Degenerative MRI Changes and Back Pain: What’s the Correlation?
Dean Chou, M.D.
Associate Professor of Neurosurgery
The UCSF Spine Center

Disclosure

- I have the following relationship to disclose:
  - Honorarium: Depuy, Globus

- I will not discuss off label use and/or investigational drugs in my presentation.

The dilemma

- 80% of Americans have back pain at some point in their lives
- That is 240 million people!
- For 95% of these people, surgery is not appropriate and will not make them better
Back pain: the numbers

- Second most common symptom-related visit to a physician.
- More than ¼ of patients with back pain state that it disrupts their activities.
- Can happen at any age.

Treatment sought

- Fewer than 5% of patients with back pain are surgical candidates.
- However, nearly 50% of patients with back pain believe that surgery is the only cure.

Back pain: costs

- In the USA, direct and indirect costs of low back pain are estimated to be $90 Billion per year.
- It is estimated that 5 percent of back pain patients account for 75% of the costs.

More numbers: opioid Use

- Americans constitute 4.6% of the world’s population
- Yet, we use 80% of the global supply of opioids!

- Pain Physician: May/June 2009: 12:507-515

The Million Dollar Question: Where is the pain coming from?

- Muscle?
- Disc?
- Facet?
- Nerve?
- Bone?
- Ligaments?
- Psychogenic???

“Fixable” degenerative causes of back pain

- Lumbar stenosis
- Disc herniation
- Spondylolisthesis
- Positive sagittal balance
- Flatback syndrome
- Coronal imbalance
- Adult scoliosis
“Unfixable” causes of back pain
- No structural abnormality or instability
- Able to stand upright and erect with good sagittal, coronal balance, pelvic incidence matching lumbar lordosis, and pelvic tilt less than 25 degrees
- True “back” pain, not buttock pain secondary to nerve compression

What about degenerative changes?
- Do they cause pain?
- If we treat these changes, do we get rid of the back pain?

Controversial: discogenic pain
- “Disc pain”
- “Degenerative disc disease”
- “Bulging disc”
- “Unhealthy disc”

Part of normal aging process.
New England Journal Study

- Many people without back pain have disk bulges or protrusions
- 64% of patients with no back pain have an abnormal MRI
- Magnetic resonance imaging of the lumbar spine in people without back pain.

Early systematic review

- "Surgery may be more efficacious than unstructured nonsurgical care for chronic back pain but may not be more efficacious than structured cognitive-behavior therapy"
- Cited 4 prospective, randomized trials:
  - Fritzell, Fairbank, Brox 2003 and Brox 2006

Consider, though

- Fairbank et al had 38 patients with spondylolisthesis (11%)
Consider, though

- Fritzell paper included patients with leg pain


Caveat to Mirza review

- Both Fritzell and Fairbanks—which included leg pain and causes of leg pain—showed improvement with surgery

- Both Brox et al studies, 2003 and 2006, completely excluded any leg pain or radiculopathy.
- No difference was found between fusion and cognitive behavior therapy and exercise.

Mirza review breakdown

- Take out deformity, instability, & neural compression, and there is no benefit to surgery.

Latest systematic review

Degenerative magnetic resonance imaging changes in patients with chronic low back pain - a systematic review.

Chou D, Samartzis D, Mataraba C, Patel A, Luk KD, Kisser JM, Skelly AC.


How is this systematic review different from Mirza review?

- Excluded any leg pain (Mirza included leg symptoms)
- Inclusion criteria was MRI only (Mirza review included non-MRI imaging and discography)
- Evaluated surgical treatment of MRI changes only, not other diagnostic tests for back pain (Mirza included treatment after discography, CT, or just x-ray).
Degenerative MRI Changes and Back Pain/Dean Chou, MD

Degenerative magnetic resonance imaging changes in patients with chronic low back pain: a systematic review.

1) In the absence of deformity or symptomatic neural compression, are MRI findings of degenerative disease (such as degenerative disc disease or facet arthropathy) associated with back pain?

2) In the absence of deformity or symptomatic neural compression, is surgical treatment of MRI findings of degenerative disease associated with different outcomes compared to non-surgical treatment?

