Occupational Back Pain:
Controversies, Evidence, Experience

John C. Keel, M.D.

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Disclosure

I have no financial interests or relationships to disclose.
Disclosure: Off-Label Use

Off-label use of treatments will be discussed.

“Disclosure”

“Doctors With a Special Interest in Back Pain Have Poorer Knowledge About How to Treat Back Pain”

*Spine 2009; 34 (11);1218-1226*
Educational Objectives

Summarize and discuss physical management of painful spine disorders

Evaluate evidence regarding interventional spine treatments

Evaluate occupational back pain guidelines

Physical Medicine and Rehabilitation

Spine Doctors
Physiatry is PM&R

Phys or physis
+ latros or iatreia
= Physiatrist

The term "physiatrist" was proposed by Frank H. Krusen at the Mayo Clinic in 1939.

How did Krusen say Physiatrist?

Johnson E. PM&R: Where We Have Been, Where We Are Heading. PM&R. Volume 1, Issue 1, Pages 3-4 (January 2009).
Fizzy actress
Fizzyatress
Physiatrist!
**PM&R is the specialty of function, injury and disease of the neuromuscular-musculoskeletal and whole-person continuum.**

**PM&R knowledge base is a crossroads:**

- Development of this knowledge base is the history of PM&R
- Allows patients to be sent down the appropriate pathway
- This is why we are a good place to start for aches and pains
What is PM&R? History

Early 1900s
- Physicians who used physical modalities developed the field
- First physical medicine association was formed by radiologists
  - American College of Radiology and Physiotherapy (1923)
- Also reflected in the name changes of the main PM&R journal
  - Archives of Physical Therapy, X-ray and Radium
  - Archives of Physical Therapy
  - Archives of Physical Medicine
  - Archives of Physical Medicine and Rehabilitation

1917 MAJ Frank B. Granger, Medical Corps director of the physiotherapy service
- "Reconstruction units" were set up in
  - 35 general hospitals and 18 base hospitals throughout the United States
- Graded exercise treatment
- Many patients could return to full duty

1943, WWII
- Baruch Committee, focused on plans to rehabilitate soldiers
- Philanthropic organization, sponsored physiatry programs at universities

1945
- Section on Physical Medicine and Rehabilitation was established in the American Medical Association

1947
- American Board of Physical Medicine (ABPM) was recognized

1949
- Name changed to American Board of Physical Medicine and Rehabilitation

1930s, 40s, 50s
- Polio epidemic
PM&R is highly applicable to spine disorders, as well as sports and other musculoskeletal disorders.

especially in the occupational setting

New England Baptist Spine Center


The Effect of Required Physiatrist Consultation on Surgery Rates for Back Pain

Study Design. Prospective trial with insurance database and surveys.

Objective. This study was developed to determine whether an insurer rule requiring physiatrist consultation before nonurgent surgical consultation would affect surgery referrals and surgery rates.

Summary of Background Data. Spine surgery rates are highly variable by region and increasing without evidence of a concordant decrease in the burden of disease. Efforts to curb misuse of surgery have not shown large changes, especially across different provider groups. As nonsurgical spine experts, physiatrists might provide patients with a different perspective on treatment options.

Methods. In 2007, the insurer required patients with nonurgent spine surgical consultations in a geographic region to first have a single visit with a physiatrist, who received extra compensation for the assessment. Surgical consultation and surgical rates results were compared between 2006–2007 and 2008–2010. An automated telephone survey of patients evaluated by physiatrists was performed to assess patient satisfaction.

Results. Physiatry referrals increased 70%, surgical referrals decreased 48%, and the total number of spine operations dropped 25%, with concomitant decreased overall cost. Although spinal fusion rates dropped, the percentage of fusion operations increased from 55% to 63% of all surgical procedures. Of 744 patients surveyed (48% response rate), 74% were satisfied or very satisfied with the physiatry consultation. Only 46% of patients who underwent previous spine surgery were satisfied. Although surgical rates decreased at all regional hospitals and all surgical groups, there were substantial shifts in market share.

Conclusion. Mandatory physiatrist consultation prior to surgical consultation resulted in decreased surgical rates and continued patient satisfaction across a large region.


Patients had more appropriate care

Patients benefit

As nonsurgical spine experts, physiatrists might provide patients with a different perspective on treatment options.

