings (Key Impairments)

*ICF Body Functions code: b7201.1* MILD impairment of mobility of pelvis

Now when less acute – examine for muscle flexibility and strength deficits that may predispose the patient to future injury - for example:

The ipsilateral hip flexors commonly exhibit flexibility deficits in patients with an innominate held at end range of anterior rotation – producing a strain to the long posterior sacraliliac ligament. The ipsilateral hip extensors commonly exhibit flexibility deficits in patients with an innominate held at end range of posterior rotation – producing a strain on the sacrotuberous ligament. The ipsilateral quadratus lumborum commonly exhibit flexibility deficits in patients with an innominate held at end range of superior translation – producing a strain on the short posterior sacroiliac ligament.

The ipsilateral hip extensors and abdominals are commonly weak in patients with long posterior sacroiliac ligament sprains. The ipsilateral hip flexors and back extensors are commonly weak in patients with sacrotuberous ligament sprains. The ipsilateral hip abductors are also commonly weak in patients with short posterior sacroiliac ligament sprains.
Intervention Approaches / Strategies

**Acute Stage / Severe Condition**

Goals: Alleviate pain with active lumbar spine/sacral movements
Alleviate pain with weight bearing activities such as standing and walking short distances.

- **Physical Agents:**
  Ultrasound, phonophoresis, TENS, and ice to the sacroiliac region

- **Manual Therapy**
  Isometric mobilization and/or passive joint mobilization procedures to restore innominate symmetry

- **External Devices (Taping/Splinting/Orthotics)**
  Sacroiliac braces may be implemented to maintain the pelvic alignment gained from the mobilization procedures
  Sacroiliac supports/braces are also indicated when ligamentous hypermobility is suspected – such as in pregnant and postpartum patients

- **Re-injury Prevention Instruction**
  Avoid postures or movements that place strain on the involved ligament

**Sub Acute Stage / Moderate Condition**

Goals: Maintain corrected pelvis position and painfree status for extended periods (i.e., several days)
Improve tolerance to repeated active spinal/sacral movements and weight bearing activities (i.e., ability to walk 15 minutes or more without pain).

- **Approaches / Strategies listed above**

- **Manual Therapy**
  Soft tissue mobilization to shortened hip flexors, extensors, or quadratus lumborum

- **Therapeutic Exercises**
  Instruct in exercises and/or movements to maintain the improvements in innominate symmetry gained with the soft tissue and joint manipulations

- **Neuromuscular Re-education:**
  Promote efficient, pain-free motor control of the trunk, pelvis, and lower extremities with bending movements, lifting maneuvers and weight bearing activities
Settled Stage / Mild Condition

Goals: Unrestricted with performance of normal ADL and walking
Normalize lumbar, pelvis, and hip muscle flexibility and strength deficits

- Approaches / Strategies listed above
- Therapeutic Exercises
  Instruct in stretching exercises to address the patient’s specific muscle flexibility deficits
  Instruct in strengthening exercises to address the patient’s specific muscle strength deficits
- Neuromuscular Re-education:
  Promote efficient, pain-free motor control of the trunk, pelvis, and lower extremities with bending movements, lifting maneuvers and weight bearing activities

Intervention for High Performance / High Demand Functioning in Workers or Athletes

Goal: Return to desired occupational or leisure time activities

- Approaches / Strategies listed above
- Therapeutic Exercises
  Provide endurance exercises to maximize muscle performance of the lumbar, abdominal, and lower extremity musculature to perform the desired occupational or recreational activities
  Encourage participation in regular low stress aerobic activities as a means to improve fitness, muscle strength and prevent recurrences

Selected References


Manual Therapy For Common Pelvic Girdle Disorders

**Impairment: Restricted Innominate Inferior Translation**

Joint Mobilization: using femoral traction
direct passive mobilization
bilateral adductor contractions

Soft Tissue mobilization: quadratus lumborum

Therapeutic Exercises: ipsilateral posterior pelvic depression
contralateral anterior pelvic elevation

