Musculoskeletal Medicine: Common Orthopedic Problems

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Disclosures

Dr Garry discloses that he holds stock in Pfizer and Merck pharmaceuticals.

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Learning Objectives

1. Cite strong indicators for immediate imaging of the lumbar spine.
2. Know the evidence-based management for low back pain.
3. Cite the risk factors and management of overuse injuries (tendinopathy, shoulder pain, carpal tunnel syndrome).
4. State management of 3 common foot problems (plantar fasciitis, Morton’s neuroma, tarsal tunnel syndrome).
Most Common Causes of LBP in Adults

- Strain or sprain 70%
- Degenerative 10%
- Discogenic 4%
- Osteoporotic fracture 4%
- Spinal stenosis 3%
- Spondylolisthesis 2%

‘Other’ includes neoplasia, pelvic etiology, abdominal etiology, etc.
1. All of the following are “red flags” suggestive of early imaging of the lumbar spine except …

A. Urinary retention
B. Renal cancer
C. Back pain at rest
D. Urinary incontinence
1. All of the following are “red flags” suggestive of early imaging of the lumbar spine except …

- A. Urinary retention (11%)
- B. Renal cancer (10%)
- C. Back pain at rest (√) (61%)
- D. Urinary incontinence (18%)
LBP Imaging – “Red Flags”

**History Findings**

- Cancer metastatic to bone (breast, lung, thyroid, renal, prostate)
- Urinary or fecal incontinence
- Urinary retention
- Progressive lower extremity motor or sensory loss
- Significant trauma related to age
- Severe pain and lumbar spine surgery in the prior 12 months

**Exam Findings**

- Major motor weakness or sensory loss
- Saddle anesthesia
- Loss of anal sphincter tone
- Fever, urinary tract infection, or wound in spine region

These are all STRONG findings and the presence of a STRONG finding indicates need for imaging.
Immediate imaging recommended for acute LBP with major risk factors for or signs of cauda equina syndrome or severe progressive neurological deficits.

Imaging after trial of therapy for those with minor risk factors for cancer, risk factors for inflammatory back disease, risk factors for VCF, signs or symptoms of radiculopathy, or risk factors for or symptoms of symptomatic spinal stenosis.

Repeated imaging is only recommended in patients with new or changed low back symptoms.

Ann Intern Med. 2011;154(3).
Summary of the American College of Physicians Best Practice Advice:

Diagnostic Imaging for Low Back Pain

Evidence that expanding imaging to those without indications does not improve outcomes

RCTs of routine imaging vs usual care without routine imaging in patients without indications for diagnostic imaging suggest no clinically meaningful benefits on outcomes related to pain, function, quality of life, or mental health.

Other supporting evidence includes the weak correlation between most imaging findings and symptoms, the favorable natural history of acute LBP with or without imaging, the low prevalence of serious or specific underlying conditions, and unclear effects of imaging on treatment decisions.

Ann Intern Med. 2011;154(3).
LBP Imaging

Adult with acute LBP without “red flags”
Suspect degenerative changes/sprain/strain

4-6 weeks of treatment/therapy

Symptoms improve
Stop imaging

Symptoms continue (XR)
Neuro deficit
MRI

No neuro deficit
Stop imaging

2. A 43-yo male was moving a dresser 2 days ago and felt pain in his low back. Pain persists and radiates to left buttock. No radiation of symptoms below the level of the knee. Which of the following recommendations have been shown to be helpful for recovery?

A. Bed rest until pain resolves
B. Use of an NSAID
C. Referral to back school
D. Early imaging
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C. Referral to back school
D. Early imaging

Correct answer: B. Use of an NSAID

Other options:
- A. Bed rest until pain resolves: 1%
- C. Referral to back school: 21%
- D. Early imaging: 1%
Acute LBP

• **Beneficial Therapies**
  - NSAIDs (A)
  - Advice to remain active (A)

• **Likely Beneficial Therapies**
  - Muscle relaxants – weigh side effects (B)
  - Epidural steroids (diskogenic pain)
  - Physical therapy–directed home exercise program

3. All of the following are beneficial in the treatment of *chronic* LBP to reduce pain and improve function except …

A. Tramadol  
B. Oxycontin  
C. Exercise  
D. Massage
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A. Tramadol

B. Oxycontin

C. Exercise

D. Massage
Chronic LBP
Beneficial Therapies

▼ Pain - ▲ Function
- Intensive multidisciplinary treatment program (B)
- Tramadol* (B)
- Exercise (B)
- Massage (A)
- Behavioral therapy (B)

▼ Pain
- Antidepressants (B)
- NSAIDs (B)
- Analgesics* (B) (narcotic analgesics)
- Back school (B)
- Manipulation (B)
- *Harpagophytum procumbens* (devil's claw)
- *Salix alba* (white willow bark)


RCT comparing massage (structural n = 132, relaxation n = 136) to usual care (n = 133) for chronic LBP in 20-65 yo patients; weekly massage (50-70 min) x 10 weeks; benefits of massage persisted for 26 wks.

