Medical Spine Care of the Low Back & Neck

Michael C. Geraci, Jr., MD PT
Medical Director, Owner, Geraci Spine and Sports Medicine
Clinical Associate Professor
SUNY @ Buffalo, School of Medicine and Biomedical Sciences
Michigan State University, College of Osteopathic Medicine
Overview

What is Physiatry?
- Physical Medicine and Rehabilitation
- Medical Spine
- Sub-Specialty - Sports Medicine
American Board of Medical Specialties
24 different medical specialties/subspecialties

- American Board of Physical Medicine and Rehabilitation
  - Brain Injury Medicine
  - Hospice and Palliative Medicine
  - Neuromuscular Medicine
  - Pain Medicine
  - Pediatric Rehabilitation Medicine
  - Spinal Cord Injury Medicine
  - Sports Medicine
Low Back Pain is:

- The most common reason for lost days from work
- The most common reason for doctor visits
- Estimate cost: > $100 Billion/year
Contributing Factors

- Compression loads
- Full lumbar flexion
  - 2-4,000 flexions & only 200 extensions/day*
  *McKenzie Institute
- Full flexion to full extension
- Shear forces
Contributing Factors

- Slips & falls
- Sitting
- Seated vibration
Contributing Factors

The questions that need to be asked:

What is true biological aging vs. the consequence of personal lifestyle choices?

**Risk factors:** What are they?

- Sedentary lifestyle
- Poor nutrition
- **Smoking** (5X more Neck & 4X more Low Back Pain)
- Family history
Contributing Factors

Risk factors: What are they?

- Chronically underweight
- Drinking > 3 caffeinated beverages/day
  - *(Do we ask our patients?)*
- Prolonged steroid use
- Early or surgical menopause < 45 years
- No weight training
Alf Nachemson *JBJS (am)*, 1964
Can we recommend this?

No!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Flexibility - Is it important in spine rehabilitation?

- Little evidence to support flexibility for LBP prevention and improve back health
- Some have negative results
  - (Nachemson 1992, Biering-Sorenson 1984)
- More important to stress flexibility at hips, knees, foot & ankle with stability at spine level
Current Research Knowledge on Aging

What we have learned from space travel

- 1 week = 2-3% muscle atrophy
  > 1 year of spinal aging

- One month bed rest = 5-6 years of spinal aging
Bigger Muscles = Better Bones
Current Research Knowledge on Aging

A large 20-year study showed that engaging in *even one* of these Major Agers – can boost the risk of early death by 80%

- Smoking
- drinking too much alcohol
- eating a poor diet
- skipping exercise

Functional Anatomy and Biomechanics for the Layperson

University of Waterloo – Stuart McGill’s Lab
McGill - Spine Biomechanist

**Disc**
- less shock absorption than previously thought

**Muscles and trabecular bone columns**
- best shock absorbers

**Disc annular tears**
- result of micro-fractures of trabecular columns when axial loads are placed on the spine
McGill - Spine Biomechanist
Disc herniation > 25,000 flexions
Primary Muscle Stabilizers:
- Quadratus lumborum
- Rectus abdominis, external obliques, internal obliques, and transverse abdominis
- Erector spinae
Scientific Evidence for Disc Reduction with an Extension Protocol

- 18 Porcine discs axially compressed and repeatedly flexed (flexion or 30° to SP)
- 11 discs: herniation occurred in opposite direction along bending axis
- *Reduction in 5 of 11 specimens with repeated extension*
- Key characteristics of discs that reduced
  - ✓ Maintenance of at least 70% of disc height
  - ✓ Centrally located herniation

Motor control - most important factor in stabilizing the spine

Sufficient stability - co-contraction of spine stabilizers
  - Controlled by CNS when needed
  - At a subconscious level

3-4% of MVIC for ADL’s
10-20% of MVIC for athletic/work/life-style activities

Avoid sitting > 50 minutes at one time
  - Get up every 30 minutes
Avoid bending forward
  - If you can’t – bend backward after you bend forward
Avoid twisting the spine
  - Twist through your hips
Avoid just bending your knees when you lift
  - Learn a hip-hinge and keep you spine in neutral
Squats with Hip-Hinge
Full prone press-up


**Prone Hyperextension has been shown to reduce disc herniations and re-hydrate discs**
Cervical retraction followed by extension

Dionne CP, Bybee RF, Tomaka J Physiotherapy 2006;92(2) 2006:75-82


McKenzie RA. The Cervical and Thoracic Spine: Mechanical Diagnosis and Therapy. Waikanae, New Zealand; 1990

Not this type of extension
Lower Trap Activation Seated
“Elbows to Back Pockets”
Modified Kibler/Press *(add thumbs to back of shoulders)*
*High activation of LT and low activation of UT*
History

- Can we classify pain types from a history?
  - Does it matter?
- Did you fill out a pain drawing?
- Did you point to where your pain is?
- Do we listen to our patients?
- What are the patients' 2 most important functional goals?
- Can the patient history tell us what the diagnosis is?
Typical Neck  Chronic Pain  Typical LBP

