

**S. I. Joint Dysfunction and Low Back Pain
Assessment & Treatment Protocols Using an Algorithm Method for
Differential Diagnosis & Treatment**

Presented by Steven Goldstein

- 1. Common Sources of LBP**
- 2. Any dysfunction involving the thoracic or lumbar spine, the sacroiliac joint or hip can create low back pain**
- 3. Structures that contribute to LBP**
- 4. Piriformis**
- 5. Sciatic Nerve**
- 6. Ligaments: long posterior SI, sacrotuberous, sacrospinous**

Case Study:

Step One: History & Observation

Roger is a 45 year old engineering executive and former rugby player who is still active in his sport complaining of local pain in the back and pain in his posterior right leg.

•He states that his back is quite sore in the mornings and has difficulty in crossing his legs to put on his pants and socks. His back gets sore at the end of the day.

Roger recalls having had some degree of back soreness for quite a long time, probably 20 years or more. He has had the normal injuries associated with active rugby playing, muscle tears and sprains to his knees & ankles, His back although sore from play, never sustained any serious injury.

Roger believes that his constant traveling and driving with the constant sitting for prolonged periods of time definitely contributes to his back pain. He has found in recent times that prolonged standing or walking also makes the pain worse.

Roger finds it difficult to find relief when the pain is bad, lying down decreases the soreness but not completely. Swimming tends also to relieve the pain but only whilst in the water. Pain medications tend only to have a limited effect.

Initial Observations:

General:

Roger is a solid medium height man of about 170cm and 95kg, indicative of a former athlete. He appears to be in good health and walks naturally without hindrance, although is flexed slightly at the hips.

Regional:

Roger has a slight scoliosis, s-curve with associated posterior rib and muscle bulking on the right thoracic, and lateral pelvic tilt with superior PSIS on the left.

Step Two: Develop a Differential Diagnosis

Possible Conditions:–Discogenic Origin–Facet Joint Syndrome–Spinal Canal Stenosis–Sacroiliac Dysfunction–Piriformis Syndrome

Myofascial Trigger Points–Spondylolisthesis–Ankylosing Spondylitis–Scoliosis–Hemipelvis

Anatomical Structures Involved

Bones - Sacrum, Lumbar vertebrae, Pelvis

Ligaments – Anterior sacroiliac, Interosseous, Posterior sacroiliac, Iliolumbar, Anterior longitudinal, Supraspinous.

Fascia - superficial back line, lateral line fascia, spiral line fascia, thoracolumbar fascia.

Muscles- 29 different muscles at on the SI Joint

The sacroiliac joint requires muscle activity to keep it stable. If muscles can't work correctly, perhaps because of a somatic dysfunction, the joint becomes unstable and painful.

Optimal function of force closure (loose pack positions: muscles & neurological control) mechanisms requires integration of posterior and anterior muscles of the spine and pelvis.

Due to multiple attachments, thoracolumbar fascia (TLF) plays a significant role in stabilization.

Significant forces can be generated by various combinations and require significant counter-forces for stabilization.

Myology of the Trunk

Anterior

Anterior

- Latissimus dorsi
- Erector spinae
- Multifidus
- Quadratus lumborum
- Interspinalis
- Intertransversarii

- Tensor fascia latae,
- Adductor brevis,
- Adductor longus,
- Pectineus
- Rectus femoris
- Vastus medialis
- Vastus lateralis.

Posterior

- External oblique
- Internal oblique
- Transversus abdominis
- Iliopsoas
- Rectus abdominis

Posterior

- Gluteus maximus
- Gluteus medius
- Gluteus minimus
- Piriformis,
- Adductor Magnus
- Semitendinosus
- Semimembranosus
- Biceps femoris

Myology of the Pelvis

Thomas Myers, Body3 Article Poise:Psoas-Piriformis Balance

Thomas Myer postulated that to understand the SI joint to you had to consider the balance between the Psoas & Piriformis, and to understand this balance one needed to understand the nature of the SI Joint.