Payors benefit
Back Pain
Scope of the Problem

Back Pain: An Important Problem!

• 60-90% lifetime incidence
• 5% annual incidence
• Among the top three symptomatic reasons for visits to a physician
• Among top causes for surgery, hospitalization
• Among top causes of disability

Disability and Low Back Pain

#1 Reason for disability, under age 45

#3 Reason for disability, other ages

1% of population is disabled due to LBP

Associated with ~25% of workers’ comp


Back Pain

• Reported 30% adult population in two national health surveys

• The most common physical condition for which patients visit their doctor

• 2004: 15% of the U.S. population visited their physician with a complaint of back pain

• 2004: 40.5 million persons sought medical treatment for low back pain

Occupational Back Pain

- Patient factors
- Workplace factors
- Return to work
- Prevention

Disc pressure

Prognosis for Low Back Pain

• 90% resolve 6-12 weeks without treatment
• 40-50% resolve in the first week
• 75% of radiculopathy can resolve in 6 months

Prognosis for Low Back Pain

Saul & Saul 1989 Spine:
• >90% symptom reduction with non-surgical treatment
• includes improvement in weakness

Bozzao 1992 Radiology:
• MRI study on disc herniations, 63% had >30% reduction, 48% had >70% reduction

126 patients randomized to surgery vs nonsurgery for disc herniation
• surgical group improved faster
• no difference after 5 years
• all improved, including weakness

Lumbar disc herniation. A controlled, prospective study with ten years of observation. Weber H.
Back Pain Evaluation, Anatomy and Imaging

What hurts in the back?

Rathmell JAMA May 7, 2008—Vol 299, No. 17

Back: Leg
Spine structures that sense pain:

Bogduk’s Postulates: What really hurts

1. The structure must have a nerve supply.
2. The structure should be capable of causing pain similar to what is clinically observed (e.g., when provoked in normal volunteers).
3. The structure should be susceptible to painful disease or injury; such disorders should be detectable by clinical, imaging, biomechanical or post-mortem tests.
4. The structure should be shown to be a source of pain in actual patients, using reliable and valid diagnostic tests.

Radicular referral:

dermatomes

sclerotomes
Trochanter is L4/5

Radicular referral:

Facet referral:

FIGURE 2
Facet referral:

Myofascial Referred Pain

Sprain/Strain

<table>
<thead>
<tr>
<th>Ligament Type</th>
<th>Location</th>
<th>remarks</th>
<th>Function</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior longituendal ligament</td>
<td>Cervical to sacral</td>
<td>Increases tension</td>
<td>Stabilizes lordosis</td>
<td>Restricts listhesis</td>
</tr>
<tr>
<td>Posterior longituendal ligament</td>
<td>Cranial to sacral</td>
<td>Increases tension</td>
<td>Resists flexion</td>
<td>Reinforces posteromedial disc</td>
</tr>
<tr>
<td>Ligamentum flavum</td>
<td>Cervical to lumbar</td>
<td>Bifid</td>
<td>Resists distraction and flexion</td>
<td>See text</td>
</tr>
<tr>
<td>Interspinous ligament</td>
<td>Adjacent spinous processes</td>
<td>Bifid</td>
<td>Resists distraction and flexion</td>
<td>Lumbar is most developed</td>
</tr>
<tr>
<td>Supraspinous ligament</td>
<td>Crosses spinous processes</td>
<td>Terminates inferiorly at L4 to L5, L5 to S1</td>
<td>Resists distraction and flexion</td>
<td>Lumbar is most developed</td>
</tr>
<tr>
<td>Iliolumbar ligament</td>
<td>See separate table</td>
<td>False ligaments</td>
<td></td>
<td>Many ligaments</td>
</tr>
</tbody>
</table>
### Sprain/Strain

<table>
<thead>
<tr>
<th>Portion</th>
<th>Origin</th>
<th>Insertion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior</td>
<td>Anteroinferior border and tip of L5 transverse process</td>
<td>Ilium</td>
</tr>
<tr>
<td>Superior</td>
<td>Thickening of anterior and posterior quadratus lumborum fascia and anterosuperior L5 transverse process</td>
<td>Ilium</td>
</tr>
<tr>
<td>Posterior</td>
<td>Tip and posterior L5 transverse process</td>
<td>Ilium</td>
</tr>
<tr>
<td>Inferior</td>
<td>Lower L5 transverse process and L5 body</td>
<td>Superior and posterior iliac fossa</td>
</tr>
<tr>
<td>Vertical</td>
<td>Anteroinferior border of L5 transverse process</td>
<td>Iliolumbar ligament</td>
</tr>
</tbody>
</table>

