Sorting out a work injury: Spine

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I have no conflicts to disclose
Outline

1. Background information/spine problems
2. What might be a pre-existing condition
3. Potential work injuries/relationship with pre-existing condition
4. Case examples
5. Treatment options
Work injuries are tough to treat

1. Often goals are not aligned between the worker and the employer
2. There can be “hard feelings”
3. Litigation
4. Job satisfaction**
5. Worry/anxiety about return to work
6. How do we measure success in this population?
7. Some of my observations
Long-term outcomes of lumbar fusion among workers' compensation subjects: a historical cohort study.

Nguyen TH, Randolph DC, Talmage J, Succop P, Travis R.

Source
Division of Epidemiology and Biostatistics, Department of Environmental Health, University of Cincinnati College of Medicine, Milford, OH, USA. dococcmed@aol.com

Abstract

STUDY DESIGN:
Historical cohort study.

OBJECTIVE:
To determine objective outcomes of return to work (RTW), permanent disability, postsurgical complications, opiate utilization, and reoperation status for chronic low back pain subjects with lumbar fusion. Similarly, RTW status, permanent disability, and opiate utilization were also measured for nonsurgical controls.

SUMMARY OF BACKGROUND DATA:
A historical cohort study of workers' compensation (WC) subjects with lumbar arthrodesis and randomly selected controls to evaluate multiple objective outcomes has not been previously published.

METHODS:
A total of 725 lumbar fusion cases were compared to 725 controls who were randomly selected from a pool of WC subjects with chronic low back pain diagnoses with dates of injury between January 1, 1999 and December 31, 2001. The study ended on January 31, 2006. Main outcomes were reported as RTW status 2 years after the date of injury (for controls) or 2 years after date of surgery (for cases). Disability, reoperations, complications, opioid usage, and deaths were also determined.

RESULTS:
Two years after fusion surgery, 26% (n = 188) of fusion cases had RTW, while 67% (n = 483) of nonsurgical controls had RTW (P ≤ 0.001) within 2 years from the date of injury. The reoperation rate was 27% (n = 194) for surgical patients. Of the lumbar fusion subjects, 36% (n = 264) had complications. Permanent disability rates were 11% (n = 82) for cases and 2% (n = 11) for nonoperative controls (P ≤ 0.001). Seventeen surgical patients and 11 controls died by the end of the study (P = 0.26). For lumbar fusion subjects, daily opioid use increased 41% after surgery, with 76% (n = 550) of cases continuing opioid use after surgery. Total number of days off work was more prolonged for cases compared to controls, 1140 and 316 days, respectively (P < 0.001). Final multi-variate, logistic regression analysis indicated the number of days off before surgery odds ratio [OR], 0.94 (95% confidence interval [CI], 0.92-0.97); legal representation OR, 3.43 (95% CI, 1.58-7.41); daily morphine usage OR, 0.83 (95% CI, 0.71-0.98); reoperation OR, 0.42 (95% CI, 0.26-0.69); and complications OR, 0.25 (95% CI, 0.07-0.90), are significant predictors of RTW for lumbar fusion patients.

CONCLUSION:
This Lumbar fusion for the diagnoses of disc degeneration, disc herniation, and/or radiculopathy in a WC setting is associated with significant increase in disability, opiate use, prolonged work loss, and poor RTW status.
Outcome of lumbar fusion in Washington State workers' compensation.
Franklin GM, Haug J, Heyer NJ, McKeefrey SP, Picciano JF.

Source
Department of Environmental Health, University of Washington School of Public Health and Community Medicine, Seattle.

Abstract
STUDY DESIGN:
This study covered a large, population-based cohort of workers in the Washington State workers' compensation system who received lumbar fusion between August 1, 1986 and July 31, 1987 to determine work disability status, reoperation rate, and patient satisfaction.

OBJECTIVES:
To use predictors of outcome of lumbar fusion to design clearer clinical guidelines for lumbar fusion in injured workers.