That in quadrupeds the spine is suspended between two hip bones at the SI joints with greater movement movement with the innominates following the motion of the femur

The shift from a horizontal to a vertical spine requires a radical shift in the function of the sacroiliac joint or does it?

Despite a radically different orientation than that of quadrupeds, our SI joint works much the same: it hangs in the pelvic girdle, and it follows femoral movement when walking.

What holds the sacrum in place is a strong ligament going from our PSIS to posterior edge of 2nd sacral segment: the dorsal sacroiliac ligament.

This ligament acts as an axis or hub for the tiny movement of the SI joint
Myers likes to use the analogy of the piriformis balancing the spine.

In the next slide he uses a broom balanced by its handle in your palm. Your head is like the head of the broom, with spine hanging in the SI joint, the piriformis exerts its pull below the level of this joint. Thus if the spine leans to the left, the tail of the spine, the part of the sacrum below the SI & coccyx would tend to move to the right.

The left piriformis exerts a ligament like restraint on this tendency, reducing strain in the SI joint

Balanced Spine allows piriformis to make periodic adjustments, unbalanced spine requires dedicated tightness in the piriformis.

Psoas like deltoid has its insertion as a point: lesser trochanter-but origin stretches from 5th lumbar to 12th thoracic. Fibres from bodies & TVP's head directly toward the insertion.

Actions are debatable: all agree it is a hip flexor, most agree with lateral rotation, but some say medial rotation.

Massage Magazine March/April 1998 pp72-83

Joint Play of the Sacrum

Nutation is sacral flexion in which the base of the sacrum moves anterior and inferior and the apex moves posterior and superior. *Counternutation* is sacral extension in which the base of the sacrum moves posterior and superior and the apex moves anterior and inferior. Piriformis & pelvic floor muscles act to pull sacrum in this direction
Nutation occurs when when a person assumes a posterior pelvic tilt position such as rising in the prone position and propping themselves on their elbows to move sacral base anteriorly

Step 3: Most Likely & Primary Diagnosis

Sacroiliac Dysfunction–Scoliosis–Discogenic Lesion

Step 4: Developing a Primary Diagnosis

The primary diagnosis is SIJ Dysfunction, which as suggested by Hertling and Kessler (1996 p 698), was once suspected responsible for a large percentage of all patients presenting with lower back pain. It wasn't until the mid 20th century that other pathologies, such as discogenic pathologies were considered, and SIJ becoming less diagnosed. However the wheel has turned and the SIJ is now again seen as a primary structure for the cause of non- specific low back pain.

Epidemiology:

–SI syndrome is present in 10% to 30% of patients with chronic low back pain.

Symptoms and Signs

- Patient presents with pain over SI joint after straightening up from a stooped position, often after lifting.
- Pain may radiate down the back of the leg and/or buttocks.
- Relatively sharp and stabbing pain that is worsened by sitting or twisting motions.

Physical Examination

Tests Performed:

Active Range of Motion (AROM) that stress the SIJ considered Motion Tests.

may be invalid but can be reliable

- Spinal flexion / extension (standing/seated)
- Spinal rotation (standing/seated)
- Spinal side flexion (standing/seated)
- Hip flexion / extension–Hip abduction / adduction
- Hip internal /external rotation

Standing & Seated Flexion Tests

- Standing flexion test (illiosacral) generally tells you which side the innominate is fixed on.
- Seated flexion test (sacroiliac) is as above will rule out the pelvis & low extremity as the cause.
- Test will not tell you if it is in-outflare or up or down slip
- If the findings in the seated test are worse than the standing test (greater deviation between PSIS' s in forward bending) treat sacrum before ilium
- If findings in standing test are worse than seated treat iliac rotations before sacrum
- Stork test confirms it is illiosacral or sacroiliac dysfunction

Provocative Tests that stress the SIJ

Ipsilateral Prone Kinetic Test:	<i>Pain on R SI</i>
Gapping Test	<i>normal</i>
Passive Ext/Med Rotation Ilium	<i>R=outflare</i>
Passive Flex/Lat Rotation Ilium	<i>ease position</i>
Approximation or Compression Test	<i>R</i>
<i>restricted indicates outflare</i>	