Mean Roland Disability Questionnaire (top) and Symptom Bothersomeness (bottom) Scores.
Psychosocial Factors Predicting Long-Term Disability in Chronic LBP

**Affect**
- Anxiety, depression, feeling of uselessness

**Behavior**
- Adverse coping strategies, impaired sleep, passive

**Beliefs**
- “Pain is harmful” and must be eliminated

**Social**
- History of abuse (physical/sexual/drug), lack of support

**Work**
- Expect pain will increase with work, pending litigation

*AFP. 2009, 79(12).*
4. A 33-yo male presents with acute LBP after reaching down to load the dishwasher. The following day noted right leg pain and lateral foot paresthesias. At presentation, you find plantar flexor weakness in addition to positive dural tension signs. Your recommendation is …

A. Go to bed for rest and return in 3 days.
B. Start high-dose prednisone as moderate to strong evidence supports this for symptom relief.
C. Prescribe an upper lumbar ESI and if symptom relief then obtain an MRI.
D. Consider surgical intervention despite outcomes which are similar to non-surgical care at 2 years.
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Lumbar HNP: Conservative Treatment

- 80% of all adult LBP resolves within 90 days (AHCPR Clinical Practice Guideline No. 14, 1994)
- 90% lumbar HNP starts to improve at 6 wks and resolve by 12 wks (Saal et al. Spine 1989)
- Avoid bed rest (Hagen et al. Coch Data Syst Rev 2004)
- Oral corticosteroids and NSAIDs have weak evidence for benefit (Holve et al. JABFM 2008; Roelors et al. Coch Data Syst Rev 2008)
- LESI provides benefit in terms of pain relief and preference for non-surgical treatment; mean = 3.6 inj/yr (Manchikanti et al. Spine 2011; Benyamin et al. Pain Physician 2012)
Lumbar HNP: Surgical Treatment

• Indications
  - Severe progressive motor deficits, cauda equina syndrome, unremitting radiculopathy x 6 weeks

• Spine Patient Outcomes Research Trial
  - Surgery provides greater improvements in pain and disability in the first two years vs nonsurgical treatment. Treatment effects are similar at ≥ 2 yrs

• Microdiskectomy as effective as open diskectomy

Gibson et al. Cochrane 2007
Weinstein et al. JAMA 2006
Pearson et al. Spine 2012
Evidence-Based Practice
Recommendations for Lumbar HNP

1. Advice to remain active (A)
2. Oral steroids and NSAIDs have limited benefit (B)
3. ESI provide (short term) symptom improvement (A)
4. If no “red flags,” then radiculopathy may be managed conservatively, without imaging, for up to 6 wks (A)
5. Radiculopathy not improving after 6 wks of conservative management may benefit from diskectomy for more rapid clinical relief (A)
6. Diskectomy has similar long-term outcomes as nonsurgical treatment (A)
Characteristics of Overuse Injury

- Low contact activities/sports that involve long training sessions with repetitive motion
- Gradual onset and increase in symptoms make these difficult to identify early
- Consequences include loss of time in activity, reduced function, pain, and psychological exhaustion
- Female athletes at greater risk

Yang et al. J Athletic Tng 2012
5. Which of the following statements is most correct regarding overuse injury?

A. Menstrual dysfunction is related to overuse injury
B. Prior injury is not important in the etiology of overuse injury
C. Chronic tendinopathies are characterized by inflammatory infiltrates
D. Overuse injury is most commonly associated with a single traumatic event
5. Which of the following statements is most correct regarding overuse injury?

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<th>Pediatric &amp; Adolescent</th>
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<tr>
<td>Susceptibility of growth cartilage</td>
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<tr>
<td>Adolescent growth spurt</td>
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<td>Developmental level</td>
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<th>Intrinsic Factors</th>
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<tr>
<td>Prior injury</td>
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<tr>
<td>Inadequate conditioning</td>
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<tr>
<td>Anatomic factors</td>
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<tr>
<td>Menstrual dysfunction</td>
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<td>Equipment</td>
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<tr>
<td>Technique</td>
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<td>Psychological factors</td>
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Overuse Injuries: Tendinosis

- Non-inflammatory degenerative condition
  - Supraspinatus, epicondylitis, patellar, achilles
- Etiopathogenic theory suggesting insufficient tensile strength of the tendon exposed to external loads which cause progressive damage
6. Which of the following statements regarding chronic tendinopathy (lateral epicondylosis, patellar tendinosis, achilles tendinosis) is most correct?

