# Low Back Pain in the Injured Worker

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## Disclosures

• I have no financial disclosures

### About Me

- Board certified in pain medicine and physical medicine and rehabilitation
- Focus primarily on interventional treatment of painful conditions
- Residency: Physical Medicine and Rehabilitation, University of Miami/Jackson Memorial Hospital, Miami, FL
- Fellowship: Interventional Pain Medicine, University of Miami/Jackson Memorial Hospital, Miami, FL
- Practice: Helena Orthopaedic Clinic, Helena, MT

# Objectives

- Overview of low back pain (LBP) as it pertains to the injured worker
- Discuss LBP in the general population and nuances in the injured worker
- Review pertinent anatomy of the low back
- Discuss the evaluation, structure based diagnosis and treatment of LBP
- Discuss considerations specific to the injured worker

## Low Back Pain: What is it?

- Pain focused in the lumbar region
- Can radiate to the gluteal region and legs, these areas commonly included
- Can be acute, subacute, chronic, acute on chronic
  - Acute exacerbation of chronic LBP



## Low Back Pain: Prevalence and Consequence

- Prevalence of LBP in the US adult population<sup>1</sup>
  - 10-30% annually experience LBP
  - Lifetime prevalence of  $\geq$  1 episode estimated as high as 65-80%
- For under 45 years of age, LBP is the leading chronic issue resulting in activity limitation<sup>2</sup>
- LBP is the leading cause of disability worldwide<sup>3</sup>
- In the US, estimated 11-12% of the population is disabled due to LBP<sup>4</sup>

## Low Back Pain in Workers

- Millions of workers in the US annually experience an occupational lower back illness<sup>2</sup>
- Across all major industries LBP is as the most common anatomic location for workers' compensation claims<sup>2</sup>
- US Department of Labor estimates that 100 million work days are lost annually because of low back pain<sup>2</sup>
- LBP represents 20% to 30% of all compensable work injuries, and about one third of worker compensation costs<sup>2</sup>

# Low Back Pain: Risks for Development

- Occupational risk factors for LBP<sup>2</sup>
  - Forceful lifting
  - Bending and twisting of the trunk
  - Whole body vibration
  - Heavy manual labor
- Personal Risk Factors for LBP<sup>5</sup>
  - Older age
  - Poor general health (smoking)
  - Psychological stress (depression)

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### Anatomy Pertinent to Low Back Pain





### Anatomy Review: Muscles and Fascia



### Anatomy Review: Ligaments



## Anatomy Review: Bones // Vertebra







## Anatomy Review: Bones // Facet Joints



### Anatomy Review: Bones // Sacroiliac Joints



## Anatomy Review: Discs



### Anatomy Review: Spinal Nerves









## Anatomy Review: Spinal Nerve Compression



Kaiser Permanente Northern California





#### Normal

No CSF effacement

#### Mild

Some effacement of CSF; cauda equina nerve roots clearly separable

#### Moderate

Aggregation of cauda equina nerve roots with near total effacement of CSF

#### Severe

Total effacement of CSF and sac deformity

Lee et al. Skeletal Radiology 2011. Lee et al. AJR 2010. Wildermuth et al. Radiology 1998



# Anatomy Review: Lumbar Radiculopathy or "Sciatica"



# Anatomy Review: Non-spinal Sources of Low Back Pain





## Anatomic Sources and Related Pain Diagnoses

### **Muscles and Ligaments**

Sprains and strains, torn muscle, myofascial pain with trigger points

### **Bones: Vertebra**

Fractures (compression, burst, spinous or transverse process fractures)

### **Bones: Facet Joints**

Joint effusions, joint arthritis

### **Bones: Sacroiliac Joints**

SIJ dysfunction, joint arthritis

### Discs

Acute disc herniation causing disc pain, chronic disc degeneration

### **Spinal Nerves**

Compression resulting in radiculopathy aka "sciatica", spinal stenosis, spinal cord injury