METHODS:
Logistic regression analysis was used to determine the predictors of work disability and risk of reoperation after fusion.

RESULTS:
The lumbar fusion incidence rate was 41.7/100,000 workers a year (n = 388 patients). Overall, 68% were work disabled and 23% required further lumbar spine surgery 2 years post-fusion. Five markers of severity predicted worse work disability outcome (older age at injury, longer time from injury to fusion, increased time on work disability before fusion, increased number of prior low back operations, and increased number of levels fused). Even after adjusting for these variables, receiving instrumentation with fusion doubled the risk of reoperation. Most patients reported that back pain (67.7%) was worse and overall quality of life (55.8%) was no better or worse than before surgery.

CONCLUSIONS:
Outcome of lumbar fusion performed on injured workers was worse than reported in published case series. Prospective studies should be conducted to determine the biologic indications that might lead to improved outcomes in this disabled population.
Outcomes of posterolateral lumbar fusion in Utah patients receiving workers' compensation: a retrospective cohort study.
DeBerard MS, Masters KS, Colledge AL, Schleusener RL, Schlegel JD.

Source
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Abstract
STUDY DESIGN:
A retrospective cohort study consisting of a medical record review and a follow-up telephone survey of patients with lumbar fusion, at least 2 years after their surgery, was performed.

OBJECTIVE:
To identify presurgical correlates and long-term outcomes from posterolateral lumbar fusion in Utah patients receiving workers' compensation.

SUMMARY OF BACKGROUND DATA:
Lumbar fusion has been criticized for its highly variable outcomes, and compensated workers are at particular risk for poor outcomes. Evidence suggests that presurgical psychosocial factors may be important modifiers of back pain reporting and back surgery outcomes.

METHODS:
The patients in this study were 185 compensated workers in Utah who underwent posterolateral lumbar fusion. Patient medical records were independently reviewed, and medical and sociodemographic variables were coded. A telephone outcome survey was completed with 130 patients (70%) an average of 4.6 years after their surgery.

RESULTS:
Reported solid fusion, reoperation, and disability rates for the follow-up sample were 74%, 24%, and 25%, respectively. As reported by the patients, 41% experienced no change or a worsened quality of life. Mean scores from the Roland and Morris Back Pain Disability Questionnaire, the Stauffer-Coventry-Index, and the Short-Form 20 Multidimensional Health Survey indicate that many patients experienced postsurgical dysfunction. Presurgical predictors of outcomes were number of prior low back operations, income at time of injury, age, litigation, and depression.

CONCLUSIONS:
Outcomes of posterolateral lumbar fusion among compensated workers in Utah are inconsistent. Outcomes can be predicted by presurgical sociodemographic variables. Screening for such presurgical risk factors may be important for prudent surgical decisions and rehabilitation planning.
DDD, low back pain

- Axial back pain is ubiquitous
- Large financial impact on society
- Etiologies numerous
- Pain generators obscure
- Physical and psychiatric pathology co-exist
Asymptomatic Subjects - DDD, bulge, HNP, stenosis
DDD, low back pain

- Imaging studies are helpful but require clinical correlation
- Patient selection for surgical procedures is paramount
- Satisfactory results are achieved only in 60-80% of patients
- And this isn’t even when accounting for work injury “factor”
Many injuries can potentially occur at work:

- **Obvious**
  - Fall from height, slip and fall
  - Lifting accident
  - Blunt trauma, car accident
  - Machinery accident, auger
  - Other

- **Not as obvious**
  - No specific incident, but accumulation
  - Aggravation of pre-existing condition
The problems - Complaints

- Back pain, neck pain
- Leg/arm pain
- Weakness, numbness, tingling
- Balance dysfunction
- Decreased activity tolerance (standing, walking)
- Instability
- Deformity
- Failure of prior surgery
- Cancer/infection
- Malaise, fever, fatigue
The problems - Complaints