A. Corticosteroid injections provide long term relief for patellar tendinosis
B. Corticosteroid injections provide long term relief for lateral epicondylosis
C. Eccentric strengthening is beneficial for lateral epicondylosis and patellar tendinosis
D. Concentric strengthening is more efficacious then eccentric strengthening in achilles tendinosis
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D. Concentric strengthening is more efficacious then eccentric strengthening in achilles tendinosis

- A: 2%
- B: 13%
- C: 62%
- D: 24%
Eccentric Strengthening

“Lengthening of a contracting muscle”

• Initial exposure to EC can result in muscle damage & delayed onset muscle soreness
• Repeated EC results in protective adaptations in muscle
• EC leads to greater muscle mass, strength, power
• Tendons demonstrate increased stiffness, greater force needed for failure, and improved ability to absorb force at the myotendinous junction
### Eccentric Strengthening

<table>
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<tr>
<th>Condition</th>
<th>Description</th>
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<tr>
<td>Lateral epicondylosis</td>
<td>9 wks of treatment, 3x per week resulted in ▼ tendon thickness, ▼ pain and disability, ▲ strength</td>
<td>Crosier et al. Brit J Sports Med 2007</td>
</tr>
<tr>
<td>Patellar tendinosis</td>
<td>Meta-analysis of RCTs found EccS to be beneficial in treatment; step program or use of 25° decline board may have further benefit in treatment</td>
<td>Visnes et al. Br J Sports Med 2007; Young et al. Br J Sports Med 2005</td>
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## Corticosteroid Injection

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<td>Lateral epicondylosis</td>
<td>Beneficial for ▼ pain reduction for up to 8 weeks but <strong>inferior to other treatments for longer term</strong></td>
<td>Coombes et al. Lancet 2010</td>
</tr>
<tr>
<td>Achilles tendinosis</td>
<td><strong>Beneficial for short term</strong> pain reduction which is lost in the intermediate term</td>
<td>Fredberg et al. Scand J Rheumatol 2004</td>
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Posterior Tibialis Tendon

- Acute or overuse injury
- Risk factors: female, > 40 years, obesity, diabetes, hypertension
- Pain with passive dorsiflexion and heel rise (posterior tibialis muscle is a plantarflexor and invertor of the foot)
- Treatment may extend 3-6 months
- Rest, ice, NSAIDs, may boot for 3-6 weeks, orthotics, PT, and eccentric strengthening

Shoulder Pain

**Impingement**
- Age > 35
- Overuse injury with an **insidious onset** of pain
- AC spurring & tendon degeneration
- Pain with overhead activity
- *Supraspinatus tendon* most commonly involved followed by *infraspinatus*

**RC Tendonitis**
- Age < 35
- Typically **acute onset**
- Pain with manual muscle testing
- Partial tears may be associated with night pain
Shoulder Pain Management Therapies

- Physical therapy
  *Beneficial for ▼pain and ▲function*

- Subacromial Injection
  *Improves abduction, ▼pain*

- NSAIDs
  *Likely beneficial vs. placebo (B)*

- Extracorporeal shockwave therapy
  *ECSWT helpful in chronic shoulder pain with calcific tendonitis*

BMJ. [www.clinicalevidence.com](http://www.clinicalevidence.com)
Cochrane 2009, 2008
Rotator Cuff Tears

- Supraspinatus weakness
- Weakness in external rotation
- Positive impingement signs (Neer’s, Hawkin’s)

Tears more likely with increased age (> 60)

3 positive signs (any age), or 2 positive signs and age > 60 = 98% probability of RC tear

Murrell et al. Lancet 2001
Biceps Tendon Rupture

• Long head of the biceps tendon most common
• **Risk factors include:** ▲ age, heavy overhead activity, shoulder overuse injury, smoking, corticosteroids
• Audible “pop,” bruising, weakness (supination)
• Surgical treatment debatable but consider for athletes, manual laborers, and those who require maximal supination strength
7. A 64-yo male with a 4-mo history of shoulder pain and LROM. No history of trauma or arthritis. Had pain for 2 mo and then noted onset of LROM. The best initial treatment for short-term pain relief & functional improvement includes which of the following?

A. Acetaminophen 650 mg po qid
B. 3-4 weeks or oral prednisone
C. Referral to physical therapy
D. Reassurance and follow up in 2 months
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A 64-yo male with 4-mo history of shoulder pain and LROM. No history of trauma or arthritis. Had pain for 2 mo and then noted onset of LROM. The best initial treatment for short-term pain relief & functional improvement includes which of the following?

