Sacroiliac Joint Assessment and Dysfunction

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Who am I?

- Owner / Director of RPM Physiotherapy, Toronto
- MSc(Pt) McMaster University 2002
- FCAMPT 2008
- Pelvic Floor Physiotherapist 2017
SI Joint Dysfunction

- Accounts for 16-30% of all low back pain (Bernard TN, Kirkaldy)

- Common risk factors include leg length discrepancy, altered biomechanics, pregnancy, advanced age, osteoarthritis and previous spinal surgery

- Lack of consensus on the existence of SI joint dysfunction

- Methods of clinical evaluation have poor specificity and sensitivity
Outline

• Anatomy and Physiology of the Pelvis
• Common MSK Conditions of the Sacroiliac (SI) Joints
• Biomechanic Examination of the Pelvis / SI Joints
• Treatment of the Dysfunctional Pelvis / SI Joint
• The Role of the Pelvic Floor
The Pelvis

- Sacrum (keystone)
- Coccyx
- Innominates (Anterior Superior Iliac Spine)
- Symphysis Pubis
- Ischial Tuberosities
The Lumbar - Pelvic - Hip Complex
Functions of the Pelvis

- Transmits weight from the upper extremities and trunk to the lower body
- Transmits ground forces to the trunk
- Shock absorption
- Transfer of weight and balance
- Supports the longitudinal load of the lumbar spine
Anatomy of the Sacrum
Form Closure of the Sacrum

- Wedge shape of the sacrum
- Reciprocal ridges and contours between the sacrum and ilium
- Cartilaginous difference between sacrum (hyaline) and ilium (hyaline but presents as fibrocartilage)
Force Closure of the Sacrum

- Sacrotuberous Ligament
- Sacrospinous Ligament
- Interosseous Ligament
- Posterior Sacroiliac Ligament
- Multi-joint Muscles and Fascia
- Pelvic Floor
- Supportive Muscle Slings
Sacral Movement

- 0.2 - 2 degrees of rotation
- 1 - 2 mm translation
- Nutation is stable position of anterior and inferior rotation of the sacral promontory wedging the sacrum further between the ilia (posterior rotation of ilium on sacrum)
- Counternutation is less stable position of posterior and superior rotation of sacral promontory (anterior rotation of ilium on sacrum)
- Movement studies based on both cadaver and living subjects
- Lack of consensus on sacral motion due to the effects of torsion and loading in living model which has proven difficult to measure
Common MSK Conditions of the Pelvis

- Sacral instability
- Sacroilitis
- Sciatica
- Sacral Fixation
- Posterior Pelvic Pain
- Pubic Symphysis Instability
- Osteoarthritis
Causes of Sacral Dysfunction

Hypermobility

Hypomobility

An inability of the pelvis to transfer load
Symptoms of SI Dysfunction

- Local pain in the back or buttock
- Radiating pain in the groin or laterally and posterior as far as the foot
- Pain in the lower abdomen (Baer’s point)
- Characterized as a dull ache
- Aggravated by rotational or unilateral movements, prolonged postures and weight bearing
- Associated with morning stiffness that eases with movement
Clinical Assessment

- Observation
- Gait Analysis
- Functional Movements
- Active Range of Motion
- Positional Tests
- Accessory Movements
- Stability Tests

Trendelenberg Test

Normal: Gluteus Medius contracts, opposite hip is elevated
Abnormal: Gluteus Medius weak, opposite hip drops
Observation

- Standing Posture
- Sitting Posture
- R = L Weight Bearing
- Pelvic Tilt
- Resting Position of Lower Extremities
Gait Analysis

- Trendelenberg Gait
- Side Flexion Toward or Away From Painful Side
- Hip Hiking
- Stride Length
- Trunk Angle
Functional Movements

- Squat
- Single Leg Stance
- Standing Rotation
- Forward / Backward Step
- Single Leg Squat
Positional Tests

• Sitting Height of Iliac Crests
• Standing Height of Iliac Crests
• Position of Ischial Tuberosities / Gluteal Folds
• Supine Anterior Superior Iliac Spine
• Standing Posterior Superior Iliac Spine
• Leg Length in Supine vs. Standing

**Sensitivity and specificity for individual tests extremely poor but cumulative values are moderate to strong***
## Sacral Movement

