The Spine: Pathology and Rehabilitation

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Demographics

• Spinal pathology is seen across all demographics and age groups
  • Affects people throughout their lives
  • Number one reason for PT referral
  • Highest cost to employers
Functions of the Spine

- Establishes our posture
- Provides an attachment site for many muscles
- Transmits forces
- Protects the spinal cord
Spinal Anatomy

- 33 Vertebrae (Approximately)
  - 7 Cervical
  - 12 Thoracic
  - 5 Lumbar
  - 5 Sacral (fused)
  - 4 Coccygeal (fused)
Spinal Anatomy

- Posterior view
- Superior articular process
- Lamina
- Vertebral arch
- Spinous process
- Transverse process
- Body (centrum)
- Vertebral foramen
- Pedicle

(c) Posterior view
(d) Lateral view

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Spinal Anatomy

- Cervical lordosis
- Thoracic kyphosis
- Lumbar lordosis

- Curves of the spine help us to absorb shock!
Spinal Anatomy: Ligaments
Spinal Anatomy: Intervertebral Disc

- Nucleus pulposus
- Annulus fibrosus
- Vertebral endplate
Posterior Musculature of the Spine

- Semispinalis capitis and cervicis
- Spinalis thoracis
- Rotae
- Quadratus lumborum
- Intertransversarii
- Interspinalis
- Splenius capitis and cervicis
- Longissimus cervicis
- Iliocostalis cervicis
- Iliocostalis thoracis
- Longissimus thoracis
- Iliocostalis lumborum
Posterior Musculature of the Spine

Latissimus dorsi
Anterior Musculature of the Spine
Anterior Musculature of the Spine

- Serratus anterior
- Linea alba
- Transversus abdominis
- Internal oblique
- Rectus abdominis
- External oblique
- Aponeurosis of the external oblique
- Inguinal ligament (formed by free inferior border of the external oblique aponeurosis)
Pathologies: Spinal Stenosis

- **Stenosis**
  - Diameter of intervertebral foramen is decreased
  - **Management:**
    - Relief with flexion
Pathologies: Spinal Stenosis
Pathologies: Scoliosis

- Scoliosis
  - Lateral curvature
Pathologies: Spondylosis

- Spondylosis
  - Essentially OA of the spine
Pathologies: Spondylosis

Figure 2. X-ray of the neck (side view) showing cervical spondylosis
Pathologies: Spondylolysis and Spondylolisthesis

- Congenital weakness in *pars interarticularis*
- Associated with repeated spinal hyperextension
  - Gymnastics, dance, etc.
- Characterized by LBP
- Relief with flexion and modified activity
Spondylolysis and Spondylolisthesis
Spondylolisthesis

Grade IV Spondylolisthesis
75–100% Slippage
Treatment: Stenosis, Spondylosis, Spondylolysis/listhesis

- https://www.youtube.com/watch?v=zYVGQwYfsKU
- https://www.youtube.com/watch?v=T1FrBPVCtgE
- https://www.youtube.com/watch?v=-9XwclhuIcE
Herniated Disc

- Occurs with “fatigue failure” or traumatic rupture
- Difficult to heal
- Pain from increased pressure
  - Disc can no longer withstand compressive forces as well
Herniated Disc
Treatment: Herniated Disc

- Controlled rest
- Educate on positions to avoid/lifting mechanics
  - *Flexion and rotation!*
- Stability in area of herniation, mobility above and below!
- Postural re-education
- Goal is to have progressive centralization of symptoms!
Treatment: Herniated Disc

- https://www.youtube.com/watch?v=clfWjqVP6U
Core Training Options for Back Pain

- https://www.youtube.com/watch?v=zEvy5CCvNLA
Remember!

- If any exercise or activity that you are doing increases your back pain or related symptoms, **STOP!**
Questions?