### **Referred from Non-spinal Sources**

Kidney stones, pelvic pain

# Anatomic Changes with Aging

- As we age, our body structures degenerate
- Lumbar region:<sup>6,7</sup>
  - Degenerative disc disease (disc bulging, disc signal intensity)
  - Facet and sacroiliac joint arthritis
  - Spinal ligament hypertrophy
  - Muscle atrophy
  - Bone mineral density
- Need to appreciate these can be normal consequences of aging, not necessarily painful and possibly pre-existing before a work injury



## **Objectives Progress**

• Goal: Overview of LBP as it pertains to the injured worker

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### Low Back Injury - Now What?

# Natural History of LBP

- Long believed that most episodes of LBP will be short-lived, 80% to 90% of attacks of low back pain resolve in about 6 weeks irrespective of type of treatment<sup>8</sup>
  - Basis for conversative measures early on in the absence of neurologic deficits
- However, multiple studies have shown that injures result in recurrent low back pain with a rate of 35% - 79% following an injury<sup>8</sup>
- In the worker, additional issues co-exist<sup>2</sup>
  - Secondary gain
  - Job satisfaction
  - Many others

# Goals of Evaluation, Diagnosis and Treatment in the Injured Worker

- Determine early if significant structural issues exist which require urgent treatment (surgery) to mitigate permanent or long term loss of function
- Determine how likely the structural issues are related to the specific reported injury
- Determine need for work modifications or time away from work
- Facilitate healing
- Initiate early rehabilitation
- Relieve pain for comfort
- Focus on a step-wise progression to return to work when appropriate

# Evaluation

- Initial visit history
  - History including mechanism of injury (high versus low impact)
  - Prior treatment
  - Previous known injuries, preexisting pain, prior surgery
  - Job demands
- Examination
  - Focused on identifying structures involved
  - Neurologic evaluation to screen for impairment (strength, sensation, reflexes, pathologic reflexes)
  - Imaging if indicated

# Imaging



# Electrodiagnostic Testing

- Nerve conduction studies (NCS) and electromyography (EMG)
- Helpful for determining if a peripheral neuropathy of the lower extremities is present
- Many be able to identify radiculopathy in some cases
- Ordered after at 4-6 weeks from injury to have the best opportunity to have significant findings



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By developing a more specific idea of the underlying structural issues, can better direct plan of care

## Treatment Spectrum Overview



## Treatment: Time

- Many acute lumbar injuries have a good opportunity to improve with supportive care<sup>8</sup>
- If neurologic deficits are present or mechanism of injury is high impact, early imaging indicated
  - Weakness
  - Significant sensory symptoms
  - Bladder or bowel disfunction
- Imaging may be preferred in situations where there is the expectation that pain will increase with work and activity; pending litigation; early failure to improve<sup>9</sup>
- Import to allow time to adequate healing and prevent re-injury
  - Work restrictions or off work
  - Attempt to progress to less restrictions as fast as appropriate

# Treatment: Physical Rehabilitation

- Multidisciplinary rehabilitation [PT/OT] (moderate-quality evidence)<sup>9</sup>
  - Mitigates debility due to inactivity
  - Normalizes pain
  - Provides me with structured feedback on progress
  - Identifies specific functional/structural issues
- Superficial heat (moderate-quality evidence)<sup>9</sup>
- Massage, acupuncture, or spinal manipulation (low-quality evidence)<sup>9</sup>

## Treatment: Medications

- Anti-inflammatories
  - NSAIDs: ibuprofen, naproxen, meloxicam, celecoxib, etc.
  - Steroids: Medrol Dosepak
- Tylenol
- Muscle relaxers
  - Cyclobenzaprine
  - Flexeril
  - Many others

- Nerve pain medications
  - Gabapentin
  - Pregabalin
  - Duloxetine
- Topical agents
  - Lidocaine, diclofenac, analgesic creams
- Opioid medications
  - Tramadol, oxycodone, hydrocodone, etc.
  - Indicated for severe pain, limited duration