<table>
<thead>
<tr>
<th>Action</th>
<th>Sacral Movement</th>
<th>Innominate Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trunk Flexion</td>
<td>Forward flexion following the lumbar spine until 60 degrees of forward flexion then limited by hamstrings creating relative counternutation (Mitchell et al.)</td>
<td>Anterior rotation</td>
</tr>
<tr>
<td>Hip flexion</td>
<td>Follows the lumbar spine into extension (Strachen et al.)</td>
<td>Posterior Rotation</td>
</tr>
<tr>
<td>Lumbar Rotation</td>
<td>Ipsilateral rotation and contralateral side flexion</td>
<td>Ipsilateral posterior rotation and contralateral anterior rotation</td>
</tr>
<tr>
<td>Lumbar Side Flexion</td>
<td>Ipsilateral side flexion</td>
<td>Ipsilateral anterior rotation</td>
</tr>
</tbody>
</table>
Accessory Tests

- Passive physiologic rotation of innominate on sacrum
- Nutation
- Counternutation
- L5 / S1 - Lack of Consensus on coupling
Stability Tests

• Distraction

• Compression

• AP Shear of innominate on sacrum

• AP Shear of sacrum on innominate

• Superior glide / Longitudinal shear test
Special Tests

- Forced FABER (Neville et al., 2011)
- ASLR
- Femoral Shear
- Sacrotuberous Stress Test
Treatment

- Manipulation / Manual Techniques
- Exercise
- Kinesiotaping
- Bracing
- Pelvic Floor Physiotherapy
Manual Therapy

- Favours conditions of hypomobility
- Inappropriate in unstable joints, osteoporosis or inflammatory conditions
- Must be done by a certified / rostered physiotherapist, osteopath or chiropractor
- In a 2017 systematic review of physiotherapy interventions by Al-subahi et al. concluded that manipulation was most effective in decreasing pain and improving functional activity
Exercise

• Barbosa et al. had patients complete a variable number of 8 exercises over 8 weeks and found a significant decreased in pain

• Concluded that exercise helps to restore normal symmetry and balance

• Heavily dependent on patient compliance and proper technique

• www.physitrack.com
Kinesiotape

• Highly variable depending on the skill of the practitioner applying the tape

• Used to restore symmetry and encourage stable nutated position

• Castro-Sanchez et al. improved pain but failed to demonstrate improved function

• Poor quality research
SI Joint Bracing

- Most often used during pregnancy and cases of severe instability

- Dependent on correct application to a neutral sacrum

- Soisson, O et al. reported that despite subjective reports of decreased pain with short term brace use, there was no significant change to lumbar or pelvic positioning and decreased pain could not be attributed to muscle activation or centre of pressure
A Case for Pelvic Floor Physiotherapy
Pelvic Floor Physiotherapy

- The pelvic floor assists the stability of the SI joints, pubic symphysis, sacrococcygeal, lumbopelvic and hip joints (Lee 2004, Hodges 2007)

- Consequences of a dysfunctional pelvic floor include incontinence, pelvic organ prolapse, dyspareunia and chronic low back pain

- Smith et al., 2006 found a stronger correlation between issues of continence with low back pain than the correlation to obesity and sedentary lifestyle

- 2017 Cross sectional study of non pregnant women with lumbopelvic pain by Dufour et al., found 95.3% of participants had some level of pelvic floor dysfunction
Pelvic Floor Physiotherapy

• Controlled act performed by a rostered physiotherapist

• Can only be assessed by internal vaginal and rectal examination

• Typically reveals either increased tone or weak pelvic floor musculature

• Currently one of the most evidence based branches of physiotherapy
Impact of Pelvic Floor on SI Joint Dysfunction

- Tight obturator internus can refer pain down the posterior aspect of the ipsilateral thigh mimicking piriformis syndrome and favours counter-nutation causing SI joint dysfunction.

- Lack of pelvic floor assessment may contribute to poor treatment choices including prescription of core exercises to an already high tone and sensitized system.

- Neville et al., 2011 found that women with chronic pelvic pain had significantly higher incidence of MSK issues which could be predicted with 85% accuracy based on two orthopaedic tests.
Pelvic Floor Resources

- Pelvic Health Solutions Directory
  http://pelvichealthsolutions.ca/find-a-health-care-professional/ontario-physiotherapists/

- International Pelvic Pain Society
  www.pelvicpain.org

- https://www.embodiaapp.com/

- http://www.juliewiebept.com/

- Pelvic Pain Explained by Stephanie Pendergast

- Faghani et al., (in study) validated referral criteria
Questions