No disclosures to report.
LUMBAR SPINE INJURIES

Prevalence in Sports

- 1-94% in sports

<table>
<thead>
<tr>
<th>Highest</th>
<th>Lowest</th>
</tr>
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<tbody>
<tr>
<td>Rowing</td>
<td>Basketball</td>
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<tr>
<td>Cross Country Skiing</td>
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</tbody>
</table>
# Prevalence in Sports

<table>
<thead>
<tr>
<th>Sports</th>
<th>American Football</th>
<th>Ice Hockey</th>
<th>NBA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30% - all lumbar spine</td>
<td>95% - all injuries</td>
<td>10% of all injuries – spine</td>
</tr>
<tr>
<td></td>
<td>28% - disc herniation</td>
<td>• 82% cervical</td>
<td>14% - ankle sprain</td>
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<tr>
<td></td>
<td></td>
<td>• 7.3% thoracic</td>
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<td></td>
<td></td>
<td>• 4.8% lumbar (checked from behind)</td>
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<td></td>
<td></td>
<td>44% back pain spondylolysis</td>
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<td></td>
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<td>73% on side of shooting</td>
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<tr>
<td>Soccer</td>
<td></td>
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<tr>
<td></td>
<td>Japan</td>
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<td></td>
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<tr>
<td></td>
<td>• 76% players vs 53.5% non-players</td>
<td></td>
<td>Degenerative Disc Disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 24% - Non-Olympic</td>
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<tr>
<td></td>
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<td></td>
<td>• 63% - Olympic</td>
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</tr>
<tr>
<td></td>
<td>Ballet</td>
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</tr>
<tr>
<td></td>
<td>20% - lumbar</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>38% - foot and ankle</td>
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</tr>
<tr>
<td></td>
<td>Gymnastics</td>
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<td></td>
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<td></td>
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</tbody>
</table>
Risk Factors

- Previous low back pain
- Decreased lumbar flexion
- Decreased lumbar extension
- Hip flexor tightness
- Increased BMI
Case Report

- 15-year old gymnast
- 7-year history of club and high school gymnastics participation
- Back pain with activity for 3 months
Most Common Cause

- Repetitive extension

VERTEBRAE

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2843565/
Injuries

- Lumbar Sprain
- Spondylolysis
- Spondylolisthesis
All 3 diagnoses have same history

- No back pain at rest
- Back pain with extension
- Back pain with twisting and rotating
- Usually no leg pain
- If severe, radicular symptoms
Physical Exam

- Pain with extension and rotation
- Normal neurological exam
- Positive Patrick Test and Reverse Tomas Tests
- Tender to palpation to vertebrae
- Pain with hyper-extension while standing
Lumbar Spine X-Rays

AP, Lateral, and Oblique
If negative,…

- Bone Scan with SPECT
- CT scan
- MRI
  - Not as good as CT Scan, but gives more information on soft tissues
If all imaging is negative,...

- Diagnosis is lumbar sprain
General Treatment

- Physical Therapy
- Chiropractic care
- Flexion-based exercise program
- Address flexibility issues
- Strengthen hip flexor muscles
Diagnosis for Spondylolysis

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2841113/

https://www.physio-pedia.com/File:Spondylolysis_CT_scan_1.docx.jpg

https://link.springer.com/article/10.1007/s11604-014-0371-4
Spondylolysis

- Positive X-Ray OR Bone scan with spec, CT scan, or MRI
- Need flexion and extension exercises to rule out spondylolisthesis
- Treatment brace for 12 weeks
- Same rehab program
- Train with corset that prevents hyper extension
- Fusion if pain persists and affects your career.
- Stop playing sport, if recreational.
Diagnosis for Spondylolisthesis

Spondylolisthesis can be described according to the body beneath it.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>25% of vertebral body has slipped forward</td>
</tr>
<tr>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>3</td>
<td>75%</td>
</tr>
<tr>
<td>4</td>
<td>100%</td>
</tr>
<tr>
<td>5</td>
<td>Vertebral body completely fallen off (i.e., spondyloptosis)</td>
</tr>
</tbody>
</table>
Diagnosis for Spondylolisthesis (cont.)

https://radiopaedia.org/cases/spondylolysis-and-spondylolisthesis?lang=us

https://www.semanticscholar.org/paper/Changes-in-lumbar-spondylolisthesis-on-axial-loaded-Kanno-Ozawa/b7612168755a556f4e057b9b44c1fb0b84a6ddfd
Spondylolisthesis

