The Athlete’s Lumbar Spine: Current Concepts on Health and Injuries

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I have disclosed that he has engaged in contracted research for CHRISTUS Santa Rosa and has ownership interest in Alphatec, Phygen.

Speaker Background

• Spine Surgeon, South Texas Spinal Clinic
• Clinical Associate Professor, UTHSC-SA
• Spine training: Baylor (Houston)
• In practice in San Antonio 10 years

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Content / Objectives

• On-field screening ‘red flags’ and management
• Low back pain
  • Epidemiology
  • Trends
  • Treatments
• Prevention

Content / Objectives

• Relevant new concepts in training
• Spondylolysis (pars fractures) updates
• Hot topics / Regenerative strategies...

Acute / Traumatic (Fall, Collision)

• Look for on-the-field ‘Red Flags’:
  • Weakness, incontinence, cannot stand or jog, impaired flexibility, loss of consciousness
  • (Concussion, upper extremity weakness, all part of head/neck/spine broader trauma considerations)
Neurologic Testing

- L2 Hip flexors (iliopsoas)
- L3 Knee extensors (quadriceps)
- L4 Ankle dorsiflexors (tibialis anterior)
- L5 Long toe extensor (extensor hallucis longus)
- S1 Ankle plantiflexors (gastrosoleus)
- Grading Strength 0-5

Acute Injury Algorithm

- Red Flag finding = Assume structural problem (fracture / instability of the C-T-L-S spine)
- Expedite ER / spinal evaluation, with:
  - Spinal precautions (head-neck immobilization and spine board)
  - Advanced Trauma Life Support, ABCs

Case #1

- 15 year old receiver
- In-game injury
- Complains of low back pain, lying on field
- Tries once, cannot get up (SEVERE pain) and/or weak in legs
- Management?
- Possible / likely injury?
You never know....

- 15 y.o. football player
- Hurt 2012
- Stopped playing
- PT 2013 for ongoing symptoms
- Now better
- But...

You never know....

Athletes and Low Back Pain

- Trend / suggestion of higher incidence of LBP
- Age, prior injury/LBP, females, Volleyball, time spent watching TV
- My observations: MATCH/CONCUR
- Significant lost time from athletic participation

Athletes and Low Back Pain

LBP Contributing factors

**Acute LBP:**
- Growth spurt
- Abrupt increases in training intensity or frequency
- Improper technique
- Unsuitable sports equipment
- Leg-length inequality

**Chronic LBP:**
- Poor core strength
- Structural issues (pars, disk)
- Tight hamstrings
Subacute or Chronic LBP

Muscle strain/ligament sprain  Intrapelvic gynecologic conditions (e.g.,
Degenerative disc disease ovarian cysts)
Isthmic spondylolysis (no slip) Renal disease
Isthmic spondylolisthesis Fracture syndrome
Ring apophyseal injury (adolescents)
Sacral stress fracture Central disc herniation (without radiculopathy)
Isthmic spondylolisthesis Sacralisation of L5/transverse process impingement
Facet syndrome Fracture stress fracture
Sacroiliac joint dysfunction Lumbar vertebral body fracture
Discl/scheumatolysis  Know your team, use the other
Neoplasim (CANCER) parts of the team (i.e. triage
prolems, let someone help if
you spot an issue).

Low Back Pain

• Treatment (strain, no fracture)
  • Core strengthening (PT)......The Posterior Chain
  • Stretch Hamstrings
  • Short-term medications: anti-inflammatory (NSAIDs),
    muscle relaxant
  • Weight optimization
  • Lessen impact activities during active symptoms

• Prevention
  • Sports-specific training
  • Flexibility.... YOGA ??
  • Rest
  • Manageable reps/goals

Flexibility

Even in (ESPECIALLY IN) football

Think outside the traditional box
i.e. Shannon Turley – Stanford Football
Stanford's Distinct Training Regimen Redefines Strength

"...For the subtle art of injury prevention, the Cardinal stretch and stretch and stretch. They stretch before and after lifts and before and after practice. They stretch for fun..."

Case #2

- 16 y.o. club and HS volleyball player
- Nagging low back pain 5 months
- More sharp/severe last 2 months
- Focal low back pain
- Activity related
- Sitting out practice more frequently
- Wants to play but hurts, taking NSAIDs
- PT regimen / work through it?

Spondylolysis

- aka pars fracture, stress reaction/fracture
- 3-6% prevalence
- Non-athletic population:
  - Often asymptomatic
  - Often incidental
  - Risk of slip: 25-50%
- May develop as stress fracture in athletics
- Adolescent athletes:
  - 38% with slip progression (avg. 10%)
  - 8% with slip decrease
Spondylolysis – Risks

- Twisting, hyperextension
- Repetitive axial loading
- Offensively linemen, gymnasts, soccer, baseball, volleyball, weightlifting, rowing, wrestlers...

Spondylolysis

Exam

- Tight hamstrings
- Pain with lumbar hyperextension
- Restricted range of motion
- ‘Stork’ Test – single leg stance, hyperextend back

Diagnosis - Imaging

- Oblique films not useful; extra radiation
- Rely on SPECT bone scan + CT (radiation)
- MRI useful for excluding other processes (disk degeneration, herniation)
### Spondylolysis Scenarios and Treatment

- **Spondylolysis** (‘crack’, ‘stress fracture’)
- Developing spondylolysis = ‘stress reaction’ (no crack...yet)
- **Treatment of these two situations**
  - Bracing (+/− 3 months), wean, rehab [CORE], ramp-up to sports
  - Stable fibrous union with resolved symptoms is OK
  - Check vitamin D ??? Doesn’t hurt...you’ll find low levels to Rx
- **Relevant treatments**
  - External electrical stimulation
  - Bone growth stimulators (external) (magnetic field)
  - Oxygen-Ozone CT guided therapy
  - Hyperbaric oxygen?

### The buzz...for disk injuries/degeneration

- Stem cells (mesenchymal stem cells)
  - Adipose-based
  - Bone marrow-based
- Needs rigorous study...evolving scientific information
- Europe >>> U.S.

### Stem Cell Therapies

- 2000’s: very little clinically; some bench research
- Now: increasing frequency of peer-reviewed clinical work

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**62. A Phase II Study Demonstrating Efficacy and Safety of Mesenchymal Precursor Cells in Low Back Pain Due to Disc Degeneration**

Hyun W. Bae, MD et al.

**STUDY DESIGN/SETTING:** Multicenter, randomized, blinded, placebo-controlled trial comparing outcomes of a single intradiscal injection of adult allogeneic mesenchymal precursor cells (MPC) mixed with a hyaluronic acid (HA) carrier to saline placebo or HA carrier control injections in patients with chronic discogenic back pain.

NASS 2014
Stem Cell Therapies

Thank you!!

Jesse DeLee
Pablo Vazquez

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