Question 1

- 477 citations were identified
- 446 were excluded by abstract
- 31 were retrieved to undergo full text review
- 26 articles were excluded

Question 2

- 341 citations were identified
- 311 were excluded by abstract
- 30 were retrieved and to undergo full text review
- all 30 articles were excluded
5 papers—Question 1

- Two reports (Kjaer, Bendix) were population based and evaluated the same Danish population sample
- Two studies selected subjects based on occupation, (Visuri, Savage)
- One study provided no information on study sample selection. (Paajanen)

Kjaer 2005 Spine

- Danish study
- Every 9th 40 year old was solicited for study
- Back pain in last year
- Strong association with LBP in last year and modic changes
- Less strong association with high intensity zone, annular tears, irregular nucleus, disc bulges

Bendix 2008 Spine

- Same population cohort as Kjaer
- Evaluated black, grey, and normal discs and relation to back pain
- Found statistically significant increase in back pain with patients with black disc.
- Grey discs had no relation to back pain
Visuri 2005 Military Med

- 108 Military recruits (men 18-26) with back pain
- 90 asymptomatic recruits
- 12 weeks back pain minimum
- 62% disc changes in back pain patients
- 34% in asymptomatic patients

Savage 1997 Eur Spin J

- UK study
- 149 working men
- Car workers, ambulance drivers, office workers, hospital porter and brewery draymen
- MRI done (34% no back pain)
- 1 year later, repeated MRI on 89 men
- No relationship between LBP and disc degeneration (more degen seen in older patients)
- 32% of asymptomatic patients had abnormal MRI
- 53% of back pain patients had abnormal MRI

Paajenen 1997 Arch Ortho Trauma Surg

- Retrospective
- Back pain 12 weeks
- Back pain patients with degen lumbar discs: 59%
- No pain patients with degen lumbar discs: 44%
Degenerative MRI Changes and Back Pain

Odds of chronic low back pain given the presence of MRI evidence of disc degeneration.

Degenerative Magnetic Resonance Imaging Changes in Patients With Chronic Low Back Pain (CLBP)

- Although there may be an association between degenerative MRI changes and CLBP, it is unknown if these estimates accurately represent the association
- There is insufficient evidence to support the routine use of MRI in patients with CLBP

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Morbidity of the MRI

- Patient labelling
- Convinced “changes” are the cause
- Seek subspecialists, potentially seeking unnecessary surgery
- Patient feels substandard care of MRI is not obtained

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Degenerative MRI Changes in Patients With Chronic Low Back Pain (CLBP)

- There are no data evaluating the efficacy of the surgical treatment of degenerative MRI changes.
- Surgical treatment of CLBP based exclusively on MRI findings of degenerative changes is not recommended.

- Degenerative magnetic resonance imaging changes in patients with chronic low back pain: a systematic review.
- Chou D, Samartzis D, Bellabarba C, Patel A, Luk KD, Kisser JM, Skelly AC.

Why do some patients do great with “fusion for back pain?”

- Back pain may not be true back pain, but buttock pain.
- Fusion matched pelvic incidence and lumbar lordosis, lowered pelvic tilt.

- 71 yo female with back & leg pain. More back than leg.
- Worse back pain with standing, diminishes dramatically when laying down.
- Healthy.
- Neuro stable.
Pelvic tilt 45 degrees

Pelvic tilt 20 degrees

L2 to ilium.

Is it really fusion for back pain?
### Why is this important?

- Payors are evaluating fusion for back pain.
- The federal government is evaluating Medicare claims for fusion for back pain (AHRQ).
- We need to show that when we fuse a patient, there is an underlying medical reason and data supporting benefit.

### Conclusions

- End plate modic changes may be associated with back pain, but also occur in the absence of back pain.
- Routine MRI's are not useful, and they carry a "morbidity".
- It's important to identify any deformity or up-down stenosis in any back pain patient (ask them to point to where the pain actually is).

### Conclusions

- "Successful" cases of fusion for back pain, may actually be because of nerve compression alleviation, restoration of lumbar lordosis and concomitant decrease in pelvic tilt, or placebo effect.
- Fusion for back pain should be implemented with extreme caution and rigorous patient selection.
Thank you!