- Same work up as Spondylolysis
- If radicular symptoms - EMG and NCV
- If EMG is positive - use anti-inflammatories, NSAIDS, prednisone
- If leg pain not improved - transforaminal epidural
- If back or leg pain not improved - lumbar fusion
- May be able to avoid surgery if patient stops participating in activity
Case Report

■ 27-year old male with hamstring tightness
Herniated Disc, Lumbar Spine

- Mechanism: torsional stress on disc causing the annular fibrosis to tear
- The nucleus pulposus leaks out. (Large molecules that are very inflammatory)
- If more leg pain than back pain or mimics a hamstring strain – review history.

https://www.hindawi.com/journals/cior/2016/1538072/fig2/
“Scottie Pippen Syndrome”

- Work up MRI, EMG, and NCV

- Treatment
  - Physical therapy extension based
  - Strengthening core, especially hip musculature
  - If fail conservative treatment, then minimally invasive spine surgery
  - *Quicker return to play with conservative care than surgery
    - 38% returned after surgery
    - 65% returned after conservative care
Case Report

- 17-year old male offensive lineman and linebacker with weakness of right arm
Cervical Spine

- Most injuries:
  - Cervical sprains
  - Stingers
  - Cervical radiculopathy
  - Brachial plexopathy
  - Cervical fractures
  - Transient quadriplegia

https://www.healthychildren.org/English/health-issues/injuries-emergencies/sports-injuries/Pages/Burners-and-Stingers.aspx
Mechanism of Injury to Stingers

- Mechanism laterally flexed to opposite side with downward traction to ipsilateral shoulder
  - Causes traction on upper trunk of brachial plexus
- Axial load to head or shoulder
  - Causes injury to cervical roots in foramen
- History of pain down the arm with numbness and possible weakness lasting 15 to 30 minutes
- Order 5 views of Cervical spine X-Rays with Flexion and Extension
- Order MRI, EMG, and NCV.
  - Wait 3 weeks for EMG from time of original injury
Mechanism of Injury to Stingers (cont.)

https://davelessard.wordpress.com/2016/01/30/si
deline-tests-for-cervical-radiculopathy/

https://www.aafp.org/afp/1999/1101/p2035.html
Physical Exam of Patient with Stingers

https://geekymedics.com/shoulder-examination/
MRI OF STINGERS

https://www.ajronline.org/doi/10.2214/AJR.10.5560
Stingers

- MRI positive HNP in college and pro athletes
- MRI negative in high school athletes – more of brachial plexus lesions
Treatment for Neck Injuries

- NSAIDS, prednisone
- Cervical transforaminal epidural for HNP
- Cervical braces
- Cervical sprains
- If history contains pain in the neck, loss of motion, then cannot return to play depending upon cervical spine X-Rays with flexion and extension

Cervical braces

https://www.aafp.org/afp/1999/1101/p2035.html
Transient Quadriplegia

- 80% all 4 extremities
  - Usually resolves within 15 to 30 minutes
  - May last 24 to 48 hours
- Related to cervical stenosis congenital vs. acquired
- Spinal stenosis less than 14mm
- Return to play with transient quadriplegia symptoms

https://www.ajronline.org/doi/10.2214/AJR.10.5560
Returning to Sports Activities Guidelines

- 1 point unilateral arm numbness and dysesthesia
- 2 points bilateral motor and sensory loss
- 3 points ipsilateral arm and leg symptoms
- 4 points transient quadriparesis
- 5 points transient quadriplegia
Returning to Sports Activities Guidelines

- Time from injury
  - 1 point less than 5 minutes
  - 2 points less than 1 hour
  - 3 points less than 24 hours
  - 4 points less than 1 week
  - 5 points greater than 1 week
Returning to Sports Activities Guidelines

- Narrowing of central canal
  - 1 point greater than 12mm
  - 2 points 10 to 12mm
  - 3 points 10mm
  - 4 points 10 to 8mm
Returning to Sports Activities Guidelines

- Scoring

<table>
<thead>
<tr>
<th>Type</th>
<th>Scoring</th>
</tr>
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<tbody>
<tr>
<td>Minimal Risk</td>
<td>0 to 6</td>
</tr>
<tr>
<td>Moderate Risk</td>
<td>6 to 10</td>
</tr>
<tr>
<td>Serious Risk</td>
<td>10 to 15</td>
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</tbody>
</table>
Questions?
SPORTS INJURIES OF THE SPINE

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Medical Director
LAGS Medical Centers