Case 4. Cervical central disc herniation

23-year-old male with what was characterized as “burning” pain.
Physical Examination

What findings on physical exam are helpful?
- Movements that provoke or peripheralize the symptoms
- Movements that reduce or centralize the symptoms
- SLR (Straight Leg Raise)
  - Crossed SLR
  - < 20 degrees
- Lumbar Shift
- Weakness (only 3-5%)
  - Progressive weakness (< 1%)
- Bowel/Bladder Incontinence (1:1 Million)

Why do so many physicians not examine patients anymore?
Differential Diagnoses

- Disc Herniations
- Spinal Stenosis
- Why are sprains and strains so common but not very important?
- What are all the S’s about?
  - Spondylosis (Spondylosis Deformans)
  - Spondylolysis (Pars stress reaction and stress fracture)
  - Spondylolisthesis (Degenerative vs Grade I-V Isthmic)
  - Spondylitis (Sero-positive v Sero-negative)
  - Spondyloarthropathy (Ankylosing Spondylitis and others)
  - Scoliosis (Idiopathic v Degenerative)
  - Stenosis (Congenital v Acquired)
    - Cervical (With or Without Myelopathy)
    - Lumbar (Central, Lateral Recess and/or Foraminal)
Imaging Studies

- Did your physician look at these studies before or after they saw you?
- When are they indicated?
- Do we find more than we bargain for?
Treatment Options

A Stepwise Approach - Where do we start?

- Exercise
  - Directional Preference
  - Motor Control
  - Stability
  - Endurance
  - Preventative
Bridges and Planks

*High muscle activation/low spinal load*

Not superman’s because of high muscle activation but high spinal load (almost 2X the load)
Free Weights and Kettlebells
Which exercise is a better abdominal/core exercise?

a. sit-up on ball or
b. stir the pot
This does not necessarily result in stability
Isolated muscle development leads to definition not function
Treatment Options

- Ice and Heat
- Oral Medications
  - NSAIDs
  - Steroids
  - Muscle Relaxants
  - Narcotics
Medications: NSAID’s/OTC - Caution

- No evidence they help Lumbar Stenosis
- 17,000 deaths/yr. (NSAID’S)
- 10% of liver transplants (acetaminophen)
  - 50% of liver transplants in UK
- IB & acetaminophen both block inflammatory response necessary for weight training strength gains
Cost of Low Back Pain: What costs the most?

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narcotics</td>
<td>$630,000</td>
</tr>
<tr>
<td>In-patient admissions</td>
<td>$318,500</td>
</tr>
<tr>
<td>Magnetic resonance imaging</td>
<td>$301,500</td>
</tr>
<tr>
<td>Surgery</td>
<td>$226,000</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>$141,000</td>
</tr>
<tr>
<td>Plain x-rays</td>
<td>$105,000</td>
</tr>
<tr>
<td>Physical therapy</td>
<td>$90,942</td>
</tr>
<tr>
<td>CT scanning</td>
<td>$46,700</td>
</tr>
</tbody>
</table>

* Four percent of 126,181 members had a documented back care encounter over the six-month period.

Source: DeGrazia et al., 2000; and Ursiny et al., 2000.
Treatment Options

Invasive Procedure: What are the Options?

- Injections: Is there a difference?
- Fluoroscopic (x-ray guided) vs Blinded

Surgery

- Do we have evidence that patient outcomes are better if Physical Therapy follows invasive procedures?
Blinded Epidural Steroid Injections

- Blinded epidurals are limited to interlaminar and caudal approaches - 36-40% miss rate and lower success rates
Future Considerations

Regenerative Medicine
- Is there a role?

Platelet Rich Plasma (PRP)
- Intradiscal

Stem Cell Therapy
- Adipose Derived Stem Cells
- Bone Marrow Concentrate
- Combination of the two
What can you do for Prevention?

- Continue your exercises even when you are 100% better
  - Twice a day and as needed
  - This reduces your chance of recurrence in the first year from:
  - 80% to only 10%

- Avoid or limit risk factors

How can you decide on treatment options?

- Know the indications of each treatment
- Know the risk/benefit ratio of each treatment
Summary/Take Home Points

How can you be your best advocate?

- Know the natural history of your condition
- Ask yourself these 3 questions
  - Am I able to perform the requirements of my work?
  - Am I able to perform sports and life-style activates?
  - Will this suggested procedure offer me a reasonable chance for success in doing my work, sport or life-style activity if I am currently not able to do them?

Where do we go from here?
What is this?

Yoga + Pilates = Yogalates
What is the latest from L.A. Gyrotonics
DRX-9000 Eliminates LBP?
Exercise and Nutrition: David after a 20 city U.S. tour
Which David would you rather treat?
Exercise vs This?
The End

Thank you!
Key References

Key References

Key References

Key References

References

References


References

References

References