If you are viewing this course as a recorded course after the live webinar, you can use the scroll bar at the bottom of the player window to pause and navigate the course.

This handout is for reference only. Non-essential images have been removed for your convenience. Any links included in the handout are current at the time of the live webinar, but are subject to change and may not be current at a later date.
Lumbopelvic Pain in the Athlete: a Review of Best Practices for Examination and Treatment

By
Scott Cheatham Ph.D., DPT, OCS, ATC, CSCS
Associate Professor
California State University Dominguez Hills

Learning Objectives

Participants will be able to:

- Discuss the different types of lumbopelvic pathologies found among athletes using the ICF definitions
- Appraise the current evidence on best practices for examination of the different pathologies discussed.
- Appraise the current evidence on best practices for treatment of the different pathologies discussed.
- Discuss common differential diagnoses that clinically present as lumbopelvic pain
Anatomy Review
Working Definition

Lumbopelvic pain: a primary complaint of pain in the area between the 12th rib and sacrum with or without leg pain\(^1-8\)

- **Acute pain:** 0 to 4 weeks
- **Subacute pain:** 4 to 12 weeks
- **Chronic pain:** 12 weeks or longer

- Regional interdependence: Other regions of the body will be considered.
- Sub-classifications of lumbopelvic pain will be discussed.
- Traumatic lumbopelvic injury not included in this discussion.
Lumbopelvic Pain
Statistics and Science

Adult Statistics

Occurrences 1,2
- Low back pain (LBP) is the second most common cause of disability in US adults.
- LBP prevalence is highest during the 3rd decade of life
- ½ of all working Americans admit to having back pain symptoms each year.
- 80% of adults will experience LBP at some point in their lives.
- Men and women are affected equally by LBP.
- For most individuals, the clinical course is benign, with 95 percent of those afflicted recovering within a few months of onset.
- 20% with acute LBP will develop chronic LBP (≥ 3 months or longer).
- Recurrences of LBP range from 20–44 percent within 1 year for working populations, to lifetime recurrences of up to 85 percent.

Occupational impact 1,2
- An estimated 149 million days of work per year are lost due to LBP.

Fiscal financial impact 1,2
- The total cost of LBP in the U.S. is estimated to be between 100–200 billion dollars annually, 2/3 is due to decreased wages and productivity.
Young Adult Statistics

**Occurrences**¹,²
- 30% of adolescents worldwide will experience at least one LBP episode.
- LBP affects young men and women equally.
- Young adults with LBP at the age 14 may have increased incidence 25 years later.
- Some authors proposed that LBP in young adults and children may occur because of growth spurts and increased physical activity.

---

**Statistics**

**Problems with reported data**
- Inconsistent reporting past 20 years.
- No consensus on the how to collect data for the different types of LBP.
- No consensus on defining LBP vs. Lumbopelvic pain.
- Different data collection methodology among countries, continents, ethnicities, etc.
- Overlapping statistics between years.
Risk Factors 1-4

- High BMI
- Psychosocial Factors (stress, depression)
- Prolonged Postures
- Hx of LBP or Injury
- Genetic Factors and Morphology
- Poor Fitness Level
- Smoking
- L-S Mobility or Muscle and Joint Flexibility
- Sedentary Lifestyle
- Smoking

Prognostic Factors

Factors for Recurrence
- History of Previous Episodes
- Excessive Spinal Mobility
- Excessive Mobility in other Joints

Factors for Chronic Pain
- Presence of Symptoms below Knee
- Psychological Stress or Depression
- Pain of High Intensity
- Fear of Pain, Movement, and Re-injury
- Low Expectations of Recovery
- Passive Coping Skills

8/6/2018
Young Athletes

- All levels of physical activity are associated with an increased risk of LBP in adolescents.
- Increased LBP has been linked to sports that impose higher stress to lumbopelvic area.¹⁻⁵

<table>
<thead>
<tr>
<th>Lacrosse</th>
<th>Field Hockey</th>
<th>Rowing</th>
<th>Competitive Dancing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rugby</td>
<td>Ice Hockey</td>
<td>Wrestling/MMA</td>
<td>Diving</td>
</tr>
<tr>
<td>Cheerleading</td>
<td>Snowboarding Skiing</td>
<td>Gymnastics</td>
<td>Football</td>
</tr>
</tbody>
</table>

Explanation for lumbopelvic pain in the athlete?

_Trompeter et al. Sports Med. 2017⁵_

- Higher level athletes have a greater level of physical activity and thus might have a higher risk of developing back pain.
- Higher level athletes spend much time in training and competition, which subjects their bodies to a great deal of mechanical strain and, thus, a high level of stress on the musculoskeletal system.
- “These athletes may experience exceedingly high musculoskeletal stress in the years from adolescence (14 years of age), in which elite competitive sports begin, until peak competitive performance at ages of up to 40 years.”
The Neuromatrix Theory of Pain

- The neurosignature for pain experience is determined by the synaptic architecture of the neuromatrix, which is produced by genetic and sensory influences.

- The neurosignature pattern is modulated by sensory inputs and by cognitive events, such as psychological stress.

- This neurosignature pattern may also occur because stressors (physical and psychological) act on stress-regulation systems, which may produce lesions of muscle, bone, and nerve tissue. 6-7

Summary: 6-7

- The neuromatrix: as a result of failed homeostasis regulation, produces the destructive conditions that may create chronic pains.
The neuromatrix theory guides us away from the Cartesian concept of pain as a sensation produced by injury, inflammation, or other tissue pathology and toward the concept of pain as a multidimensional experience produced by multiple influences.6-7

Shouldn’t we look at lumbopelvic pain as a multidimensional problem?