### Sprain/Strain

<table>
<thead>
<tr>
<th>Superficial to deep:</th>
<th>Individual muscles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinotransversales:</td>
<td>Splenius capitus</td>
</tr>
<tr>
<td></td>
<td>Splenius cervicis</td>
</tr>
<tr>
<td>Erector spinae:</td>
<td>Iliocostalis</td>
</tr>
<tr>
<td></td>
<td>Longissimus</td>
</tr>
<tr>
<td></td>
<td>Spinalis</td>
</tr>
<tr>
<td>Transversospinal:</td>
<td>Semispinalis</td>
</tr>
<tr>
<td></td>
<td>Multifidus</td>
</tr>
<tr>
<td></td>
<td>Rotatores</td>
</tr>
<tr>
<td>Intersegmental:</td>
<td>Interspinalis</td>
</tr>
<tr>
<td></td>
<td>Intertransversarius</td>
</tr>
</tbody>
</table>
“Wear and tear” in the spine

It's part of the human condition
Imaging for Low Back Pain

**Indications**
- various guidelines exist

**Modalities**
- MRI
- CT
- X-ray, “transillumination of the spine”

Pitfalls for imaging

**False positives**

**Incidental findings**

**Patients should not read their own reports without “supervision”**
Imaging is not always right!

X-rays: no pain, yet 25% “abnormal”
Myelogram: no pain, yet 24% “abnormal”
Hitselberger 1968 J of Neurosurgery

CT: no pain, yet 36% L4/5, L5/S1 “abnormal”
Weisel 1984 Spine

MRI: no pain, 20% <60 yrs, 36% >60 yrs had disc “abnormality”
Boden 1990 JBJS:

MRI: no pain, yet 52% have “disc bulge”
27% have “disc protrusion”
1% have “disc extrusion”
MRIJensen 1995 NEJM:

It's how you're doing that counts!

What are we going to do with this information?

Ask before medical testing

We take great care to appropriately use imaging
Occupational Back Pain: PM&R Treatment Options
Maximizing Function

Options for spine pain?

Broad range:

Doing “nothing”
Physical treatments, therapy
Modalities
Exercise
Orthoses, assistive devices
Medications
Imaging and other tests
Spine injections and other minimally invasive procedures....
“Nothing”

Maintain fitness and activity as tolerated
“Pain” is not “harm”

Maintain general health, weight
DISH
lipomatosis

Don’t smoke

Exercise is my #1 favorite prescription!

*Exercise is a panacea!
Activity is recommended

Spine degeneration is not reason to limit activity

Aggressive therapy program

Not pain-contingent

Resistance exercise, quota-based

Flexibility

Functional tasks
Exercise

1. **Eliminate back impairments**
   Flexibility, strength, endurance

2. **Reduce back pain intensity**
   10-50%

3. **Reduce back pain-related disability**
   Desensitizing
   Overcoming fear/avoidance

“Pain” is not always “harm”

*It just isn't*
Modalities

Passive treatments

*E.g.*, heat, cold, TENS, traction, braces and orthoses, *etc.*

No substantial scientific evidence

Medications

Acetaminophen  
Tylenol

NSAIDs (anti-inflammatories)  
Motrin  
Aleve
Favorite medication recommendation

1. Acetaminophen in combination with
2. NSAIDs (anti-inflammatories)

Both at over-the-counter dosing
Used on as-needed basis

Favorite recommendation Evidence

The efficacy of pain control following nonsurgical root canal treatment using ibuprofen or a combination of ibuprofen and acetaminophen in a randomized, double-blind, placebo-controlled study.

International Endodonic Journal, 37, 531-541, 2004

The results demonstrate that the combination of ibuprofen with acetaminophen may be more effective than ibuprofen alone for the management of postoperative endodontic pain.
Favorite recommendation
Evidence

Combined acetaminophen and ibuprofen for pain relief after oral surgery in adults: a randomized controlled trial


Maxigesic tablets provide superior pain relief after oral surgery to acetaminophen or ibuprofen alone.