• Adhesive capsulitis
• 3-4 weeks or oral prednisone (20 mg/d) was superior to PT or acetaminophen in improved function and reduced pain in the short term (1-2 months)

Cochrane 2006
Ann Rheum Dis 2004
Adhesive capsulitis is associated with diabetes, cardiac disease, thyroid dysfunction, and Parkinson’s disease.
Adhesive Capsulitis

- PT/analgesics = mainstay of treatment despite limited evidence
- PT + IA steroids better than PT alone at 3 mo
- Oral steroids ▼pain & ▲function at 1 mo
- Efficacy of capsular distension is equal to manipulation

  • **Stage I**: “painful” stage, 6 wks to 9 months, slow onset of pain. As pain worsens, shoulder loses motion.

  • **Stage II**: "freezing" stage, marked by a slow improvement in pain, but persistent LROM, generally lasts 4-9 months.

  • **Stage III**: The final stage is the "thawing", during which shoulder motion slowly returns toward normal. This generally lasts 5-26 months.

Arth Rheum 2003: 48(3), 829
Cochrane 2006, 2008
J Should Elbow Surg 2009
8. The diagnostic test of choice for carpal tunnel syndrome is...

A. Patient history
B. Paresthesias in the radial 2 digits
C. Nerve conduction velocities
D. Ultrasound demonstrating compression of the median nerve
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Carpal Tunnel Syndrome

- Classic vs. Dynamic
- Associated with thyroid, diabetes, pregnancy
- Compression of the median nerve
  - Sensory ➔ radial 3 ½ digits
  - Motor ➔ intrinsic thumb, radial lumbricals

- Flick test (most sensitive finding)
- Phalen’s test
- Monofilament testing
- 2-point discrimination
- Weak thumb abduction

D’Arcy et al. JAMA 2000
LeBlanc, AFP 2011
Carpal Tunnel Syndrome

- **Treatment Options**
  - Wrist splints, ultrasound, yoga, carpal bone mobilization – possibly beneficial in short term
  - Corticosteroid injection – beneficial at 1 & 4 mo, superior to oral corticosteroids
  - Surgical release – beneficial over splinting at 6 mo

*Surgical release to prevent progression of symptoms as opposed to “return to normal”*

Cochrane 2009
AFP 2011: 83(8)
Dupuytren’s Contracture

- Males > 40 years
- 4th finger most common
- Associated with northern European/Scandinavian ancestry, hereditary, smoking, alcohol, and diabetes
- Development of nodules to progressive fibrosis of the palmar fascia causing shortening and thickening with subsequent flexion contracture of the digit
- CSI for painful nodules; splinting not helpful
- Collagenase injections
- Surgical management

Purulent Tenosynovitis

• Flexor tendons most common

• Kanavel’s signs
  – Slight digital flexion
  – Uniform volar swelling
  – Flexor tendon tenderness
  – Pain with passive extension

• S. aureus or Streptococcus

Antibiotics and surgical consultation

Source: OpenI at U.S. National Library of Medicine
9. Risk factors for plantar fasciitis include all of the following except...

A. Pes cavus foot structure
B. Obesity
C. Pes planus foot structure
D. Normal ankle dorsiflexion
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C. Pes planus foot structure
D. Normal ankle dorsiflexion

58%
18%
18%
6%
Plantar Fasciitis Is More Likely to Occur in Persons Who...

- Are obese
- Spend most of the day on their feet
- Have limited ankle dorsiflexion, tight achilles
- Have pes cavus or pes planus foot structure
- Participate in excessive running
Plantar Fasciitis

- Heel pain
- Worse with first steps after prolonged rest or first steps in the morning
- Tender at medial calcaneal tubercle

Cochrane 2009
JAAOS 2008

Plantar Fasciitis Management

1. *Initiate patient directed therapies*
   - Relative rest, ice massage, analgesics, stretching, weight loss

2. *Initiate physician directed therapies*
   - Physical therapy, stretching, deep myofascial massage
   - Orthotics (B)
   - Night splint (B)
   - CS injection (B)
   - Autologous blood *injection* (B)
   - ECSWT is an option for *chronic recalcitrant cases* (B)
Morton’s Neuroma

- Irritation, trauma or excessive force on the intermetatarsal plantar nerve
- 3-4 web space most common
- ♀ (8-10x) >> ♂
- Burning pain in foot with toe numbness
- Palpable mass or click between metatarsals (Mulder’s sign)
- Treatment: shoes with wide toe box and low heels, orthotics, injection [80% improve with these measures]
Tarsal Tunnel Syndrome

- Entrapment of the posterior tibial n. just posterior to the medial malleolus
- Provoked by subtalar pronation
- Can be mistaken for plantar fasciitis
  - Nontender medial calcaneal tubercle
- Electrodiagnostics may be useful in diagnosis (C)
  - Problems with false negatives
- * Correct biomechanics and consider injection
Answers

1. C
2. B
3. B
4. D
5. A
6. C
7. B
8. C
9. D