- Clinicians still classify and treat based upon a label.
- ICD-10 and ICF were designed to compliment each other but may not fully account for the comprehensive influence of pain.
- Treatment paradigms need to be updated to reflect the latest in pain science, etc.
Annual Training & Competition

Growth Spurts and Immature Neuromuscular System

Sequence of Events
Lumbopelvic Pain in the Athlete

Musculoskeletal Injury to Lumbopelvis

Lack of Muscle Strength, Length, and Mobility of the Musculoskeletal System

Psychosocial Influences (sympathetic)

Lack of Proper Rest, Recovery, and Regeneration (parasympathetic)

Pain Neuromatrix (Lumbopelvic Pain)

Classifications of Lumbopelvic Pain
Traditional, ICF, ICD-10
Traditional Classifications

- Chronic Low Back Pain
- Acute Low Back Pain
- Mechanical Back Pain
- Non-Specific Low Back Pain

Diagnosed Myofascial, Diskogenic, Spondy, Degenerative, Instability, Facet, Sacroiliac Joint, etc.

Contemporary Classification Systems

- International Classification of Functioning, Disability and Health (ICF)
- International Classification of Disease (ICD 10)
Contemporary Classification Systems

- ICF: Provides a system of categorizing a medical condition and addressing important aspects of “the individual's life”.
- ICD-10: Used for billing and documentation purposes.
- Traditional nomenclature (e.g. naming a pathology) and classifications are still used clinically and in research.
  - We will use these terms in later sections.

Lumbopelvic Pain and Mobility Deficits
Acute Pain + Mobility Deficits

- **ICF:** Acute low back pain with mobility deficits
- **ICD10 (M99.03):** Lumbosacral segment/somatic dysfunction
- **Clinical Findings:**
  - Acute low back, buttock or thigh pain (duration of one month or less)
  - Restricted lumbar range of motion and segmental mobility
  - Low back and low back-related lower extremity symptoms reproduced with provocation of the involved lower thoracic, lumbar or sacroiliac segments

Sub Acute Pain + Mobility Deficits

- **ICF:** Sub acute low back pain with mobility deficits
- **ICD10 (M99.03):** Lumbosacral segmental/somatic dysfunction
- **Clinical Findings:**
  - Sub acute, unilateral, low back, buttock or thigh pain
  - Symptoms reproduced with end-range spinal motions and provocation of the involved lower thoracic, lumbar or sacroiliac segments
  - Presence of thoracic, lumbar, pelvic girdle, or hip active, segmental, or accessory mobility deficits
Lumbopelvic Pain and Movement Coordination Deficits

**Acute Pain + Coordination Deficits**

- **ICF:** Acute low back pain with movement coordination impairments
- **ICD10 (M53.2):** Spinal instabilities
- **Clinical Findings:**
  - Acute exacerbation of recurring low back pain that is commonly associated with referred lower extremity pain
  - Symptoms produced with initial to mid-range spinal movements and provocation of the involved lumbar segment(s)
  - Movement coordination impairments of the lumbopelvic region with low back flexion and extension movements
Sub Acute Pain + Coordination Deficits

- **ICF:** Sub acute low back pain with movement coordination impairments
- **ICD10 (M53.2):** Spinal instabilities

**Clinical Findings:**
- Sub acute exacerbation of recurring low back pain that is commonly associated with referred lower extremity pain
- Symptoms produced with mid-range motions that worsen with end range movements or positions and provocation of the involved lumbar segment(s)
- Lumbar segmental hypermobility may be present
- Mobility deficits of the thorax and pelvic/hip regions may be present
- Diminished trunk or pelvic region muscle strength and endurance
- Movement coordination impairments while performing self care/home management activities

Chronic Pain + Coordination Deficits

- **ICF:** Chronic low back pain with movement coordination impairments
- **ICD10 (M53.2):** Spinal instabilities

**Clinical Findings:**
- Chronic, recurring low back pain that is commonly associated with referred lower extremity pain
- Presence of one or more of the following:
- Low back and/or low back-related lower extremity pain that worsens with sustained end-range movements or positions
- Lumbar hypermobility with segmental motion assessment
- Mobility deficits of the thorax and lumbopelvic/hip regions
- Diminished trunk or pelvic region muscle strength and endurance
- Movement coordination impairments while performing community/work related recreational or occupational activities
Lumbopelvic Pain with Referral or Radiating Pain to Lower Extremity

8/6/2018

Acute Pain + Referral in LE

- **ICF**: Acute low back pain with related (referred) lower extremity pain
- **ICD10 (M51.26)**: Flatback syndrome, or lumbago due to displacement of intervertebral disc

**Clinical Findings:**
- Low back pain, commonly associated with referred buttock, thigh, or leg pain, that worsens with flexion activities and sitting
- Low back and lower extremity pain that can be centralized and diminished with positioning, manual procedures, and/or repeated movements
- Lateral trunk shift, reduced lumbar lordosis, limited lumbar extension mobility, and clinical findings associated with the sub acute or chronic low back pain with movement coordination impairments category are commonly present
Acute Pain + Radiating Pain in LE

- **ICF:** Acute low back pain with radiating lower extremity pain
- **ICD10** *(M54.41):* Lumbago with sciatica

**Clinical Findings:**
- Acute low back pain with associated radiating pain in the involved lower extremity
- Lower extremity paresthesias, numbness, and weakness may be reported
- Symptoms are reproduced or aggravated with initial to mid-range spinal mobility, lower limb tension/straight leg raising, and/or slump tests
- Signs of nerve root involvement (sensory, strength, or reflex deficits) may be present

---

Sub Acute Pain + Radiating Pain in LE

- **ICF:** Sub acute low back pain with radiating lower extremity pain
- **ICD10** *(M54.41):* Lumbago with sciatica

**Clinical Findings:**
- Sub acute, recurring, mid-back and/or low back pain with associated radiating pain and potential sensory, strength, or reflex deficits in the involved lower extremity
- Symptoms are reproduced or aggravated with mid-range and worsen with end range lower limb tension/straight leg raising and/or slump tests
Chronic Pain + Radiating Pain in LE

- **ICF:** Acute low back pain with radiating lower extremity pain
- **ICD10 (M54.41):** Lumbago with sciatica
- **Clinical Findings:**
  - Chronic, recurring, mid back and/or low back pain with associated radiating pain and potential sensory, strength, or reflex deficits in the involved lower extremity
  - Symptoms are reproduced or aggravated with sustained end-range lower limb tension/straight leg raising and/or slump tests

Lumbopelvic Pain with Cognitive or Affective Tendencies
Acute Pain + Cognitive Issues

- **ICF:** Acute or sub acute low back pain with related cognitive or affective tendencies
- **ICD10 (M54.5):** Low back pain/low back strain/lumbago

**Clinical Findings:**
- Acute or sub acute low back and/or low back-related lower extremity pain
- Presence of one or more of the following:
  - Two positive responses to Primary Care Evaluation of Mental Disorders for depressive symptoms
  - High scores on the Fear-Avoidance Beliefs Questionnaire and behavior consistent with an individual who has excessive anxiety or fear
  - High scores on the Pain Catastrophizing Scale and cognitive processes consistent with individuals with high helplessness, rumination, or pessimism about low back pain

Chronic Pain + Generalized Pain

- **ICF:** Chronic low back pain with related generalized pain
- **ICD10 (M54.5):** Low back pain/low back strain/lumbago

**Clinical Findings:**
- Low back and/or low back-related lower extremity pain with symptom duration for > 3 months
- Generalized pain not consistent with other impairment-based classification criteria presented in this clinical guideline
- Presence of depression, fear-avoidance beliefs, and/or pain catastrophizing
ICF Classification Summary

- **Acute, Sub Acute**
  - Lumbopelvic Pain and Mobility Deficits
  - Lumbopelvic Pain and Coordination Deficits
  - Lumbopelvic Pain with Referral or Radiating LE Pain
  - Lumbopelvic Pain with Cognitive Issues
- **Acute, Sub Acute, Chronic**
- **Acute, Chronic**

Lumbopelvic Pain

Clinical Presentation of Common Conditions

Myofascial Pain (MTrPs)

Patient Profile

- **Description:** A syndrome characterized by chronic pain that is caused by multiple trigger points and fascial constriction
- **Mechanism:** Poor posture, muscle imbalance, pattern overload, etc.

<table>
<thead>
<tr>
<th>Clinical Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• TrPs (local and referred pain)</td>
</tr>
<tr>
<td>• Fatigue and weakness</td>
</tr>
<tr>
<td>• Decreased ROM</td>
</tr>
<tr>
<td>• Autonomic signs and symptoms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Travell and Simons Examination Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The clinician manually palpates and finds a taut band of muscle with a nodule</td>
</tr>
<tr>
<td>• Upon sustained palpation, the patient reports a painful sensation in an area consistent with the established referred pain pattern of the involved muscle.</td>
</tr>
<tr>
<td>• The clinician quickly rolls his/her fingers over taut band and observes the presence of a visible or palpable local twitch response.</td>
</tr>
<tr>
<td>• During palpation, the patient demonstrates a general pain response characterized by withdrawing from palpation, wincing, or verbalizing their discomfort.</td>
</tr>
</tbody>
</table>
MTrPs Referral Pattern

- Iliopsoas
- Glut Medius
- Quadratus Lumborum
- Piriformis
- Erector Spinae
- Hamstrings

Diskogenic Disorders
Patient Profile

- **Descriptions:** Diskogenic disorders range from internal disk derangements to annular tears and extrusions.

- **Mechanism:** Variable: no apparent reason, combined flexion with rotation, or lifting.

<table>
<thead>
<tr>
<th>Clinical Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pain location midline, unilateral or bilateral</td>
</tr>
<tr>
<td>• Somatic or radicular, or both</td>
</tr>
<tr>
<td>• Centralization or peripheralization</td>
</tr>
<tr>
<td>• Directional preference favoring extension</td>
</tr>
<tr>
<td>• Pain provoked on rising from sitting</td>
</tr>
<tr>
<td>• Loss of lumbar extension following flexion</td>
</tr>
<tr>
<td>• Positive neural tension testing (straight leg raise with a radiculopathy presentation)</td>
</tr>
</tbody>
</table>

**Lumbar Spine Segmental Nerve Root Lesion**

<table>
<thead>
<tr>
<th>Level</th>
<th>Myotome</th>
<th>Dermatome</th>
<th>Reflexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>T12</td>
<td>None</td>
<td>Medial thigh and inguinal area</td>
<td>None</td>
</tr>
<tr>
<td>L1</td>
<td>None</td>
<td>Back, anterior thigh, medial upper thigh</td>
<td>None</td>
</tr>
<tr>
<td>L2</td>
<td>Psoas and Hip Adductors</td>
<td>Back to anterolateral to proximal medial thigh</td>
<td>None</td>
</tr>
<tr>
<td>L3</td>
<td>Psoas and Quadriceps</td>
<td>Back to anterolateral to proximal medial thigh to patella</td>
<td>Diminished or absent patellar reflex</td>
</tr>
<tr>
<td>L4</td>
<td>Tibialis anterior and extensor hallucis</td>
<td>Medial buttck, lateral thigh to medial lower leg and medial aspect of foot</td>
<td>Diminished or absent patellar reflex</td>
</tr>
<tr>
<td>L5</td>
<td>Extensor hallucis, peroneals, gluteus medius, and dorsiflexors</td>
<td>Buttock, posterior and lateral thigh to anterolateral aspect of leg to the dorsum of foot</td>
<td>None</td>
</tr>
<tr>
<td>S1</td>
<td>Ankle plantar flexion and hamstrings</td>
<td>Buttock, thigh, and posterior leg and lateral foot</td>
<td>Diminished or absent Achilles reflex</td>
</tr>
<tr>
<td>S2-S4</td>
<td>Pelvic floor muscle</td>
<td>Perineum, genitals, and lower sacrum</td>
<td>Positive superficial anal reflex or reduced anal wink</td>
</tr>
</tbody>
</table>
Degenerative Disorders
Patient Profile

- **Descriptions**: Spondylosis refers to spinal degenerative osteoarthritis that begins at the disk and progresses along the articulation between the neural foramina or zygapophysial joints. End results is spinal stenosis.

- **Mechanism**: Aging. Most common in patients ≥ 48 years of age. One of the primary reasons for surgery in patients ≥ 65 years of age.

<table>
<thead>
<tr>
<th>Clinical Presentation of Spinal Stenosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Age: ≥ 48 years of age</td>
</tr>
<tr>
<td>• Pain location midline, unilateral or bilateral</td>
</tr>
<tr>
<td>• Somatic or radicular, or both, with leg pain most dominant</td>
</tr>
<tr>
<td>• Centralization or peripheralization</td>
</tr>
<tr>
<td>• Symptom production with walking or standing, or both</td>
</tr>
<tr>
<td>• Directional preference favoring flexion</td>
</tr>
</tbody>
</table>

---

**Diskogenic vs. Stenosis**

<table>
<thead>
<tr>
<th></th>
<th>Diskogenic</th>
<th>Spinal Stenosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common Age</strong></td>
<td>30-50 years of age</td>
<td>&gt;50 year of age</td>
</tr>
<tr>
<td><strong>Aggravating Factors</strong></td>
<td>Prolong sitting, bending and twisting</td>
<td>Prolonged standing, repeated extension activity</td>
</tr>
<tr>
<td><strong>Relieving Factors</strong></td>
<td>Movement, change in position</td>
<td>Movement, sitting, lying with knees bent</td>
</tr>
<tr>
<td><strong>Corrective Exercise</strong></td>
<td>Focus on abdominal core strengthening in spinal neutral/extension</td>
<td>Focus on abdominal core strengthening with more spinal flexion</td>
</tr>
</tbody>
</table>
Spondylolysis/Spondylolisthesis

- **Descriptions:**
  - Spondylolysis: A defect in the lumbar pars interarticularis (L4-L5, L5-S1)
  - Spondylolisthesis: A slippage of one vertebra on another
    - Five types: dysplastic, isthmic, degenerative, traumatic, & pathologic.
    - Common Ages: 10 and 15 years

- **Mechanism:** Variable: trauma to overuse injuries

<table>
<thead>
<tr>
<th>Grades of Spondylolisthesis</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I</td>
<td>1% to 25%</td>
</tr>
<tr>
<td>Grade II</td>
<td>26% to 50%</td>
</tr>
<tr>
<td>Grade III</td>
<td>51% to 75%</td>
</tr>
<tr>
<td>Grade IV</td>
<td>76% to 100%</td>
</tr>
<tr>
<td>Grade V</td>
<td>more than 100%</td>
</tr>
</tbody>
</table>
Spinal Instability

Patient Profile

- **Descriptions**: Instability suggests excessive movement in a given lumbar motion segment that contributes to pain.

- **Mechanism**: Clinical instability is a less well-defined condition, and this suggests that a patient may benefit from a stabilization-based treatment program.

<table>
<thead>
<tr>
<th>Clinical Presentation of Spinal Instability</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Age: &lt;37 years</td>
</tr>
<tr>
<td>• Pain location variable</td>
</tr>
<tr>
<td>• Somatic or radicular, or both</td>
</tr>
<tr>
<td>• Isolated lumbar flexion &gt;53 degrees</td>
</tr>
<tr>
<td>• Beighton scale &gt;2</td>
</tr>
<tr>
<td>• Lack of hypomobility or hypermobility, or both, during segmental mobility testing</td>
</tr>
</tbody>
</table>
Sacroiliac Joint Pain

Patient Profile

- **Descriptions:** Pain described as symptoms that originate at the sacroiliac joint. Pain generated from the sacroiliac joint can refer pain to other parts of the hip and pelvis.
- **Mechanism:** Trauma, overuse, or pregnancy

<table>
<thead>
<tr>
<th>Clinical Presentation of SI Joint Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Somatic pain primarily within 2 cm of the posterior superior iliac spine</td>
</tr>
<tr>
<td>• Unilateral below L5 with referral to thigh</td>
</tr>
<tr>
<td>• Pain provoked rising from sitting</td>
</tr>
<tr>
<td>• Absence of centralization and peripheralization</td>
</tr>
<tr>
<td>• No directional preference</td>
</tr>
<tr>
<td>• Three or more positive sacroiliac joint provocation test results</td>
</tr>
</tbody>
</table>
Lumbar Facet Disorder

Patient Profile

- **Descriptions**: Facet joint pain is thought to result from capsular irritation or the degenerative sequelae. Pain from the facet joint is typically unilateral and somatic.

- **Mechanism**: Variable. Not well known. Hypomobility?

<table>
<thead>
<tr>
<th>Clinical Presentation of Facet Joint Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Somatic pain</td>
</tr>
<tr>
<td>• Unilateral with primary referral to gluteal and rarely distal</td>
</tr>
<tr>
<td>• Pain not provoked rising from sitting</td>
</tr>
<tr>
<td>• Absence of centralization and peripheralization</td>
</tr>
<tr>
<td>• No directional preference</td>
</tr>
<tr>
<td>• No symptoms with coughing or sneezing</td>
</tr>
</tbody>
</table>
Lumbopelvic Pain
Basic Orthopedic Examination
Patient Outcome Scales\textsuperscript{5,8,9}

- 28 common lumbopelvic pain questionnaires

Patient Outcomes

- Oswestry Disability Index
- Roland Morris Disability Questionnaire
- Numeric Pain Rating Scale (11-point)
- Short Form Heath Survey
- Quebec Back Pain Disability Scale

Mental Impairment Scales

- The Fear-Avoidance Beliefs Questionnaire
- Pain Catastrophizing Scale
- Tampa Scale of Kinesiophobia
- Beck Depression Inventory
- Hospital Anxiety and Depression Scale

History, Observation, Palpation

- **History:** See clinical presentation section
- **Observation:** Inspect region for swelling, redness, tissue guarding/spasm, autonomic signs, skin lesions, etc.
- **Palpation\textsuperscript{10}:** Tissue integrity examination

<table>
<thead>
<tr>
<th>Grade</th>
<th>Interpretation</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Pain</td>
<td>No signs of pain or discomfort with pressure.</td>
</tr>
<tr>
<td>I</td>
<td>Mild Pain</td>
<td>Tenderness reported without flinching to pressure.</td>
</tr>
<tr>
<td>II</td>
<td>Moderate Pain</td>
<td>Wincing or flinching to pressure.</td>
</tr>
<tr>
<td>III</td>
<td>Severe Pain</td>
<td>Signs of severe pain such as verbal gestures and withdrawing of body part to pressure.</td>
</tr>
<tr>
<td>IV</td>
<td>Noxious-Intolerable Pain</td>
<td>Unbearable pain, patient does not allow palpation to the specific area of pain.</td>
</tr>
</tbody>
</table>
Lumbopelvic ROM

**Description:** The amount of active lumbar flexion, extension, rotation, and side bending motion measured using an inclinometer.

**Clinimetric Properties:**
- Lumbar motion obtained with radiographic measures
  - Flexion: $r = 0.95$
  - Extension: $r = 0.85$
  - Inter-rater (MD and physiotherapist) $r = 0.88$ for flexion standard error of measurement (SEM) = 4.6 and $r = 0.42$ for extension, SEM = 2.3.
### Muscle Performance (MMT)

#### Neuromotor Testing

<table>
<thead>
<tr>
<th>Level</th>
<th>Motor</th>
<th>Reflex</th>
<th>Sensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1-L2</td>
<td>Hip Flexion (Utility Score 2)</td>
<td>NA</td>
<td>Dermatome (Utility Score 2)</td>
</tr>
<tr>
<td>L3-L4</td>
<td>Knee Extension (Utility Score 2)</td>
<td>Patellar (L2-L3) (Utility Score 2)</td>
<td>Dermatome (Utility Score 2)</td>
</tr>
<tr>
<td>L4-L5</td>
<td>Ankle Dorsiflexion (Utility Score 2)</td>
<td>NA</td>
<td>Dermatome (Utility Score 2)</td>
</tr>
<tr>
<td>L5</td>
<td>Great Toe Extension (Utility Score 2)</td>
<td>NA</td>
<td>Dermatome (Utility Score 2)</td>
</tr>
<tr>
<td>L5-S1</td>
<td>Unilateral Standing (Utility Score 2)</td>
<td>Achilles (Utility Score 2)</td>
<td>Dermatome (Utility Score 2)</td>
</tr>
<tr>
<td>S1</td>
<td>Walk on toes (Utility Score 2)</td>
<td>Ext. Digi Brevis (L5-S1) (Utility Score 2)</td>
<td>Dermatome (Utility Score 2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Score</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I</td>
<td>Evidence strongly supports the use of this test</td>
</tr>
<tr>
<td>Level II</td>
<td>Evidence moderately supports the use of this test</td>
</tr>
<tr>
<td>Level III</td>
<td>Evidence minimally supports the use of this test</td>
</tr>
</tbody>
</table>

*Cook CE, Hegedus EJ. Orthopedic Physical Examination: Evidence Based Approach. Prentice Hall*
Neurodynamic Testing

Straight Leg Raise Test

- **Description:** The patient is in the supine position. The examiner passively elevates the involved leg. A positive test result if the concordant leg pain is reproduced.

- **Reference Standard:** Lumbosacral nerve root compression identified with magnetic resonance imaging.

- **Diagnostic Utility:** Sensitivity: 97%; Specificity: 57%; +LR: 2.23; −LR: 0.05.
Cross Over Sign Test

- **Description:** The patient lies in a supine position. The examiner passively raises the asymptomatic leg. A positive finding occurs if there is a reproduction of the concordant leg symptoms in the contralateral leg.

- **Reference Standard:** Surgical visualization of protruded lumbar intervertebral disks.

- **Diagnostic Utility:** Sensitivity: 43%; Specificity: 97%; +LR: 14.3; −LR: 0.59

Slump Test

- **Description:** The patient sits and slumps forward while the examiner passively extends the patient’s knee while maintaining dorsiflexion and evaluates for reproduction of concordant symptoms. The patient then extends the neck and symptoms are again evaluated. A positive test result when the concordant symptoms are provoked in the slump position and eased when neck flexion is released.

- **Reference Standard:** Herniated nucleus pulposus identified on computed tomography and/or magnetic resonance imaging.

- **Diagnostic Utility:** Sensitivity: 83%; Specificity: 55%; +LR: 1.82; −LR: 0.32
Prone Knee Bend Test

- **Description:** The patient lies prone. The examiner passively flexes the patient’s knee, moving the foot toward the buttock. A positive test result occurs if a reproduction of the concordant symptoms presents.

- **Reference Standard:** Operative visualization of herniation.

- **Diagnostic Utility:** Sensitivity: 84%; Specificity: NT; +LR: NA; −LR: NA.

Lumbar Spine: Special Testing

**Provocation or movement**
Flexion Quadrant (R+L)
(Flexion, Sidebend, Rotation)

Rationale: Nerve root vs. Facet pathology

(+) Response: The patient’s symptoms are reproduced

Alternate: Test is done in sitting

Utility Score: NA

Extension Quadrant (R+L)
(Extension, Sidebend, Rotation)

Rationale: Nerve root vs. Facet pathology.

(+) Response: The patient’s symptoms are reproduced

Alternate: Test is done in sitting

Utility Score: 3

Segmental Mobility Testing

- **Description:** With the patient prone, lower thoracic and lumbar spine segmental movement and pain response are assessed

- **Reference Standard:** Reliability studies.

- **Diagnostic Utility:** Measures for determining mobility reported low reliability for ordered scales in patient studies:
  - ICC = 0.25
  - Kappa = −0.2 to 0.26
Prone Instability Test

- **Description:** The patient lies prone over the end of a treatment plinth. The examiner applies a PA spring over a spinous process to identify a provocative segment. The patient is then asked to lift the legs while holding onto the plinth. The examiner applies a PA spring over the identified tender segment. A positive test result of there the legs are elevated.

- **Reference Standard:** Success deemed with a stabilization program.

- **Diagnostic Utility:** Sensitivity: 72%; Specificity: 58%; +LR: 1.7; −LR: 0.59

Passive Lumbar Extension Test

- **Description:** The patient lies prone while the examiner elevates both lower extremities approximately 30 cm and gently pulls while maintaining the knees extended. A positive test result occurs if the patient abnormal sensation in the lumbar region.

- **Reference Standard:** Radiologic evaluation of instability.

- **Diagnostic Utility:** Sensitivity: 84.2; Specificity: 90.4; PPV: 0.80; NPV: 0.927; LR: 8.84
Posterior-Anterior Mobility Test

- **Description:** The patient lies prone while the clinician applies a posteroanterior central pressure to the spinous processes.

- **Reference Standard:** Radiologic evaluation of translational instability.

- **Diagnostic Utility:** Sensitivity: 29%; Specificity: 89%; +LR: 2.52; −LR: 0.81.61

Centralization Test

- **Description:** The patient either stands or lies prone. The patient is instructed to do the following:

  - Repeated extension (5-20 reps) at different ROM’s

- **Reference Standard:** Reliability Studies, patient outcomes

- **Alternate:** prone press-up

- **Diagnostic Utility:** Utility Score: 1
Special Tests: SI Joint

Provocation Tests

8/6/2018

Distraction Test

- **Description:** The patient lies supine while the examiner places firm downward pressure over the anterior superior iliac spines. A positive result occurs if the concordant symptoms are reproduced.

- **Reference Standard:** 80% pain relief with injection of local anesthetics into sacroiliac joint

- **Diagnostic Utility:** Sensitivity: 60%; Specificity: 81%; +LR: 3.20; −LR: 0.49
**Thigh Thrust Test**

- **Description:** The patient lies supine while the ipsilateral hip flexed. The examiner places one hand under the sacrum and supports the patient’s ipsilateral hip with their other hand. A downward force is imparted along the long axis of the femur toward the plinth. A positive result is reproduction of concordant symptom.

- **Reference Standard:** 80% pain relief with injection of local anesthetics into the sacroiliac joint.

- **Diagnostic Utility:**
  - Sensitivity: 50%; Specificity: 69%; PPV: 0.58; NPV: 0.92; +LR: 2.80; −LR: 0.18.

**Gaenslen Test**

- **Description:** The patient lies supine while the ipsilateral hip flexed and the contralateral leg hanging off the edge of a plinth. The examiner places a downward force, moving the ipsilateral innominate into posterior rotation while stabilizing the contralateral leg. A positive test occurs if the concordant symptoms are reproduced.

- **Reference Standard:** 80% pain relief with injection of local anesthetics into the sacroiliac joint.

- **Diagnostic Utility:**
  - **RIGHT:** Sensitivity: 53%; Specificity: 71%; PPV: 0.47; NPV: 0.76; +LR: 1.84; −LR: 0.66.13
  - **LEFT:** Sensitivity: 50%; Specificity: 77%; PPV: 0.50; NPV: 0.50; +LR: 2.21; −LR: 0.65.
Compression Test

- **Description:** The patient is in a side-lying position with hips and knees comfortably flexed. The examiner stands behind the patient and applies a downward force over the iliac crest. A positive result occurs if the concordant symptoms are reproduced.

- **Reference Standard:** 80% pain relief with injection of local anesthetics into the sacroiliac joint

- **Diagnostic Utility:** Sensitivity: 69%; Specificity: 69%; PPV: 0.52; NPV: 0.82; +LR: 2.20; −LR: 0.46

Sacral Thrust Test

- **Description:** The patient is in a prone position. The examiner places a firm downward pressure over the sacral base. A positive test results if the concordant symptoms are reproduced.

- **Reference Standard:** 80% pain relief with injection of local anesthetics into the sacroiliac joint

- **Diagnostic Utility:** Sensitivity: 63%; Specificity: 75%; PPV: 0.56; NPV: 0.80; +LR: 2.50; −LR: 0.50
SI-Joint Cluster Testing

Distraction, thigh thrust, compression, sacral thrust
Gaenslen’s (right), and Gaenslen’s (left)

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>(+) Predictive</th>
<th>(-) Predictive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or more positive tests</td>
<td>.1.0</td>
<td>.44</td>
<td>.41</td>
<td>1.0</td>
</tr>
<tr>
<td>2 or more positive tests</td>
<td>.93</td>
<td>.66</td>
<td>.58</td>
<td>.96</td>
</tr>
<tr>
<td>3 or more positive tests</td>
<td>.94</td>
<td>.78</td>
<td>.68</td>
<td>.96</td>
</tr>
<tr>
<td>4 or more positive tests</td>
<td>.60</td>
<td>.81</td>
<td>.60</td>
<td>.81</td>
</tr>
<tr>
<td>5 or more positive tests</td>
<td>.27</td>
<td>.88</td>
<td>.50</td>
<td>.72</td>
</tr>
</tbody>
</table>


Function & Movement Based Testing

- **Goal:** Assess quality of movement based upon the patient’s individual needs and goals
  - Functional Movement Screen
  - Star Excursion/Y-Balance Test
  - SFMA
  - Occupational movements
  - Ergonomics/Bodymechanics
Lumbopelvic Pain\textsuperscript{8,9}

Differential Diagnosis

<table>
<thead>
<tr>
<th>Condition</th>
<th>History and Physical Examination</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>+ LR (95% CI)</th>
<th>− LR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back related tumor</td>
<td>Constant pain not affected by position or activity; worse with weight-bearing, worse at night</td>
<td>0.84</td>
<td>0.69</td>
<td>2.2</td>
<td>0.34</td>
</tr>
<tr>
<td>Age over 50</td>
<td></td>
<td>0.55</td>
<td>0.98</td>
<td>23.7</td>
<td>0.25</td>
</tr>
<tr>
<td>History of cancer</td>
<td></td>
<td>0.29</td>
<td>0.90</td>
<td>3.0</td>
<td>0.79</td>
</tr>
<tr>
<td>Failure of conservative intervention (failure to improve within 30 days)</td>
<td></td>
<td>0.15</td>
<td>0.94</td>
<td>3.0</td>
<td>0.87</td>
</tr>
<tr>
<td>Unexplained weight loss</td>
<td></td>
<td>100</td>
<td>0.46</td>
<td>1.7</td>
<td>0.22</td>
</tr>
<tr>
<td>No relief with bed rest</td>
<td></td>
<td>1.00</td>
<td>0.46</td>
<td>2.2</td>
<td>0.22</td>
</tr>
<tr>
<td>Cauda equina syndrome</td>
<td>Urine retention</td>
<td>0.90</td>
<td>0.95</td>
<td>18</td>
<td>0.11</td>
</tr>
<tr>
<td>Fecal incontinence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saddle anesthesia</td>
<td></td>
<td>0.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensory or motor deficits in the feet (L4, L5, S1 areas)</td>
<td></td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>History &amp; Physical Examination</td>
<td>Sensitivity</td>
<td>Specificity</td>
<td>+ LR (95% CI)</td>
<td>− LR (95% CI)</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>-------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Back related infection</td>
<td>Recent infection (e.g., urinary tract or skin infection), Intravenous drug user/abuser</td>
<td>0.40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Concurrent immunosuppressive disorder</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deep constant pain, increases with weight bearing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fever, malaise, and swelling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spine rigidity; accessory mobility may be limited</td>
<td>0.27</td>
<td>0.98</td>
<td>13.5</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>Fever: Pyogenic osteomyelitis</td>
<td>0.50</td>
<td>0.98</td>
<td>25.0</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td>Fever: Spinal epidural abscess</td>
<td>0.63</td>
<td>0.98</td>
<td>41.5</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>Fever: Tuberculosis, Osteomyelitis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spinal compression fracture</td>
<td>History of major trauma such as an vehicle accident, fall from a height, or direct blow to the spine</td>
<td>0.30</td>
<td>0.85</td>
<td>12.8</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>Age over 50</td>
<td>0.79</td>
<td>0.64</td>
<td>2.2</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>Age over 75</td>
<td>0.59</td>
<td>0.84</td>
<td>3.7</td>
<td>0.49</td>
</tr>
</tbody>
</table>
General Treatment Approaches

- Patients are unique, each program needs to be customized
- The Regional Interdependence Model should be foundation for all approaches.

Treatment Paradigms
Osteopathic
- Evidence: Strong
  - Franke et al. 2014 (systematic review)

Muscle Energy Technique
- Evidence: Poor
  - Franke et al. 2015 (systematic review)

McKenzie Method
- Evidence: Moderate
  - Machado et al. 2006 (systematic review)
  - Clare et al. 2004 (systematic review)

Mulligan Concept
- Evidence: Strong
  - Hussien et al. 2017 (study)
  - Hidalgo et al. 2015 (study)

Movement System Impairement
- Evidence: Moderate
  - Azevedo et al. 2018
  - Azevedo et al. 2015
A Treatment-Based Classification (TBC) Approach to Examination and Intervention of Lumbar Disorders

Delitto et al. 1995
Burns et al. 2011

Treatment Based Classification

- Definition: The clinician makes treatment decisions based on the patient’s clinical presentation.

- Purpose: To identify features at baseline that predict responsiveness to four different treatment strategies.

- 3 step classification process
  - Step 1: Screening the Athlete
  - Step 2: Staging the Athlete
  - Step 3: Choosing an intervention
Step I: Screening

Goal: Determining if the patient is appropriate for physical therapy services, or if a referral to other professionals is necessary.

- Screen: medical “red flags”
  - E.g. unexplained weight loss, history of metastatic disease, immunosuppressive illness, night pain, and/or changes in bowel or bladder function

- Screen: precautionary “yellow flags”
  - PRO: Fear Avoidance Beliefs Questionnaire (FABQ)
    - Reliability (0.64-0.80), MDC: 12 pts (work), 9 pts (physical activity)
    - E.g. depression, anxiety, and pain catastrophizing

Step II: Staging the Athlete

Goal: Determining the patient’s level of severity and degree of disability.

- PRO
  - Modified Oswestry Disability Index (ODI)
    - Reliability: 0.90, MDC: 4-10 pts, MCID: 6% pts
  - Numeric Pain Rating Scale
    - Reliability: 0.76, MCID: 2 pts

3 Stages

- Stage 1: Acute
- Stage 2: Subacute
- Stage 3: Chronic
Step II: Staging the Athlete

**Stage 1: Acute (elevated pain)**
- Goal: Symptom relief
- Elevated modified ODI (≥ 20%) and NPRS scores.
- Limited ability to perform basic activities of daily living such as sitting (≥ 30 min), standing (≥ 15 min), and walking (≥ ¼ mile).

**Stage: 2 Subacute**
- Goal: Symptom relief and quick return to function
- Modified ODI scores ≤ 20% with little difficulty during basic activities of daily living.
- Difficulty performing more demanding daily activities and exercise, such as jogging.
Step II: Staging the Athlete

**Stage 3: Chronic**
- Goal: return to high physical demands
- modified ODI scores $\leq 20\%$ with no difficulty with ADL's but unable to resume full sports participation.
- Athlete may be able to practice or compete, but is still limited due to physical conditioning.
- Athletes with recurrent LBP complaints may be in stage III.

---

Step III: Choosing the intervention

*Burns et al. 2011*
Screen the Athlete  
"Red Flags"  
FABQ

Stage the Athlete  
modified ODI  
NPRS

Stage 1: Acute  
Elevated ODI ≥ 20% and NPRS  
Limited ADL’s

Subgroups  
Manipulation  
Stabilization  
Specific Exercise  
Traction

Stage 2: Subacute  
Elevated ODI ≤ 20%  
and NPRS  
Exceeds stage I criteria  
Basic ADL’s still difficult

*Individualized  
Stabilization  
Specific Exercises

Stage 3: Chronic  
Elevated ODI ≤ 20% and NPRS  
Able to perform ADL’s  
Cannot participate in full sport

*Individualized  
Stabilization  
Specific Exercises

Emerging Manual Treatment Paradigms
Emerging Treatment Paradigms

- Reflex Neuromuscular Stabilization
- Total Motion Release
- Primal Reflex Release Technique
- Dynamic Neuromuscular Stabilization
- Myokinesthetics
- Strain-Counterstrain Positional Release Therapy

Total Motion Release (TMR)
Total Motion Release (TMR)

- Created by Tom Dalonzo-Baker, PT
- Evaluation & treatment paradigm utilizing the RI model
  - Body is a unified system striving to maintain dynamic center of gravity/balance.
  - Pain or dysfunction may be affected by movements elsewhere in the body.
  - Incorporates: Fascial Tensegrity, Cross Education, Cross-Over Effect, Neural Integration
- Uses 0-100 scale to rate motion quality/quantity across 6 motions.*
  - Arm Raise, Arm Press, Trunk Twist, Leg Raise, Sit-to-stand, and Bent Knee Toe Reach.
  - Motion modifications are utilized past the basic TMR evaluation.

