Spine Injury and Back Pain in Sports

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Back Pain

- Increases with Age
- Girls > Boys in Teenage years
- Anywhere from 15 to 80% of children and adolescents have back pain depending on the studies
Back Pain

- Most common cause is muscular
- History and Exam to rule out other causes
- Most patients with back pain need core strengthening

Back Pain - Is it Serious?

- Symptoms
  - Night Pain
  - Duration
  - Onset
  - Location
  - Is it affecting activities
  - Alleviating and Aggravating Activities
Back Pain - Is it Serious?

• Symptoms
  – Bowel or Bladder
  – Neurologic
• Stresses - associated Family Factors

Back Pain - Is it Serious?

• Constitutional Symptoms
  – Fever
  – Weight Loss
  – Night Sweats
Spine Examination

• Observation
  – Postural Shift
  – Walking
• Range of Motion
  – Forward Bending
  – Extension
• Spine Symmetry
• Rib Rotation especially on Forward Bending
• Limb Length
• Shoulder Height

Spine Examination

• Straight Leg Raise
• Contralateral Straight Leg Raise
• Faber Test
Spine Anatomy

Vertebral Body
Posterior Elements
Disc

Spine Anatomy

Vertebral Body
Posterior Elements
Disc
Spinal Canal
Cervical Spine Injury

Bone
Ligaments
Disc
Spinal Cord
Nerve Roots
Peripheral Nerves

Nerve Root and Brachial Plexus Injury

• Pinch or Stretch of the Cervical Nerve Roots or Brachial Plexus
• “Burners”
• Most Common
• Poorly Understood
• Rarely does nerve root disruption occur
Brachial Plexus

Nerve Root and Brachial Plexus Injury

- Short Lived
- Shoulder and elbow weakness
- Normal neck range of motion
- Stretch
- Compression
Nerve Root and Brachial Plexus Injury

**Mechanism**

- Traction - flexion of neck away from side
- Lateral Neck Flexion

**Treatment**

- Return to activity with normal exam
- Transient
- If any neck pain, weakness, tingling, lack of range of motion they may not return and require medical evaluation
- Patients with cervical stenosis have been found to be more likely to have burners - Pavlov ratios
Torg Ratios

Ratio of 0.8 or less is Indicative of canal narrowing

Spinal Cord Neuropraxia and Transient Quadriplegia

- Tingling
- May have motor weakness
- Involves both arms, both legs or all 4 extremities
- Transient and most recover with in 15 minutes
- Neck pain is minimal
Spinal Anatomy

- Average spinal cord is about 10mm in diameter
- Spinal Canal less than 14 mm is abnormal
- Pavlov ratio

Mechanism of Spinal Cord Neuropraxia or Transient Quadraparesis

- Pincer Mechanism - hyperextension
Recurrence of Transient Spinal Cord Neuropraxia

• Up to 56% in football
• The narrower the canal the higher the recurrence rate
• Return to sports controversial depending on the anatomy

Permanent Cervical Paralysis and Quadriplegia

• Most are related to Axial loading not hyper-flexion
• When head is flexed 30 degrees forward it straightens the cervical spine making it more susceptible to axial loading
Rule Changes against Spearing with the helmet

- Direct hitting with top of head produces larger forces on the cervical spine than forces applied further forward on the head.

![Graph showing Cervical Quadraparesis over years.](image)

Cervical Quadraparesis
Cervical Spine Injuries

Backboard and head position

Cervical Spine Immobilization

- Head and neck held still
- Helmet - remove face mask leave the helmet in place
- If helmet must be removed for the airway then remove cheek pads and carefully remove
- If the helmet is removed the shoulder pads will elevate the trunk - must account for this by keeping head and neck in a neutral position
Spondylolysis and Spondylolisthesis
Lumbar Spine

4 to 6% of the population
Most typically seen at L5
Spondylolysis and Spondylolisthesis

• Up to 47% of young athletes with low back pain
• 1/3 of gymnast and ballet dancers
• Also seen in weightlifters, down lineman, wrestlers, divers, etc.

Spondylolysis and Spondylolisthesis

• Pain with hyperextension
• Treat with stretching, core strengthening, and bracing
• Surgery rarely needed
• Most can return to sports
Spondylolysis and Spondylolisthesis
Lumbar Spine

4 to 6% of the population
Most typically seen at L5

History

- 13 y.o. mid back pain
- Posture is poor
- Aching pain after standing

Standing and Forward Flexion
Scheurmann’s

- Kyphosis and wedging of vertebral bodies
- Fixed - it is not passively flexible like postural round back
- Exercise for core strength
- Rarely brace or surgery
- Most common cause of structural kyphosis in adolescents

History

- 14 y. o boy with back and leg pain
- Acute onset with lifting weights
- Pain down both legs
- Pain with Valsalva
- Excellent pain relief with oral steroids but it has recurred off the medicine
- Hurts with forward flexion and hurts with sitting
- Hamstring tightness and positive Straight leg raise
Central Disc Herniation

Herniated Disc

- Uncommon in teenagers
- Rest
- Oral analgesics
- Injection
- If no improvement: surgery
History

- 16 year old down lineman
- Sudden “pop”
- Extreme pain on forward flexion
- Immediate Pain down both legs

Apophyseal End Plate Fracture
Apophyseal End Plate Fracture

- Adolescent Boys
- Associated with vigorous activity
- Symptoms and Signs are consistent with a herniated disc
- Disc Material and Fragment of Bone and Cartilage in the Spinal Canal
- Typically L4
- Most require operative intervention for pain relief
- Like herniated disc they are uncommon
History

- 14 y.o. girl soccer player with lower back pain
- Pain at night
- Postural Shift
- Limited Range of Motion

Radiographs
Osteoblastoma

History

• 12 y.o. girl with neck pain
• Constant
• Hurts everywhere
• Pain at Night
• Limited Neck Motion
• Neck Range of Motion is Limited
Radiographs

Bone Scan and CT Osteoblastoma
**History**

- 11 y.o. girl - acute onset of back pain
- No fever
- Constant
- Between shoulder blades
- Pain at night
- Hurts with forward flexion

**Idiopathic Disc Calcification**
Idiopathic Disc Calcification

- Often Abrupt Onset
- Nuclueus Pulposa calcifies
- Mild elevation ESR
- May have fever

- Treatment is Symptomatic