•Illiobial Band Stretch Test

Special Tests for SI Joint Dysfunction

- Patrick's test/ FABER test
- Gaenslen's test
- Long Sit Test
- Straight Leg Raise

Long Sit Test

- Evaluative for ilial rotation on sacrum at SI
- Therapists thumbs on medial malleoli
- Patient "sets" pelvis with bridge maneuver and then performs active long sit
- Therapist indicates any change in orientation of medial malleolus relationship
- Involved goes longer to shorter – anterior rotation
- Involved goes shorter to longer – posterior rotation

Step Five: Make A Working Diagnosis

Inspection/Postural Analysis:

- Bilateral hip flexion in both walking and standing

- Right posterior rotation of thoracic spine observed as muscle bulking

- Exaggerated shoulder/arm swing indicating possible hypomobile lumbar/pelvic region
- Right C-curve scoliosis from T-5 to L4
- Tissue compression on the left side lumbar
- Even A/C joints bilateral
- Left Iliac crest is higher
- Left externally rotated femur

•Palpation

- PSIS is higher on the left side
- ASIS is higher on the left side
- Hypertonic
- tender bilateral erector spinae, possible TP's
- tender bilateral quadratus lumborum, possible TP's
- tender right gluteus medius
- tensor fasciae latae, possible TP's
- tender left piriformis, possible TP's
- psoas major bilateral
- bilateral ITB's

•Special Test Findings

- Standing Flexion: *Right fixation*
 - Seated Flexion: *Normal*
 - Stork or Gillets: *Right fixation*
 - Patrick's test/ FABER test *Right SI joint pain*
 - Gaenslen's test *Right SI joint pain*
 - Long Sit Test: *Short leg on left, R longer to shorter = ant rotation*
 - Straight Leg Raise *65° pain at SI joint*
 - Illiotal Band Stretch Test *Left No pain-restricted Right pain at SI joint*
-

Step Six: Develop a Treatment Plan

Strategies for Treatment

- Thomas Myers' strategy:
 - Open monoarticular hip flexors-pectineus, iliacus & anterior adductors
 - Make sure multi-articular hip flexors are supple:TFL, sartorius, rectus femoris
 - Seek balance in hip extensors: hamstrings & lower lateral rotators
 - In lordotic cases-ease thoraco-lumbar fascia & deep transversospinalis muscles
 - Free psoas, especially medial fibres, carefully, sensitively
 - Seek ease in the piriformis

Steven's Approach

- Begin with Indirect techniques for autonomic nervous system & myofascia
 - Two pointing for assessment & parasympathetic effect
 - Long & Short Lever Compressions
 - Direct techniques
 - IFR static compression or cross hand stretches at high leverage points in myofascial net
 - Static origin/insertion-golgi tendon origin releases Joint play crowding techniques
 - MET or contract-relax for joint correction (osteopathic or Rick Phaigh's approach)/release of hypertonic musculature
 - Direct MFR/Deep tissue long stripping with active patient ROM
 - Static ischaemic compression or trigger point/NMT approaches
 - Aggressive friction techniques if appropriate
-

Step Seven: Implement the Treatment Plan

Upslip Correction

1. With patient supine
2. Stand at edge of table on side of upslip
3. Grasp patient's leg with both hands, just below knee and just above the ankle.
4. Lift the leg into hip and knee flexion
5. Bring patient's leg back down to the table top in a smooth, gliding motion. *The back of the knee and back of the ankle must meet the table at the same time.*
6. Repeat several times until patient is familiar with maneuver
7. Instruct patient that he/she should now *actively push* their leg through the extension a bit faster than you've been moving them passively. Give a count while the patient is in 90° flexion
8. Once patient has mastered this, as patient comes into extension accelerate the movement with your own effort once patient reaches 40° knee flexion

Onsen Manual: The Treatment of Pain, 1996 Structural Assessment & Correction of the Lower Body by Rick Phaigh with Richard Polishuk