• #1 thing I see: (if no obvious injury)
  • Pain
  • N/T
  • Decreased ability to function
The problems - Diagnoses

- DDD
- Herniated Disc
- Lumbar strain/sprain
- Whiplash
- Radiculopathy
- Myelopathy
- Spondylolisthesis (isthmic/degenerative)
- Scoliosis
- Spinal stenosis
- Facet arthropathy
- Sagittal imbalance, failed prior surgeries
- Fracture
- Tumor
- Discitis
- Osteomyelitis
Chronic or Pre-existing

- DDD
- Herniated Disc
- Lumbar strain/sprain
- Whiplash
- Radiculopathy
- Myelopathy
- Spondylolisthesis (isthmic/degenerative)
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Chronic or Pre-existing

How do I determine this?

- History
- Imaging**
- Events/injury that occur
Imagine if person had minor fall with significant neck pain
Chronic or Pre-existing
Chronic or Pre-existing
Chronic or Pre-existing

Not all herniations are the same. Radiology report unlikely to be of great benefit for sorting that out. History and prior records important.
Often a work injury may be described as an **aggravation** of a pre-existing condition vs. the **cause**.

Example, someone has spinal stenosis and arthritis. Suffers injury. Denies prior symptoms, since injury is symptomatic.
Aggravation of prior condition

• These can be most challenging to definitively sort out.

• Have to really scrub through the history and symptoms, do the symptoms make sense?

• Plausible? Reasonable?

• How have they responded to treatments, are their symptoms what I would expect?

Doesn’t necessarily mean all pain after that point is related to that injury!!
Aggravation of prior condition

Example:
- Lumbar stenosis, no symptoms
- Lifting injury, now with leg pain
- Slight bulging disc, not enough by itself, but “tipped” over stenosis
- If symptoms are reasonable, probably makes sense to say aggravation

Example:
- Works with neck bent, no inj.
- Intermittent neck pain
- Related to work, yes, caused or permanent aggravation?
Treatment Options

• Unless significant structural/neurologic injury, start conservatively
• Always have a goal in mind
• Try and set realistic expectations if prior conditions
• Cautiously increase treatments, but it is ok to have limits
• Educate properly from the start!!!
Treatment Options

• Unless significant structural/neurologic injury, start conservatively
  • OTC meds, relative rest, PT/OT, follow ups
  • Ex: unstable spine fracture vs compression fracture
Treatment Options

• Unless significant structural/neurologic injury, start conservatively

• Always have a goal in mind
  • You have a lumbar strain, will hurt for a while, we will rest it and improve your function, but will plan on return to work ....
  • RTW goal, pain goal, etc...
Treatment Options

• Unless significant structural/neurologic injury, start conservatively
• Always have a goal in mind
• Try and set realistic expectations if prior conditions
  • Your new sciatica will decrease, but chronic LBP will always be there, may get int. back pain like all of us, pain-free may not be an option
Treatment Options

- Unless significant structural/neurologic injury, start conservatively
- Always have a goal in mind
- Try and set realistic expectations if prior conditions
- Cautiously increase treatments, but it is ok to have limits
  - Not everyone needs injections, if they have tried everything else, does not always mean surgery is the next logical step
Goals of spine surgery

- Relieve pain
- Restore or maintain stability
- Restore or maintain alignment
- Decompress the neural elements
- Optimize return of function or prevent deterioration of function
- Obtain a diagnosis (tumor/infection)
Goals of spine surgery:

What do we actually do?

- Decompress
- Stabilize
- Realign
Conditions that do well*

• Spinal Stenosis
• Herniated Discs
• Radiculopathy
• Spondylolisthesis
• Myelopathy
• Tumors/infections
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What do all of these have in common?
• Neural compression or instability, not just pain
Surgical *Versus* Nonoperative Treatment for Lumbar Disc Herniation

Four-Year Results for the Spine Patient Outcomes Research Trial (SPORT)

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**Study Design.** Concurrent, prospective, randomized, and observational cohort study.

