DISCLAIMER

The information contained in this presentation is not intended as a substitute for professional medical advice, diagnosis or treatment. It is provided for educational purposes only. You assume full responsibility for how you choose to use this information.
Tips for a Healthy Spine

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No Conflicts of Interest
Outline for Today’s Talk

• Scope of the problem
• Basic spine anatomy
• What causes spine pain
• What can be done to manage spine pain
Back Pain is extremely common

Spine Anatomy
101
Anatomy

Lumbar Spine

Facet Joint

Disc

Vertebrae

Nerve Root
Anatomy

- Shock absorber
- Allows for bending and twisting motions
- Built like the sole of a sneaker
Anatomy

- Connection between neighboring vertebrae
- “Knuckles” of the spine
Anatomy

- Stacking blocks
- Shaped with a central hole
- These align to form the spinal canal
Common Causes of Pain
Common Causes of Pain – Disc Tears

- Pain with increased pressure on the disc
- Can be associated with sitting, coughing and sneezing
Common Causes of Pain – Facet Joint Arthritis

- Can be unilateral or bilateral
- Associated with stiffness
- Scoliosis can predispose
Common Causes of Pain – Pinched Nerve Herniated Disk
Common Causes of Pain – Pinched Nerve Herniated Disk
Ways of Avoiding Low Back Pain
There is a Genetic Component to Back Pain

The genetic component to back pain is independent of the activities that we do.
Don’t Be a Slouch

- Hold your stomach in
- Keep your head straight
- Starts in childhood

Sway Back  Lumbar Lordosis  Thoracic Kyphosis  Forward Head  Good Posture
Pressure on Discs Varies by Position & Activity
The neck is a fulcrum with the weight of the skull being the forces transmitted to the base of the cervical spine and shoulders.
Carrying a Bag

- Smith et al. Gait and Posture 2006
- 30 female students (22.4 +/- 2.2)
- 15% bodyweight backpack
  - Without backpack
  - Both shoulders
  - Unilateral shoulder
Carrying a Bag

Pelvic Tilt

Without

Unilateral Shoulder

14.5
15
15.5
16
16.5
17
17.5
18
18.5
19
19.5

Weill Cornell Medicine

NewYork-Presbyterian
How we lift affects pressures exerted on our spine discs

<table>
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<tr>
<th>Condition</th>
<th>0 kg</th>
<th>10 kg</th>
<th>20 kg</th>
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<tbody>
<tr>
<td>Squat- Bending Torque</td>
<td>13.1</td>
<td>17.1</td>
<td>19.2</td>
</tr>
<tr>
<td>Stoop- Bending Torque</td>
<td>23.4</td>
<td>30.2</td>
<td>34.3</td>
</tr>
</tbody>
</table>
Take a Load Off

• Don’t lift anything too heavy
• Kneel down and tighten abs
• Lift with legs, not your back
Rates of Chronic Lower Back Pain Increase with Body Mass Index

Prevalence of Lower Back Pain based on BMI

Distribution of Fat Also Plays a Role in Back Pain Prevalence

Prevalence of Lower Back Pain based on Waist Circumference

- < 34 in
- 34 to 37.7 in
- > 37.8 in

- Men
- Women
Smoking, in addition to a long list of other health offenses, restricts blood flow to the discs that cushion and support your spine.
Pilates and Back Pain


• RCT with 39 active patients with chronic LBP
• Specific Pilates group vs standard of care
• **Results**
  - RMDQ
    • Pilates (2.0) vs Control (3.2) p=0.023
  - Pain
    • Pilates (18.3) vs Control (33.9), p=0.002

• **Conclusions**
  - Treatment with a modified Pilates-based approach is more efficacious than usual care in a population with chronic low back pain
Yoga for Back Pain


- 967 patients with CLBP

**Results**
- Strong evidence for short-term effects on pain
- Back-specific disability
- Global improvement
- Yoga was not associated with serious adverse events.

**Discussion**
- This systematic review found strong evidence for short-term effectiveness and moderate evidence for long-term effectiveness of yoga for chronic low back pain
Good and Bad Spine Exercises

- Exercise is good for the lower back
- Not all are beneficial
- However:
  - Toe touches may increase stress on disc and ligaments
  - You CAN overstretch hamstrings
Try: Hamstring Stretches

- Lie on back and bend one knee
- Gentle stretch down the back of your leg
- Hold 15-30 sec
- 2-4 reps
Core Stability

Crunches
- Strengthen back and stomach
- Tighten abs
- Breathe out

Sit-Ups
- Strain Hip Muscles
- Pressure on the discs
Try: Press-up Back Extensions

- Lie on stomach
- Push with your hands
- Use elbows if needed
- Hold for several seconds
Try: Bird Dog

- Start on your hands and knees
- Tighten stomach muscles
- Lift one leg
- Try lifting and extending your opposite arm
- Low back stability
Try: Bridging

- Lie on back with knees bent
- Push your heels and squeeze buttocks
- Lift hips off the floor
- Avoid overarching
- Hold 10 seconds
Summary

• Back and neck pain are extremely common and not completely avoidable
• Maintaining a healthy diet and exercise program has been shown to reduce pain
• Flexibility and core stability become more important as we age
• While we cannot reverse time or pick our parents, rehabilitation specialists can prevent progression
Thank you!

