

Role of Pre Operative Interventions in Post Operative Outcomes

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Introduction

- Predictors of outcomes
 - Demographic
 - Medical comorbidity
 - Psychological comorbidity
 - Medication history

Demographic

- Age
- Race
- Employment history
- Education
- BMI

Age

- In most studies, comparison is ± 70 y/o
- Complication rates increase with age
- Long term outcomes favorable

Employment history

- Disability
- Secondary gain
 - Litigation
 - Work Injury

BMI

- Data variable

Risk Factors for Surgical Site Infection After Spinal Surgery: A Systematic Review and Meta-Analysis Based on Twenty-Seven Studies

Xiao-Qiang Peng, Chun-Guang Sun, Zheng-Guo Fei, Qi-Jia Zhou

e318

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WORLD NEUROSURGERY, [HTTPS://DOI.ORG/10.1016/J.WNEU.2018.11.15](https://doi.org/10.1016/j.wneu.2018.11.15)

- Meta analysis based on 27 studies
- Elective lumbar surgery
- Moderate to strong evidence that **obesity reduced clinical outcomes**

Outcomes and Complications of Diabetes Mellitus on Patients Undergoing Degenerative Lumbar Spine Surgery

Javier Z. Guzman, BS,* James C. Iatridis, PhD,* Branko Skovrlj, MD,† Holt S. Cutler, BSc,*
Andrew C. Hecht, MD,* Sheeraz A. Qureshi, MD, MBA,* and Samuel K. Cho, MD†

- Review of 9 years of data from over 2.5M patients from NIS database.
- Degenerative lumbar surgery
- **Obesity associated with increased complications**

Impact of obesity on complications and outcomes: a comparison of fusion and nonfusion lumbar spine surgery

Ikemefuna Onyekwelu, MD,¹ Steven D. Glassman, MD,^{1,2} Anthony L. Asher, MD,³
Christopher I. Shaffrey, MD,⁴ Praveen V. Mummaneni, MD,⁵ and Leah Y. Carreon, MD, MSc²

- Registry data for lumbar decompression $\pm$ fusion
- 1250 patients. Obesity defined BMI>30
- **Clinical outcomes similar**
- Slightly more LBP in obese group
- Surgical time and EBL greater for obesity

- Morbid obesity associated with
 - Increased risk VTE
 - Higher EBL and transfusion requirements
 - Greater medical complications
 - Longer LOS
 - Higher readmission rate
 - Higher infection rate

Epstein NE. More risks and complications for elective spine surgery in morbidly obese patients. *Surg Neurol Int.* 2017;8:66. Published 2017 Apr 26.

Effect of body mass index on patient outcomes of surgical intervention for the lumbar spine

Michael Flippin¹, Jessica Harris², Elizabeth W. Paxton², Heather A. Prentice², Donald C. Fithian¹, Samuel R. Ward³, Sara P. Gombatto⁴

J Spine Surg 2017;3(3):349-357

- Kaiser Database. 8049 patients with instrumented lumbar fusion.
- Increasing BMI associate with
 - Blood loss
 - Infection
 - DVT
 - Reoperation rate

Summary of Demographics

- Age. Effects complications. Outcomes still favorable
- Employment. Disability, work injury, litigation
- Obesity. Data is mixed. Most data associates obesity with worse outcomes. Weight loss probable opportunity to improved outcomes.

- Predictors of outcomes
 - Demographic
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 - Psychological comorbidity
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Medical Comorbidity

- Cardiovascular
- Diabetes mellitus
- Nutrition
- Smoking
- Bone health

Diabetes

- DM correlated with obesity and VTE
- DM associated with
 - Higher infection risk
 - Increased pseudoarthrosis
 - More adverse events
 - Higher hospital costs and LOS

Epstein NE. Predominantly negative impact of diabetes on spinal surgery: A review and recommendation for better preoperative screening. *Surg Neurol Int.* 2017;8:107. Published 2017 Jun 13. doi:10.4103/sni.sni_101_17