Movement Re-Education: ipsilateral trunk elongation during daily activities

**Impairment: Restricted Innominate Posterior Rotation**

Joint Mobilization: using gluteus maximus
direct passive mobilization
bilateral adductor contractions

Soft Tissue Mobilization: iliacus

Therapeutic Exercises: hip extensor strengthening
hip flexor stretching

Movement Re-Education: promote hip extensor and abdominal control
during functional activities

**Impairment: Restricted Innominate Anterior Rotation**

Joint Mobilization: using hip flexors
using adductors
using passive mobilization
bilateral adductor contractions

Soft Tissue Mobilization: gluteal myofascia

Therapeutic Exercises: isometric hip flexor contractions
gluteal and hamstring stretching

Movement Re-Education Options: neutral standing posture
allow limb to fully trail trunk (into hip extension and anterior
innominate rotation) during terminal stance/pre-swing
Quadratus Lumborum
Soft Tissue Mobilization

Pelvic Pattern
Contract/Relax Stretch and Re-education

Iliacus
Soft Tissue Mobilization
Impairments: Pelvic Girdle Positional Asymmetry
Limited Innominate Inferior Translation

Innominate Inferior Translation – leg pull

Innominate Inferior Translation – prone direct mobilization

Cues: Generate inferior translation via force through lower extremity or via direct force on ilium
Ensure that hip, thigh, knee and leg are free of pathology prior to applying inferior traction to tibia
Symptom level and response to initial mobilization determine the amplitude and speed of the mobilization

The following references provide additional information regarding this procedure:
Impairments: Innominate Positional Asymmetry
  Limited Left Innominate Anterior Rotation -or-
  Limited Right Innominate Posterior Rotation

Innominate Isometric Mobilization using hip flexors and extensors:
  Left Innominate Anterior Rotation
  Right Innominate Posterior Rotation

Cues: Utilize iliacus and rectus femoris on the left, gluteus maximus and hamstrings on the right
  Having both feet off the table lessens undesired antagonist co-contraction
  Manually contact the appropriate surface required to elicit the desired agonist contraction
  Slow build-up of force - maximal, painfree contraction - full relaxation
  Use compression/support on top of knees to facilitate relaxation
  Repeat contraction - relaxation cycle 3 to 5 times
  “Balance” pubes via bilateral adductor contractions following every innominate mobilization or manipulation

The following references provide additional information regarding this procedure:
Impairments:  Innominate Positional Asymmetry
Limited Inferior Translation of Left Innominate (Left Pube)
Limited Left Innominate Anterior Rotation

Innominate Isometric Mobilization using hip adductors and extensors:
Left Pube Inferior Translation
Left Innominate Anterior Rotation
Right Innominate Posterior Rotation

Cues:  Utilize adductors on the left, gluteus maximus and hamstrings on the right
Stand on patient’s right side to provide an efficient force application (lean) into left adductors and right tibia
Impairment: Limited Innominate Posterior Rotation

Innominate Posterior Rotation

Cues: Stand in front of patient
Utilize force couple on the innominate – mobilizing the ASIS posteriorly, mobilizing the ischial tuberosity anteriorly

The following references provide additional information regarding this procedure:
Impairment: Limited Innominate Anterior Rotation

Innominate Anterior Rotation

Cues: Location of the foot placement on the floor and the height of the table determine the amount of posterior rotation on the contralateral innominate. Utilize ipsilateral passive hip extension to create innominate anterior rotation. To isolate mobilizing force to the sacroiliac and pubic articulations, manually stabilize the sacrum. Create mobilizing and stabilizing forces with a lateral trunk lean.

The following reference provides additional information regarding this procedure: Freddy Kaltenborn PT: The Spine: Basic Evaluation and Mobilization Techniques, p. 110, 1993
Impairments: Limited Innominate Mobility
Limited Sacral Mobility

Lumbopelvic Region Manipulation

Cues: Flex, and sidebend thorax to the same side as the involved SI, and rotate thorax and lumbar spine away from the involved side – recruiting movement into the sacrum. Through the ASIS, apply a posterior and slightly lateral mobilization or manipulation to the innominate.

The following research publications provide additional information regarding this procedure:


