Physical Assessment of the Patient with Low Back Pain

Maxim S. Eckmann, M.D.
Professor of Anesthesiology and Pain Medicine
UT Health San Antonio, Texas, USA
## Faculty Disclosure

<table>
<thead>
<tr>
<th>Honoraria/Expenses</th>
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<tr>
<td>Consulting/Advisory Board</td>
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<td>Funded Research (Individual)</td>
<td>Abbot, Boston Scientific, SPR</td>
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**Yes, as follows:**

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**Off-Label Product Use**

Will you be presenting or referencing off-label or investigational use of a therapeutic product?

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Goals and Objectives

• Outline an approach for organizing causes of low back pain (LBP)
• Apply organized approach to LBP to select and interpret physical exam maneuvers and assessments
• Recognize differential evaluation of LBP sources to include:
  • Acute vs Chronic LBP
  • Assessment of “Red Flags”
  • Myofascial LBP
  • Facetogenic LBP
  • Sacroiliac Pain
  • Radicular LBP
  • Discogenic LBP
  • Vertebral/Sacral Fracture Pain
  • Referred Pain
  • Non-specific LBP
Impact of Low Back Pain (LBP)

- Fifth most common reason for all physician visits (USA).
- Prevalence
  - 25% report at least 1 day LBP in last 3 months
  - 7-8% report severe LBP in last year
  - 75-85% lifetime prevalence in industrialized society
- Cost
  - $26 billion direct health care costs 1998, now >$80 billion
  - 2% of workforce compensated for LBP
  - 5% of patients w/back pain disability account for 75% of the total costs.
Factors Associated with Low Back Pain

• Heavy lifting
• Twisting and bending
• Physical activity
• Obesity
• Arthritis and osteoporosis
• Pregnancy
• Age > 30 years
• Bad posture
• Stress and depression

Predictors of Delayed Recovery

• Depression / Anxiety
• Passive coping
• Job Dissatisfaction
• Significant Disability
• Disputed Compensation Claims
• Somatization
• Emotional Distress
General Assessment
Physiologic Effects of Acute Pain, Generally Absent in Chronic Pain

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<th>Metabolism increased</th>
<th>Respiratory Derangement</th>
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<tr>
<td>• Poor healing</td>
<td>• Tachypnea</td>
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<td>• Muscle breakdown / weakness</td>
<td>• Atelectasis</td>
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<thead>
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<th>Cardiovascular</th>
<th>Adrenal axis</th>
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<td>• Tachycardia, HTN</td>
<td>• Sodium and water retention</td>
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<th>Decreased Movement</th>
<th>Gastrointestinal</th>
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<td>• Increased risk of thromboembolism</td>
<td>• Reduced motility</td>
</tr>
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<td>• Further deconditioning</td>
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<td>• Decreased NK cell count</td>
<td></td>
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<tr>
<td>• Neurogenic inflammation</td>
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</table>
Detecting Pain: Pain Behavior

• First described by Fordyce as denoting the verbal and nonverbal behaviors exhibited by pain sufferers that serve to communicate the fact that they are experiencing pain.

• Examples:
  • Limping, guarding, grimacing, moaning.

• Origin:
  • 1) Nociceptive input, spinal reflexes, involuntary
  • 2) Operant conditioning (later)
Neuroanatomy: Cutaneous Dermatomes

- Clavicle
  - C4

- Thumb
  - C6

- 4th, 5th finger
  - C8

- Nipples
  - T4

- Umbilicus
  - T10

- Medial 1st Toe
  - L4

- Lateral Foot, 5th Toe
  - S1
Neuroanatomy: Cutaneous Dermatomes for Referred Pain

- **Central Diaphragm**  
  *C4*

- **Lungs**  
  *T2-T6*

- **Heart**  
  *T1-T4*

- **Aorta**  
  *T1-L2*

- **Esophagus**  
  *T3-T8*

- **Pancreas, Spleen**  
  *T5-T10*

- **Somach, Liver, GB**  
  *T6-T9*

- **Adrenals**  
  *T8-L1*

- **Small Intestine**  
  *T9-T11*

- **Colon**  
  *T10-L1*

- **Kidney, Ovaries, Testes**  
  *T10-L1*

- **Ureters**  
  *T11-T12*

- **Uterus**  
  *T11-L2*

- **Bladder, Prostate**  
  *S2-S4*

- **Urethra, Rectum**  
  *S2-S4*
Visceral Diseases referring pain to the low back

- Peptic ulcer
- Pancreatitis
- Nephrolithiasis
- Pyelonephritis
- Prostatitis
- Pelvic infection or tumors
- Aortic dissection
Consideration for consultation:
Specific Problems to Target

• **Axial Pain**
  • Myofascial
  • Tendinous / Ligamentous
  • Facet Joint
  • Vertebral
  • Sacroiliac
  • Discogenic

• **With Neurologic Sx**
  • Radiculitis / Neuroforaminal Stenosis
  • Spinal canal stenosis
  • Piriformis Syndrome
  • Lumbar Post-Laminectomy Syndrome
Axial low back pain: History

- **Mechanism of Injury**
  - Specific Injury (e.g. T-bone MVA)
  - Indolent course

- **Radiation**
  - Above knee (e.g. sacroiliac pain, facet pain)
  - Below knee, dermatomal (e.g. L5 radiculopathy)
  - Below knee, non-dermatomal (e.g. spinal stenosis, CRPS)

- **Quality** (key words: burning, shooting, tingling)

- **Timing / Precipitating factors**

- **Psychosocial problems/stressors**
Summary of Common Physical Exam Maneuvers for LBP

- **Gait**
  - Identify potential problems below the spine

- **Neurological**
  - Sensation, Strength (L5 extensor hallucis longus)
  - Reflexes: L4 (patellar), L5 (biceps femoris), S1 (ankle)

- **Quadrant loading / Prone hip extension (facet joints)**

- **Segmental tenderness / trigger points (facet / myofascial)**

- **Faber / Gaenslen tests (hips/SIJ)**

- **Straight leg raise (SLR) test / Crossed SLR (radiculitis)**
  - SLR 91% sensitive / Crossed SLR 88% specific *

Radiologic Imaging: Importance of Clinical Correlation

### Magnetic Resonance Imaging

- **n=67** with no symptoms
- 3 neuroradiologists

<table>
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<th>YEARS</th>
<th>ABN.</th>
<th>HNP</th>
<th>STEN</th>
<th>Bulg. Disc</th>
<th>Degen. Disc</th>
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<td>20-39</td>
<td>22%</td>
<td>21%</td>
<td>1%</td>
<td>56%</td>
<td>34%</td>
</tr>
<tr>
<td>40-59</td>
<td>22%</td>
<td>22%</td>
<td>0%</td>
<td>50%</td>
<td>59%</td>
</tr>
<tr>
<td>60-80</td>
<td>57%</td>
<td>36%</td>
<td>21%</td>
<td>79%</td>
<td>93%</td>
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</table>

Acute versus Chronic Pain

- Low back pain
  - Acute: 4 wks
  - Subacute: 4-12 wks
  - Chronic: >12 wks

- 50 to 75% recover in 4 weeks
- 90% recover in 6 weeks
- Functional outcome depends more on patient behavior than on the medical treatment

- Keys to Recovery
  - Maintain function
  - Manage psychosocial distress
  - Be as active as possible
  - Return to work as soon as possible
Acute versus Chronic Pain

- 30% of patients report at least moderate pain 1 year after acute episode
- 20% of patients report significant activity limitations

Low back pain
- Acute: 4 wks
- Subacute: 4-12 wks
- Chronic: >12 wks
“RED Flags”
Red Flags

• “Red Flags” are symptoms suggestive of serious underlying pathology.
  • In isolation – not very predictive, guidelines vary

• Screening questions for acute LBP, or chronic LBP with change in symptoms

• Present in about 1-4% of cases.
  • Fracture (5-6%)
  • Malignancy (1-2%) esp. metastasis from prostate, breast and lung
  • Infection (1%) osteomyelitis, discitis, abscess
  • Cauda Equina Syndrome (0.4%)
  • Ankylosing spondylitis : 0.3%

• If serious cause of LBP is suspected, further workup is warranted
  • Imaging
  • Laboratory assay

Eur Spine J (2016) 25:2788–2802
J Bone Joint Surg Am. 2018;100:368-74
Associations of Serious Back Pain Etiology

• Fracture
  • Trauma
  • Age > 50 y
  • Age > 70 y

• Malignancy
  • H/o cancer
  • Unexplained weight loss
  • Pain awakens from sleep
  • Age > 50 y
  • Age > 70 y

• Infection
  • Fevers, chills, sweating
  • Recent infection
  • Pain awakens from sleep
  • Persistent night sweats

• Cauda Equina Syndrome
  • Recent loss of bowel control
  • Recent loss of bladder control

• Over 16 international guidelines and 46 symptoms/signs exist.

*References*

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J Bone Joint Surg Am. 2018;100:368-74
Predictive value of risks, symptoms, signs

<table>
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<tr>
<th></th>
<th>No. (%)</th>
<th>Sens. (%)</th>
<th>Spec. (%)</th>
<th>PPV†</th>
<th>NPV†</th>
<th>PLR†</th>
<th>NLR†</th>
<th>Probability of Diagnosis (%)</th>
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<td>Fracture</td>
<td>554 (5.6)</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Age of &gt;50 yr</td>
<td>410 (4.1)</td>
<td>74</td>
<td>32.9</td>
<td>6.1  (5.6-6.7)</td>
<td>95.5 (94.8-96.2)</td>
<td>1.1 (1.05-1.16)†</td>
<td>0.79 (0.69-0.91)†</td>
<td>6.1</td>
</tr>
<tr>
<td>Age of &gt;70 yr</td>
<td>171 (1.7)</td>
<td>3.9</td>
<td>80</td>
<td>8.4  (7.2-9.7)</td>
<td>95.2 (94.7-95.6)</td>
<td>1.55 (1.36-1.76)†</td>
<td>0.86 (0.82-0.91)†</td>
<td>8.4</td>
</tr>
<tr>
<td>Trauma</td>
<td>137 (1.4)</td>
<td>24.7</td>
<td>88.6</td>
<td>11.3 (9.7-13.3)</td>
<td>95.2 (94.8-95.7)</td>
<td>2.17 (1.86-2.54)†</td>
<td>0.84 (0.81-0.89)†</td>
<td>11.4</td>
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<td>Malignancy</td>
<td>159 (1.6)</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Age of &gt;50 yr</td>
<td>114 (1.2)</td>
<td>71.7</td>
<td>32.6</td>
<td>1.7  (1.4-2.1)</td>
<td>98.6 (98.1-99.0)</td>
<td>1.06 (0.96-1.17)</td>
<td>0.87 (0.68-1.11)</td>
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<td>Age of &gt;70 yr</td>
<td>36 (0.4)</td>
<td>22.6</td>
<td>79.5</td>
<td>1.8  (1.3-2.5)</td>
<td>98.4 (98.1-98.7)</td>
<td>1.1 (0.82-1.47)</td>
<td>0.97 (0.9-1.06)</td>
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<td>Pain awakens from sleep</td>
<td>88 (0.9)</td>
<td>55.4</td>
<td>41.8</td>
<td>1.5  (1.2-1.9)</td>
<td>98.3 (97.8-98.7)</td>
<td>0.85 (0.83-1.1)</td>
<td>1.07 (0.9-1.27)</td>
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<td>13 (0.1)</td>
<td>8.2</td>
<td>95.6</td>
<td>3    (1.7-5.1)</td>
<td>98.5 (98.3-98.7)</td>
<td>1.87 (1.1-3.17)†</td>
<td>0.96 (0.92-1.01)</td>
<td>3.0</td>
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<td>Cancer</td>
<td>49 (0.5)</td>
<td>32</td>
<td>95.6</td>
<td>10.5 (8-13.8)</td>
<td>98.9 (98.6-99.1)</td>
<td>7.25 (5.65-9.3)†</td>
<td>0.71 (0.64-0.79)†</td>
<td>10.6</td>
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<td>Infection</td>
<td>120 (1.2)</td>
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<td>Fever, chills, or sweating</td>
<td>14 (0.1)</td>
<td>11.7</td>
<td>93.2</td>
<td>2    (1.2-3.5)</td>
<td>98.9 (98.6-99.1)</td>
<td>1.71 (1.04-2.81)†</td>
<td>0.95 (0.89-1.01)</td>
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<td>Pain awakens from sleep</td>
<td>69 (0.7)</td>
<td>57.5</td>
<td>41.8</td>
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<td>98.8 (98.4-99.1)</td>
<td>0.99 (0.85-1.15)</td>
<td>1.02 (0.82-1.25)</td>
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<td>Persistent sweating at night</td>
<td>21 (0.2)</td>
<td>17.5</td>
<td>86.1</td>
<td>1.5  (1.2-4.1)</td>
<td>98.8 (98.6-99.1)</td>
<td>1.26 (0.85-1.86)</td>
<td>0.96 (0.88-1.04)</td>
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<td>Recent infection</td>
<td>29 (0.3)</td>
<td>24.2</td>
<td>97.4</td>
<td>10.2 (7.1-14.5)</td>
<td>99.1 (98.8-99.2)</td>
<td>9.31 (6.63-13.07)†</td>
<td>0.78 (0.7-0.86)†</td>
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<td>Cauda equina syndrome</td>
<td>36 (0.4)</td>
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<td>Recent loss of bladder control</td>
<td>8 (0.1)</td>
<td>22.2</td>
<td>90.4</td>
<td>0.8  (0.4-1.7)</td>
<td>99.7 (99.5-99.8)</td>
<td>2.31 (1.25-4.27)†</td>
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<td>Recent loss of bowel control</td>
<td>5 (0.1)</td>
<td>13.9</td>
<td>95</td>
<td>1    (0.4-2.5)</td>
<td>99.7 (99.5-99.8)</td>
<td>2.78 (1.23-6.3)†</td>
<td>0.91 (0.8-1.03)</td>
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J Bone Joint Surg Am. 2018;100:368-74
Increased value of considering multiple factors

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<th>Spec. (%)</th>
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<th>PLR†</th>
<th>NLR†</th>
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<tr>
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<tr>
<td>Combination 1: trauma and age of &gt;50 yr</td>
<td>14.8</td>
<td>94.2</td>
<td>13.1 (10.6-16.0)</td>
<td>94.9 (94.4-95.4)</td>
<td>2.54 (2.05-3.16)†</td>
<td>0.90 (0.87-0.94)†</td>
<td>13.1</td>
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<tr>
<td>Combination 2: trauma and age of &gt;70 yr</td>
<td>5.2</td>
<td>98.7</td>
<td>20.4 (14.3-28.1)</td>
<td>94.6 (94.2-95.1)</td>
<td>4.35 (2.92-6.48)†</td>
<td>0.96 (0.94-0.98)†</td>
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<td><strong>Malignancy</strong></td>
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<tr>
<td>Combination: unexplained weight loss and cancer</td>
<td>2.5</td>
<td>99.8</td>
<td>14.3 (4.7-33.6)</td>
<td>98.4 (98.2-98.7)</td>
<td>10.25 (3.6-29.21)†</td>
<td>0.98 (0.95-1)</td>
<td>14.3</td>
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<tr>
<td><strong>Infection</strong></td>
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<td></td>
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<tr>
<td>Combination: fever, chills, or sweating, and a recent infection</td>
<td>7.5</td>
<td>99.4</td>
<td>13.8 (6.9-25.2)</td>
<td>98.9 (98.6-99.1)</td>
<td>13.15 (6.66-25.97)†</td>
<td>0.93 (0.88-0.98)†</td>
<td>13.8</td>
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<td><strong>Cauda equina syndrome</strong></td>
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<td></td>
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<tr>
<td>Combination: recent loss of bladder control and recent loss of bowel control</td>
<td>8.3</td>
<td>97.2</td>
<td>1.1 (0.3-3.4)</td>
<td>99.7 (99.5-99.8)</td>
<td>3 (1.01-8.92)†</td>
<td>0.94 (0.85-1.04)</td>
<td>1.2</td>
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*J Bone Joint Surg Am. 2018;100:368-74*
When to Refer to Specialist / Surgeon

• Bladder/bowel dysfunction
• Hypoesthesia over the perineum
• Rapidly progressing neurological dysfunction
  • Loss of strength/sensation
  • Hypo or Hyperreflexia
• Failed non-operative therapy in presence of known HNP, severe stenosis, spinal instability
Myofascial LBP
Myofascial Pain Syndrome (MPS)

- Sensory, motor or autonomic signs, and symptoms originated by hyperirritable nodules in a taut band of skeletal muscle.
- Estimated lifetime prevalence 85%.
- These taut bands reflect myofascial trigger points (MTrPs).
- MTrPs radiate in characteristic patterns upon stimulation.
  - Treatment focuses on returning muscle bands to normal working length.
  - May be found in association with spine pain, possibly due to spontaneous motor endplate activity, stiffness, or central sensitization.
- Tender points, in comparison, characteristically do not radiate.

*Calvo-Lobo et al. Medicine (2017) 96:10*
Examination of MTrPs

Muscle Direction

Finger Movement

Pressure Pain Threshold Testing (PPT)
e.g. kg/cm²
Referral Patterns for the Low Back / Lower Extremities

Gluteal

Tensor Fascia Latae
Referral Patterns for the Low Back / Lower Extremities

**Extensor Muscles**

- **Iliocostalis lumborum**
- **Longissimus thoracis**

**Quadratus Lumborum**

- **A**
- **B**
- **C**
Referral Patterns for the Low Back / Lower Extremities

Multifidi and Others

Rectus Abdominis
Quantitative Testing for MPS?

Sonoelastography and PPT difference between active MTrPs, latent MTrPs, and control points.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Active MTrPs (n = 20)</th>
<th>Latent MTrPs (n = 20)</th>
<th>Control points (n = 20)</th>
<th>ANOVA P (F)</th>
<th>Bonferroni correction P (mean difference)</th>
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<td>A–L</td>
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<td>Sonoelastography</td>
<td>2.92 (0.35)</td>
<td>2.50 (0.22)</td>
<td>2.22 (0.40)</td>
<td>&lt;0.001 (21.371)</td>
<td>0.001 (0.41)</td>
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<tr>
<td>PPT, kg/cm²</td>
<td>2.97 (0.82)</td>
<td>3.56 (0.77)</td>
<td>4.49 (0.90)</td>
<td>&lt;0.001 (16.562)</td>
<td>0.091 (−0.59)</td>
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</table>
Axial Pain: Tendinous / Ligamentous pain

- **Ligaments**
  - Part of the spine stabilization system
  - Disc annulus / facet capsule / spinal ligaments
  - Embedded mechanoreceptors in ligaments important in maintenance of proper posture and muscle coordination

- **Diagnosis**
  - Difficult to differentiate from other sources of pain
  - Suspect in radiographically unremarkable spines.

- **Treatment**
  - Conservative / non-pharmacologic / pharmacologic
  - Bed rest / inactivity **not** recommended

Facetogenic LBP
Clinical Presentation
Diagnosis of Lumbar Facet Pain

• Prevalence: 5-42% depending on the study. Increases with age.
• Classic Symptoms / Signs / Risk Factors
  • Axial (Unilateral) Pain
  • Radiation: lower facet joints - buttock, thigh, groin, and sometimes lower leg
  • Radiation: upper lumbar facet joints - flank, hip, groin, and lateral thigh.
  • No nerve root tension sign
  • Increased pain with back extension, quadrant loading (but can with flexion)
  • Paraspinal Tenderness
  • Age >65
• Contemporary studies have had difficulty confirming these signs/symptoms as predictive.
• Significant Referral Pattern Overlap
• Diagnosis confirmed with controlled diagnostic blocks

Anesthesiology 2007; 106:591–614
Exam – Facetogenic Pain vs Other Sources

- Evaluate for Superficial Tenderness
- Examine muscles
- Find Spinous Process
- Slow, deep pressure
Sacroiliac Pain
Axial Pain: Sacroiliac Pain

• **Incidence:**
  • 12% of low back pain

• **Diagnosis**
  • Physical exam maneuvers
    • Poorly predictive (~60%)
    • Sacral sulcus tenderness
    • Faber / Gaenslen tests
  • Diagnostic injections
    • Also inconsistent
    • Capsule leakage
SIJ Provocation Maneuvers and Symptoms

**Table 2**

<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacroiliac joint pain</td>
<td>++++</td>
<td>+</td>
</tr>
<tr>
<td>Groin pain</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>Buttock pain</td>
<td>+++</td>
<td>+</td>
</tr>
<tr>
<td>Indicating posterior superior iliac spine as pain source</td>
<td>+++</td>
<td>+</td>
</tr>
<tr>
<td>Abnormal sitting posture</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>Pain lessens with NSAIDs</td>
<td>+ +</td>
<td>+</td>
</tr>
<tr>
<td>Pain lessens with exercise</td>
<td>+ +</td>
<td>+++</td>
</tr>
<tr>
<td>Pain lessens with manipulation</td>
<td>+ +</td>
<td>+++</td>
</tr>
<tr>
<td>Gillet’s test</td>
<td>+ +</td>
<td>+</td>
</tr>
<tr>
<td>Patrick’s test</td>
<td>+</td>
<td>+ +</td>
</tr>
<tr>
<td>Gaenslen’s test</td>
<td>+ +</td>
<td>+</td>
</tr>
<tr>
<td>Sacral sulcus tenderness</td>
<td>+ +</td>
<td>+</td>
</tr>
<tr>
<td>Midline sacral thrust</td>
<td>+</td>
<td>+ +</td>
</tr>
<tr>
<td>Bone scan</td>
<td>+ +</td>
<td>+ + +</td>
</tr>
<tr>
<td>Computed tomography</td>
<td>+ +</td>
<td>+ + +</td>
</tr>
</tbody>
</table>

Sensitivity/specificity scale: + = 0-25%; ++ = 26%-50%; +++ = 51%-75%; ++++ = 76%-100%

**TABLE 1** Differential diagnosis

I. Piriformis Syndrome

II. Hip joint pathology
   a. Fracture
   b. Avascular necrosis
   c. Osteoarthritis

III. Discogenic pain

IV. Zygopophysial joint pain

V. Rheumatoid arthritis

VI. Ankylosing spondylitis

VII. Myofascial pain

VIII. Lateral trochanteric bursitis

IX. Referred pain

X. Malignancy

XI. Visceral referred pain

XII. Radiculopathy
Sacroiliac Pain and Spondyloarthropathies

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Ankylosing Spondylitis</th>
<th>Reactive Arthritis (Reiter’s Syndrome)</th>
<th>Psoriatic Arthropathy</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLA-B27 frequency</td>
<td>90%</td>
<td>60% to 80%</td>
<td>50%</td>
</tr>
<tr>
<td>Sacroiliitis</td>
<td>Almost 100%</td>
<td>&lt;50%</td>
<td>Approximately 20%</td>
</tr>
<tr>
<td>Symmetry of sacroiliitis</td>
<td>Symmetric</td>
<td>Asymmetric</td>
<td>Asymmetric</td>
</tr>
<tr>
<td>Typical age of onset</td>
<td>Adult &lt;40 yr</td>
<td>Young to middle aged</td>
<td>Young to middle aged</td>
</tr>
<tr>
<td>Peripheral joint involvement</td>
<td>Approximately 25%</td>
<td>Approximately 90%</td>
<td>Approximately 95%</td>
</tr>
<tr>
<td>Type of onset</td>
<td>Gradual</td>
<td>Acute</td>
<td>Variable</td>
</tr>
<tr>
<td>Eye involvement</td>
<td>30%</td>
<td>Common</td>
<td>Occasional</td>
</tr>
<tr>
<td>Skin or nail involvement</td>
<td>None</td>
<td>Common</td>
<td>Almost 100%</td>
</tr>
<tr>
<td>Infectious agents as triggers</td>
<td>Unknown</td>
<td>Yes</td>
<td>Unknown</td>
</tr>
<tr>
<td>Sex ratio</td>
<td>M:F = 3:1</td>
<td>Mostly males</td>
<td>Males = Females</td>
</tr>
</tbody>
</table>

Adult Seronegative Spondyloarthropathies: Disorders With the Highest Degree of Sacroiliac Joint Involvement

Radicular, Ischemic, and Neuropathic Pain
Neuropathic Pain: Radiculitis / Radiculopathy

• **Causes**
  - Disc Herniation
  - Disc leakage
  - Spondylosis
  - Tumor invasion

• **Diagnosis**
  - History / neurologic exam
  - Straight leg raise (SLR) / Crossed straight leg raise
    • SLR 91% sensitive / Crossed SLR 88% specific
  - Seated Slumped Root Test exceeds SLR sensitivity in some studies
  - Motor Exam, include Extensor Hallucis Longus (L5), Reflexes (L4-S1)
  - Sensory Exam (light touch, pinprick)
Examinations for Lumbar Radiculitis

- **Slump Test**
- **Bowstring**
- **Straight Leg Raise**
- **Lasegue’s Sign**
Neuropathic Pain: Spinal (Canal) Stenosis

- **Etiology**
  - Central Disc Herniation
  - Ligamentum Flavum Hypertrophy
  - Spondylosis
  - Tumor invasion
- **Diagnosis**
  - Similar to workup for radiculopathy
  - History of neurogenic claudication
  - Radicular symptoms without radicular signs
    - i.e. SLR test can be negative
- **Treatment**
  - Same as for radiculitis
  - May require surgical intervention
Neuropathic Pain: Piriformis Syndrome

• **Etiology**
  - Piriformis muscle tightening /irritation
  - Sciatic nerve runs in close proximity (or through)
  - Pressure on sciatic nerve imitates radiculitis
  - May be associated with sacroiliac joint dysfunction

• **Diagnosis**
  - Direct palpation of trigger point

• **Treatment**
  - Piriformis stretching
  - Piriformis trigger point injection
Pain of the Anterior Spine Elements, Disc and Vertebral Body
Axial Pain: Discogenic Pain

• **Incidence:**
  • Up to 39% of low back pain
  • More common in early adulthood

• **Etiology**
  • Pain from annulus – fissure leading to ingrowth of nociceptive nerves

• **Diagnosis**
  • No well validated physical exam maneuvers
    • Manual shear test?
  • Provocative Discography is the gold standard confirmatory test

Axial Pain: Vertebral Pain

- **Pathologic fractures**
  - Osteoporosis
  - Tumor invasion / metastases

- **Diagnosis**
  - Tuning fork test – used but not well validated
  - Plain films
  - CT scan

- **Treatment**
  - Promote mineralization
    - Bisphosphonates
  - Vertebral Augmentation
  - XRT

Non-Specific Low Back Pain (NSLBP)
NSLBP - Features

• Over 80% of LBP complaints cannot be attributed to a specific disease or anatomic abnormality.

• Pragmatic Classification

• Heterogeneous population
  • Cognitive and affective components
  • Course of recovery

• Several different etiologies proposed
  • Functional/Anatomical
  • Neurologic/Central
  • Sensorimotor

• Conservative Management, including PT; non-opioid medical therapy
NSLBP – Proposed Etiologies

Definitions of the dysfunction patterns.

<table>
<thead>
<tr>
<th>Dysfunction pattern</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articular dysfunction pattern</td>
<td>Low back disorders in which you presume the dominant cause of nociception/pain refers to an articular structure dysfunction (facet joint, capsuloligamentous structure, disc, etc.)</td>
</tr>
<tr>
<td>Myofascial dysfunction pattern</td>
<td>Low back disorders in which you presume the dominant cause of nociception/pain refers to a myofascial structure dysfunction (muscle, fascia, tendon, etc.)</td>
</tr>
<tr>
<td>Neural dysfunction pattern</td>
<td>Low back disorders in which you presume the dominant cause of nociception/pain refers to a neural structure dysfunction (nerve root, peripheral nerve, etc.)/neuropathic pain</td>
</tr>
<tr>
<td>Central dysfunction pattern</td>
<td>Low back disorders in which you presume the dominant underlying cause is not related to a structural cause, but refers to a pain processing dysfunction (e.g. hyperalgesia due to central sensitization)</td>
</tr>
<tr>
<td>Sensorimotor control dysfunction pattern</td>
<td>Low back disorders in which you presume the dominant underlying cause refers to a sensorimotor control dysfunction, whereby a continuous source of nociceptive or neuropathic input remains</td>
</tr>
</tbody>
</table>
Summary

• Be vigilant for serious causes of LBP such as malignancy, infection, fracture etc.

• Evaluate Neurologic Symptoms, Signs, other Red Flags
  • Combination of multiple Red Flag symptoms may be of more help
  • Serious causes of LBP may require specialist referral

• Understand benefits and limitations of physical exam maneuvers
  • Avoid over-utilization of imaging
  • Diagnosis may need modification over longitudinal course of care
References


References, cont.