- Diabetes associated with
 - Increased adverse events
 - Higher 30 day readmission rate
 - Lower PRO
 - Diabetic control mitigates harm
 - » Peng X. World Neurosurgery. 2018
 - » Guzman J. Spine. 2014
 - » Wukich D. World Journal of Orthopedics. 2015
 - » Armaghani S. JBJS, Am. 2016
 - » Qin C. Spine. 2016

Perioperative hemoglobin A1c as a predictor of deep infection following single-level lumbar decompression in patients with diabetes

Jourdan M. Cancienne, MD, Brian C. Werner, MD, Dennis Q. Chen, MD,
Hamid Hassanzadeh, MD, Adam L. Shimer, MD*

The Spine Journal 17 (2017) 1100–1105

- Post op infection associated with Hgb A1C
- Critical level appears to be about 7 to 7.5.

Nutrition

- Low prealbumin (< 20) risk factor for infection in spine surgery
- Low albumin (< 3.5) risk factor for infection in spine surgery
 - » Salvetti D. Surg Neurol Int. 2015
 - » Tempel Z. J Neurol Surg. 2015
 - » Schoenfeld A. The Spine Journal. 2013

Bone Health

- Testing and appropriate medical management for prevention and treatment of low bone density should be done routinely for any patient at risk.
 - » Lehman R. JAAOS. 2015.
 - » McCoy S. Clin Neurol Neurosurg. 2019.
 - » Seki S. Eur Spine J. 2017.
 - » Neuerburg C. J orthop Surg Res. 2017.
 - » Chaudhary N. World Neruosugery. 2017.

Summary of Medical Comorbidities

- Modifiable medical problems that affect clinical outcomes in spine surgery
 - Nutrition
 - Bone health
 - Forteo. Vitamin D
 - Diabetes Mellitus
 - A1C less than 7.5
 - Smoking cessation
 - Cardiovascular health

- Predictors of outcomes
 - Demographic
 - Medical comorbidity
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Psychological Comorbidity

- Depression
- Expectancy
- Symptom magnification/fear avoidance
- Coping

Depression

- Very common comorbidity associated with patients with chronic LBP

Clinical Depression Is a Strong Predictor of Poor Lumbar Fusion Outcomes Among Workers' Compensation Subjects

Joshua T. Anderson, BS,* Arnold R. Haas, BS, BA,† Rick Percy, PhD,† Stephen T. Woods, MD,†
Uri M. Ahn, MD‡ and Nicholas U. Ahn, MD§

- Administrative database in Ohio for lumbar fusion
- 123 patients with pre op depression compared to 2676 without depression.
- Depressed patients significantly more likely to be taking narcotics
- **RTW 10% for depression group vs. 32% for control**

A Prospective Study of Psychological Predictors of Lumbar Surgery Outcome

Paula M. Trief, PhD,* William Grant, EdD,† and Bruce Fredrickson, MD‡

- 102 patients undergoing lumbar surgery prospectively complete psych questionnaires
- Pain and function assessed at 6 mos and 1 year
- Used Zung depression scale and modified somatic perception questionnaire to evaluate depression and anxiety
- **Failure to improve pain predicted by anxiety and depression**
- **Failure to improve function predicted by anxiety and depression**
- Hostility did not predict any outcome

The Impact of Comorbid Mental Health Disorders on Complications Following Adult Spinal Deformity Surgery With Minimum 2-Year Surveillance

Bassel G. Diebo, MD,* Joshua D. Lavian, BS,* Daniel P. Murray, BA,* Shian Liu, MD,[†] Neil V. Shah, MD, MS,* George A. Beyer, MS,* Frank A. Segreto, BS,* Lee Bloom, MD,* Dennis Vasquez-Montes, MS,[‡] Louis M. Day, MD,* Douglas A. Hollern, MD,* Samantha R. Horn, BA,[‡] Qais Naziri, MD, MBA,* Daniel Cukor, PhD,[§] Peter G. Passias, MD,[‡] and Carl B. Paulino, MD*

- Review NY database in patients with ≥ 4 level lumbar fusion.
- Compared patients with and without mental health disease
 - Limited to depression, anxiety, sleep d/o, stress d/o
- 6020 total, 1631 with mental health disease.
 - Depression most prevalent: 59%
- **Mental health disease significantly predicted any complication, any readmission, and any revision**