# Treatment: Interventional Management Using Image Guidance









# Treatment: Interventional Management of Muscle Pain

- Trigger points are discrete, focal, hyperirritable spots located in a taut band of skeletal muscle
- Injection with local anesthetic +/steroid has been shown to be effective option to inactivate trigger points and provide relief of symptoms<sup>10</sup>
- Performed with ultrasound or fluoroscopic guidance



# Treatment: Interventional Management of Disc and Radiculopathy Pain

- Lumbar epidural steroid injections
  - Help relieve pain through targeted delivery of steroid medication
  - Can be used diagnostically
- Transforaminal approach
  - Level I evidence disc herniation and Level II evidence in the setting of lumbar spinal stenosis<sup>11</sup>
- Interlaminar approach
  - Level I evidence for lumbar disc herniation and Level II evidence for the treatment of lumbar spinal stenosis and axial/discogenic pain<sup>11</sup>
- Caudal approach
  - Level II–III evidence for treatment of lumbar spinal stenosis with caudal approaches, Level II in post-surgery syndrome<sup>11</sup>





# Treatment: Interventional Management of Facet Pain

- Options to diagnosis and treat facet pain
- Lumbar facet intraarticular injections
- Lumbar facet innervation medial branch nerve blocks
  - MBB more predictive over IA injections
- Radiofrequency ablation of lumbar medial branches
  - Repeat lumbar medial branch RFA if 3 months of improvement or greater<sup>12</sup>



Treatment: Interventional Management of Sacroiliac Joint Pain

- Sacroiliac joint injection
  - Can be diagnostic and provide treatment
- Sacroiliac innervation nerve blocks
- Sacroiliac joint deinnervation with radiofrequency ablation





# Treatment: Spinal Cord Stimulation

- Used for the treatment for chronic intractable pain of the trunk and/or limbs
- Food and Drug Administration indications include<sup>13</sup>:
  - Radicular pain syndrome & radiculopathies resulting in pain secondary to failed back syndrome or herniated disc
  - Epidural fibrosis
  - Degenerative disc disease (herniated disc pain refractory to conservative and surgical interventions)
  - Arachnoiditis
  - Pain following back surgeries



# Treatment: Surgery

- Different options based off structural issue(s) and need for stabilization
- Common approaches:
  - Laminectomy
  - Posterior fusion
  - Anterior fusion
- Adjacent level disease risk<sup>14</sup>
  - Up to 30% with instrumented lumbar fusions
  - Decompressions without instrumentation have smaller risk 5.6%



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# How Long Until Maximal Medical Improvement? Restrictions Decreased?

- Can be **difficult** to estimate in LBP
- 1<sup>st</sup> occurrence in a previously asymptomatic younger worker without significant structural deficits or severe symptoms and a low impact physical occupation? Outlook is good
- Everyone else?
- Many variables exist
  - Age
  - Prior injuries
  - Specific type of injury and severity
  - Work type
  - Depression
  - Litigation

## Treatment Outcomes and Return to Work

- Best data is likely from meta-analysis of individual studies
- 2015 meta-analysis<sup>15</sup> of return to work following spinal surgery findings:
- Less likely to return if:
  - Older
  - Not working before surgery
  - Longer absences from work
  - Higher physical workload
  - Legal representation
- In summary, difficult to predict based of injury alone and more evidence is needed if we are to develop predictive models

## LBP: Key Points

### • Anatomy:

- Many different structures in the "low back" and adjacent regions
- Close together, can be overlap in symptoms and injury patterns

### • Evaluation, diagnosis and treatment:

- Focus in on identifying structural issues and moving toward functional improvement
- Appropriate escalation to interventional or surgical management

### • Worker specific elements:

- Attempt to return to work as early as appropriate
- Estimations regarding MMI can be challenging to provide as dependent on many variables

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