References

1. Rick Phaigh with Richard Polishuk Onsen Manual: The Treatment of Pain, 1996 Structural Assessment & Correction of the Lower Body
2. Liebenson, C (1996). Rehabilitation of the spine. Williams & Wilkins: Media; PA
3. Myers, Thomas, Body3 Article Poise: Psoas-Piriformis Balance
Massage Magazine March/April 1998 pp72-83
4. Chaitow-DeLany, Clinical Application of Neuromuscular Technique Volume 2, Churchill Livingstone 2002, p775. Magee, David, Orthopaedic Physical Assessment, 4th Edition, 2002 Elsevier, pp569
6. Maitland, Jeffrey, Spinal Manipulation Made Simple, North Atlantic Books
7. Hertling & Kessler, Management of Common Musculoskeletal Disorders 3rd Ed., Lippincott Williams & Wilkins, 1996
Algorithm Method

STEP	TASK/PROCEDURE
STEP 1 - HISTORY AND OBSERVATION	Review the preliminary history that was obtained by giving the patient a questionnaire to complete. Do observation as you meet the patient Obtain the chief complaint in the patient's own words Ask for any reports and review them Consider if patient should complete a special regional questionnaire such as Oswestry, etc. Get a description of the pain, dysfunction and disability. Get and consider information on the lifestyle and social background factors.
STEP 2 - DEVELOP A DIFFERENTIAL DIAGNOSIS	Identify problems that cause similar problems and list them from least serious to most serious. Consider the following questions: – Which conditions could possibly be responsible? – Which anatomical structures could be involved? – Which mechanisms are you thinking of? – How do you think the symptoms affect this patient's activities of daily living and emotional life? Decide – what are the most likely problems that this patient could have?
STEP 3 - DEVELOP A PRELIMINARY DIAGNOSIS	Make a decision on which path to follow to find out what is wrong with the patient. Develop a hypothesis or hunch or idea for the chief complaint. What do your textbooks tell you about the mechanisms of the problem?
STEP 4 - MAKE A WORKING DIAGNOSIS	Determine the findings for this patient. Routine Procedures – what were the findings from doing routine procedures? Special Tests - what were the findings from doing special procedures? Which categories of syndromes apply to some extent – list according to the greatest degree of involvement. What is the mechanism of dysfunction, pain and disability for each one? What is your working diagnosis of this patient's problem?
STEP 5 - DEVELOP A TREATMENT PLAN	Refer again to the algorithm for ideas about management. Select procedures and therapies that will assist with correction of the cause (mechanism) of dysfunction, pain production and disability. Check the risk factors and contraindications for each procedure you have identified. List the procedures in sequence of least forceful to most forceful. Always start with the least forceful procedure first. Summarise: – Which soft tissue techniques would be appropriate for this patient?

Somatic Education Australia T.T.L.E.

	<ul style="list-style-type: none">- Which modalities will be good if the patient has a lot of inflammation?- What advice should the patient be given for things to do at home and for sleeping habits?
STEP 6 - IMPLEMENT A TREATMENT PLAN	<p>Explain to the patient:</p> <ol style="list-style-type: none">1. What you have found2. What you plan to do3. What the patient may expect following the treatment4. What you expect the patient to do after the first treatment or in future to assist their recovery. <p>Get consent from the patient to proceed. Implement your care procedures Determine patient response Advise the patient on what to do and when to return Record what you have done and advised the patient (Keep accurate notes of what you do for the patient and get informed consent for assessment and treatment procedures before you do them.)</p>
STEP 7 - CONFIRM YOUR DIAGNOSIS	<p>Follow your patient's progress, determine if the care is effective. If the care is effective, (the patient is better), it suggests that your diagnosis is confirmed If there is no change after about 6 visits – do a complete re-assessment and arrive at a new hypothesis and patient care plan OR refer the patient. If the patient gets worse after any visit – reassess the patient, modify your care plan or refer the patient. After taking care of the patient for one or more times, indicate whether you are able to confirm the diagnosis based on the patient's response to your care? Indicate if the patient is better, worse, no change or has been referred.</p>