TMR: Fab 6
Total Motion Release (TMR)

- Identify greatest area of asymmetry or dysfunction and treat the GOOD side.

- Commonly performed in 2-3 sets of 10-20 repetitions per motion
  - May use static holds at end range for 20-30 seconds.
  - May combine styles; re-assessment is key.
  - TMR System does have “rules” to follow.

- Reassess dysfunctional movement.
  - Treat “good” side until dysfunction is resolved or improvement no longer occurs.
  - Treat until body is “balanced”

- Most of the “evidence” is based on related studies/literature; few direct TMR studies.

Primal Reflex Release Technique (PRRT)
Primal Reflex Release Technique

- Created by John Iams, PT

- Primal reflexes control unlearned movement patterns & are triggered to protect the body
  - Ex: Withdrawal reflex, startle reflex, etc.

- Muscles tense as part of the fight, flight, or freeze response

- Following activation of primal reflexes, pain may be produced through “up-regulation,” a sustained period of heightened arousal of the nervous system

(Iams, 2014; Hansberger et al., 2015; Hansen-Honeycutt et al., 2016)

Primal Reflex Release Technique

- Use PRRT to downregulate Primal Reflexes
  - Moro, Palmar, Plantar, Rooting, Startle, Withdrawal

- 1 Minute Nociceptive Exam (~23 locations)

- Treat over stimulated nervous system
  - May take 12 seconds to a couple of minutes

- Light reflex stimulation
  - Reciprocal Inhibition
  - Deep Tendon Reflex
  - Independent Muscle(s) Releases
PRRT: Explanatory Theory

- Repetitive reflex stimulations send many impulses to the spinal cord, which may cause the spinal cord and brain to temporarily “overload” and “reset”.

- When this happens, the brain may evaluate the situation and determine the current circumstances.

- If there was no actual current pathology or illness, rather only a faulty neurological circuit, the brain will clear the faulty pattern.

- This mechanism is similar to what may be happening in the gate theory of pain control.

Myokinesthetic System (MYK)
Myokinesthetic System

- Created by Michael Uriarte, DC
- Global assessment and treatment model used to assess and balance the central nervous system
  - A system to identify nerve root level of treatment
    - Assessing postural asymmetries, neurological symptoms, & painful/weak movements.
  - Purpose: to balance the nervous system by correcting posture abnormalities (Uriarte, 2014)
    - Posture imbalances and muscle spasms can be caused by changes in CNS function (Shacklock, 1999)
- Postural assessment used to identify dysfunctional nerve root level
  - Peripheral neuropathy and pain
  - Weak ranges of motion via manual muscle testing
  - Diagnosed pathological conditions

Myokinesthetic System

- Treatment Components: treat all muscles innervated by nerve root with passive/active movement and tactile stimulation.
  - Increased mechanoreceptor firing decreases nociceptor firing
  - Forms of proprioceptive input change the brain’s perception of and reaction to pain
  - MT evokes changes in the SNS

- Treatment Guidelines
  - Active and passive movements
  - Tactile stimulation
  - Always completed bilaterally
  - Utilize charts/books for treatment

( Uriarte, 2014; Zoppi, Voegelin, Signorini, & Zamponi, 1991, Kaye et al., 2008; Shacklock, 1999)
Emerging Treatment Paradigms

- Many of the treatment paradigms are still under investigation and have not been fully validated.
- Research: UIdaho DAT is currently investigating many of the paradigms.
  - “We will demonstrate some of the paradigms in the afternoon lab.

Specific Lumbopelvic Interventions

- Non-Specific LBP (NSLBP)
- Acute LBP (ALBP)
- Subacute LBP (SLBP)
- Chronic LBP (CLBP)
Manual Treatments

**Acupuncture**
- Evidence: Strong
  - Yeganeh et al. 2017 (CLBP)
  - Liu et al. 2015 (LBP)
  - Taylor et al. 2014 (CLBP)

**Massage**
- Evidence: Weak
  - Furlan et al. 2015 (CLBP)
  - Kumar et al. 2013 (NSLBP)

**Spinal Manipulation**
- Evidence: Weak
  - Rubenstein et al. 2012, 2013 (ALBP)

Movement Based Therapies

**Yoga**
- Evidence: Low to moderate
  - Wieland et al. 2017 (LBP)

**Pilates**
- Evidence: Low to moderate
  - Yamato et al. 2015 (LBP)

**Core Stabilization**
- Evidence: Weak to strong
  - Coulombe et al. 2017 (CLBP)
  - Macedo et al. 2016 (ALBP)
  - Saragiotto et al. 2016 (CLBP)

**Proprioceptive Exercises**
- Evidence: Weak
  - McKaskey et al. 2014 (CLBP)
Modalities

**Low Level Laser**
- Evidence: Moderate
  - Glazov et al. 2016 (LBP)

**Radiofrequency Denervation**
- Evidence: Weak
  - Maas et al. 2015 (CLBP)

**Therapeutic Ultrasound**
- Evidence: Weak
  - Ebadi et al. 2014 (CLBP)

**TENS**
- Evidence: Weak
  - Khadilkar et al. 2005

Psychosocial Approaches

**Back School**
- Evidence: Weak
  - Parreira et al. 2017 (CNSLBP)
  - Poquet et al. 2016 (ALBP/SLBP)

**Mindful-Based Stress Reduction**
- Evidence: Moderate
  - Anheyer et al. 2017 (LBP)

**Multidisciplinary Biopsychosocial Treatment**
- Evidence: Strong
  - Kamper et al. 2014 (CLBP)
  - Marin et al. 2017 (SLBP)
Summary

- Lumbopelvic pain is very difficult to treat.
- No secrets to treatment. It's varies among individuals.
- Perhaps, the pain neuromatrix needs to be addressed first in order to progress these patients.
- There needs to be a better consensus on the many classifications and treatment options.
- Athletes may be more susceptible due to the potential risk factors highlighted in this discussion.

References

References


Questions?
Thanks!!!

Scott Cheatham
scheatham@csudh.edu