**Objective.** To assess the 4-year outcomes of surgery *versus* nonoperative care.

**Summary of Background Data.** Although randomized trials have demonstrated small short-term differences in favor of surgery, long-term outcomes comparing surgical to nonoperative treatment remain controversial.

**Methods.** Surgical candidates with imaging-confirmed lumbar intervertebral disc herniation meeting SPORT eligibility criteria enrolled into prospective, randomized (501 participants), and observational cohorts (743 participants) at 13 spine clinics in 11 US states. Interventions were standard open discectomy *versus* usual nonoperative care. Main outcome measures were changes from baseline in the SF-36 Bodily Pain (BP) and Physical Function (PF) scales and the modified Oswestry Disability Index (ODI - AAOS/Modems version) assessed at 6 weeks, 3 months, 6 months, and annually thereafter.

**Results.** Nonadherence to treatment assignment caused the intent-to-treat analyses to underestimate the treatment effects. In the 4-year combined as-treated analysis, those receiving surgery demonstrated significantly greater improvement in all the primary outcome measures (mean change surgery vs. nonoperative; treatment effect; 95% CI): BP (45.6 vs. 30.7; 15.0; 11.8 to 18.1), PF (44.6 vs. 29.7; 14.9; 12.0 to 17.8) and ODI (−38.1 vs. −24.9; −13.2; −15.6 to −10.9). The percent working was similar between the surgery and nonoperative groups, 84.4% *versus* 78.4% respectively.

**Conclusion.** In a combined as-treated analysis at 4 years, patients who underwent surgery for a lumbar disc herniation achieved greater improvement than nonoperatively treated patients in all primary and secondary outcomes except work status.

**Keywords:** SPORT, intervertebral disc herniation, surgery, nonoperative care, outcomes. *Spine 2008;33:2789–2800*

Lumbar disc surgery remains one of the most commonly performed operations, with rates exhibiting considerable geographic variation.1 Two recent randomized trials demonstrated that surgery provides faster pain relief and perceived recovery in patients with herniated disc.2–4 Outcomes were similar at 1 year for patients assigned to surgery and for those assigned to nonoperative treatment. However, both trials included substantial numbers of surgical patients in the nonoperative comparison arm due to treatment crossover, affecting the interpretation of the intent-to-treat analyses. This paper reports 4-year results for SPORT based on the continued follow-up of the herniated disc randomized and observational co-
Conditions that do well
Causes for poor outcomes in spine surgery

- Patient Selection
- Wrong surgery
- Poor execution
- Unrealistic expectations
Examples of mine:

40 yo after fall from top of trailer with T12 compression fracture
  • Sig fracture, treated with custom TLSO for 6 weeks
  • Returned to work full duty at 8-10 weeks

45 yo with work injury out of state (1.5 years old) with massive L5-S1 HNP and sig LBP/sciatica
  • Had microdiscectomy
  • Resolution of leg pain, ongoing LBP
  • Ok to return to work at 3 months
Right patient

Right diagnosis

Right plan

Right execution and followup

Success
And each of these have multiple variables involved, ie the “right patient” includes social factors, right timing, good understanding of predictable outcomes etc...
Take home points

• Work Injuries can be difficult to successfully treat and measure outcomes
• Goals may be misaligned, bringing those together can help immensely
• Important to try and accurately sort out new injury, no injury, aggravation. Mostly done by history and imaging
• Treatments should be conservative whenever possible, and should not be done in check list format
Take home points:

- Work Injuries can be difficult to successfully treat and measure outcomes.
- Goals may be misaligned; bringing those together can help immensely.
- It's important to try and accurately sort out new injury, no injury, aggravation. Mostly done by history and imaging.
- Treatments should be conservative whenever possible, and should not be done in check list format.

Thank you!