Michael Sein, MD
Assistant Professor, Rehabilitation Medicine
Low Back Pain
Is Surgery the Answer?

Ali A. Baaj, MD
Assistant Professor of Neurological Surgery
Weill Cornell Medical College
How Common is Back Pain?

• 8 out of 10 in US suffer from low back pain
• Major cause of visits to doctors and the ER
• Major cause of missed work days
• Costs over $50 billion per year

Back pain is a big deal!
Why is Back Pain Common?

Spinal Column with Vertebrae

- Cervical Vertebrae (7)
- C₁ - C₇
- Thoracic Vertebrae (12)
- T₁ - T₁₂
- Lumbar Vertebrae (5)
- L₁ - L₅
- Sacrum (5 - fused)
- Coccyx (4 - fused)

Ouch!
Lower Back Anatomy

- 5 lumbar vertebra – *carries the weight*
- Disks – *act as shock absorbers*
- Joints/ligaments/muscles – provides mobility
- Nerves – control LE function/bowel/bladder/sexual function
Low Back Pain Diagnosis

• History
• Physical Examination
• Diagnostic studies
  • MRI, CT, X-rays
Low Back Pain Specific Causes

- Disk herniation/degeneration (spondylosis)
- Scoliosis
- Spinal infections
- Osteoporosis related spine fractures
- Trauma
- Tumor
Disc Herniation

Vertebral Body

Normal Disk

Herniated Disk
How Do I Know if I have a Herniated Disc?

- Unilateral leg pain > low back pain
- Radiates to foot or toes
- Numbness and tingling in leg or foot
- Sometimes after lifting something heavy or moving furniture
Prognosis

• 90% of pts with acute LBP will have stopped consulting their doctor within 3 mos (Croft BMJ 1998)

• 5% of pts with an acute episode of LBP develop chronic LBP and related disability (Koes BMJ 2006)

Most DON’T Need Surgery
## Risk Factors

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Occurrence/Chronicity</th>
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<tbody>
<tr>
<td>Individual</td>
<td>Age, obesity, weakness of back and abdominal muscles, smoking</td>
</tr>
<tr>
<td>Psychosocial</td>
<td>Stress, anxiety</td>
</tr>
<tr>
<td>Occupational</td>
<td>Lifting, bending</td>
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Low Back Pain Diagnostic Studies

- Plain x-rays – Flexion/Extension views
- Myelogram
- Post-myelogram CT scans
- MRI scans
- Bone scan
- EMG/NCV
- Discogram
- Selective Diagnostic Blocks
  - Nerve root blocks
  - Facet blocks
Radiographic Studies and LBP

- Boden et al studied 67 asymptomatic patients and found abnormalities in one third of patients

- Radiographic abnormalities in 40-50% of those without LBP
Low Back Pain Treatment

• Medical Therapy
• Non-surgical procedures
• Surgery
Low Back Pain Medical Therapy

• Assurance/Education
• Lifestyle Modifications
• Physical Therapy
• Medications
  • Non-steroidal
  • Steroidal
  • Muscle Relaxants
  • Pain medication
Low Back Pain Non-Surgical Procedures

- Injections
  - Epidural steroids
  - Facet Joint Injections
  - Nerve Root Injections
Injections

- Superior articular process
- Transverse process
- Medial branch of dorsal ramus
- Articular branches
Low Back Pain Surgical Treatment

• Highly successful when executed well on the right patient
• Accurate DIAGNOSIS is critical!
• Complications can be DEVASTATING i.e. Paralysis/Death
• Failed surgery – very difficult to correct
Low Back Pain Surgical Treatment

• What are the goals of surgery?
  1) Remove disc or bone that is compressing the nerve and/or
  2) Stabilize the spine with instruments (screws, rods)


ALIF Implants

- Threaded Cage (cylindrical and tapered)
  - Titanium (+/- BMP)
  - Threaded bone dowels
- Trapezoidal Implant
  - Allograft
  - Titanium
  - PEEK
Screws and Rods
Minimally Invasive Options
Minimally Invasive Options

360 pounds with disc

4 cm incision, almost no blood loss, 1 hour
Minimally Invasive Options

2 cm working channel

4 cm incision, 30 cc blood loss, 1 hr 20 mins
Conclusions

• Low back pain is COMMON

• Often resolves and no surgery is needed

• Your surgeon needs to explain to you WHY you need surgery

• Get 2\textsuperscript{nd} opinions – ask for less invasive!