Another favorite recommendation

Meloxicam: Selective COX-2 Inhibition in Clinical Practice.

Other medications

Narcotics
Muscle relaxants
Neuropathic pain medications

Spine Injections

Putting a pain relieving medicine on the place that hurts in the spine

A stepwise approach, for diagnosis as well as treatment

May often be a process of elimination, several treatments over a few months
Lumbar Epidural Steroid Injection

Places the medication in the space around the nerves

Purpose is to target leg symptoms

Other terms: Nerve block

**Purpose:** determine the effectiveness of ESI in obviating the need for an operation in patients with lumbar radicular pain who were otherwise considered to be operative candidates

No prior prospective, randomized, controlled, double-blind studies demonstrating their efficacy (*Level 1*)

**Method**

- Fifty-five patients (55)
- Referred to four spine surgeons because of lumbar radicular pain
- And who had radiographic confirmation of nerve-root compression
- And all patients initially requested surgery
- Randomized and referred for a selective nerve-root injection
  - Bupivacaine alone
  - Or bupivacaine with betamethasone
  - Received as many as four injections
Results

Follow-up 13-28 months

29 of 55 patients did not elect surgery following injection (52%)

Bupivacaine alone:
• 9 of 27 elected no surgery (33%)
• 18 elected surgery (67%)

Bupivacaine and steroid:
• 20 of 28 elected no surgery (71%)
• 8 elected surgery (29%)

The difference in the operative rates between the two groups was highly significant (p < 0.004).

Study Conclusions

Injection with corticosteroids are significantly more effective than those of bupivacaine alone in obviating the need for a decompression

Patients who have lumbar radicular pain at one or two levels should be considered for treatment with SNRB/ESI with corticosteroids prior to being considered for operative intervention
My Comments

Does not state how many were screened to get participants – selection bias?

Injection method: was it a SNRB? Consistent?

How reliable is the method of blinding the injector?
  - Volume different
  - Color obvious

The injectate volume difference:
  - Greater spread
  - Reduced concentration of local by 50%

My Comments

Good responses for both:

Stenosis

Herniated disc

*Back pain* responded in both groups!

Multiple injections needed.

Some effect from anesthetic alone.
Lumbar Facet Injection

Places the medication in or around the spine joints

Purpose is to target symptoms in the back itself

Other terms: Medial branch block, radiofrequency ablation

3. L4/5, L5/S1 intra-articular facet injections and arthrograms, < 0.1 mL contrast.
Left L4 medial branch nerve block, demonstrating extent of flow of 0.1 mL contrast. The outline of the mamillary process is seen.

Facet joint injections and RF: Evidence

Acknowledgement: ISIS educational materials
Facet pain prevalence

Prevalence of facet joint pain in chronic low back pain is 15-40% as shown by valid controlled diagnostic blocks

Manchikanti, BMC Musculoskeletal Disord 2004; 5:15

Medial branch blocks are a valid test

• Target specificity has been established

• Physiological effectiveness has been established via an experimental, randomized placebo controlled trial

Dreyfuss Spine Dreyfuss. 1997; 22:895
Kaplan, Dreyfuss. Spine 1998; 17:1847
Bogduk’s Postulates

1. The structure must have a nerve supply.
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Medial branch blocks are a valid test

• A series of blocks averts false positives
• This is the best way to simulate the effect of radiofrequency ablation (RF)
• RF is thermal coagulation of the afferent nerve (medial branch) in order to prevent the conduction of nociceptive impulses

Dreyfuss Spine Dreyfuss. 1997; 22:895
Kaplan, Dreyfuss. Spine 1998;17:1847
Radiofrequency is better than placebo

- 3 valid randomized, placebo-controlled trials and valid prospective descriptive studies all of which demonstrate positive results

- 47-80% success rate of medial branch RF neurotomy

Valid RCTs

Valid Descriptive Studies


My Comments

Medical evidence is still limited, and it is an area for study

Controversies

Official Disability Guidelines (ODG)

Very unfavorable towards *interventional spine care*

However, clinical experience and more complete evidence is favorable....
Thank You!

John C. Keel, M.D.

DoctorKeel.com

jkeel@nebh.org