Psychological Predictors of Outcomes with Lumbar Spinal Fusion: A Systematic Literature Review

Mark Wilhelm¹, Michael Reiman², Adam Goode², William Richardson³, Christopher Brown⁴, Daniel Vaughn⁵ & Chad Cook^{6*}

Physiother. Res. Int. 22 (2017) e1648

- Review paper. Lumbar fusion for degenerative disease with minimum 6 mos f/u. Included some baseline psych variable.
- Depression & SF MCS most frequent outcome variables
- **Depression** significantly associated with **poor disability outcomes** and **HRQOL** scores. Also **higher medical costs**
- **Catastrophizing, neuroticism and lower baseline MCS** also associated with **worse outcomes**.

- Fear, depression and catastrophizing mediate pain and disability in patients with Chronic LBP.
 - » Marshall P. Plos One. 2017.
- Review of 9853 lumbar surgical patients from spine registry.
- 90 day readmit associated with general health & depression.
 - » Wadhwa R. J Neurosurg Spine. 2017
- 182 Dutch pts evaluated 6 mos post discectomy. 78% RTW.
- Fear of movement, passive coping, and higher physical workload all associated with worse outcomes
 - » den Boer J. Pain. 2006
- Pre op depression predicts post op satisfaction independent of functional improvement
 - » Adogwa O. Spine. 2013

- Swedish RCT. 118 patients to undergo lumbar fusion.
- Prehab started 8 to 12 weeks pre op.
- Compared prehab based on 4 one hours sessions before and one session after surgery of CBT vs. conventional care.
- Primary outcome ODI. Secondary measures for pain, anxiety, fear, catastrophizing, depression.
- Active group showed slight improvement pre op
- At 8 weeks and 6 mos post op, both groups improved, and no difference between groups
- Did not mention what treatment patients received following surgery.
- Conclusion – **no clear advantage for CBT prehab**
 - » Lotzke H. Physical Therapy. 2019

PREPARE: presurgery physiotherapy for patients with degenerative lumbar spine disorder: a randomized controlled trial

Yvonne Lindbäck, RPT, MSc^{a,*}, Hans Tropp, MD, PhD^{b,c}, Paul Enthoven, RPT, PhD^a,
Allan Abbott, RPT, PhD^{a,d}, Birgitta Öberg, RPT, PhD^a

- Swedish RCT. 197 patients. Prehab PT vs. control in patients prior to elective lumbar spinal surgery.
- Primary outcome ODI. Secondary measures for pain, anxiety, fear, depression, and pain.
- 85/99 treatment group received at least one visit PT, and 56/99 > 12 visits
- Following surgery, both groups treated similarly
- Treatment group significantly improved prior to surgery
- At 1 year f/u, no significant difference in outcomes between 2 groups.

An analysis from the Quality Outcomes Database, Part 1. Disability, quality of life, and pain outcomes following lumbar spine surgery: predicting likely individual patient outcomes for shared decision-making

Matthew J. McGirt, MD,¹ Mohamad Bydon, MD,² Kristin R. Archer, PhD, DPT,^{3,4} Clinton J. Devin, MD,⁵ Silky Chotai, MD,⁵ Scott L. Parker, MD,⁵ Hui Nian, PhD,⁶ Frank E. Harrell Jr., PhD,⁶ Theodore Speroff, PhD,^{7,8} Robert S. Dittus, MD, MPH,^{7,8} Sharon E. Philips, MS,⁸ Christopher I. Shaffrey, MD,⁸ Kevin T. Foley, MD,¹⁰ and Anthony L. Asher, MD,¹ for QOD Vanguard Sites

- Evaluated 7600 patients from prospective spine registry with over a year follow-up.
- Higher education, worse pre op LEP, & better baseline QOL score associated with higher odds ODI improvement
- Obesity, smoking, pre op psych distress, dominant LBP, duration symptoms > 3 months, unemployment, Work Comp, & higher ASA score associated with lower odds ODI improvement.

Eur Spine J (2010) 19:1841–1848

Javier Cobo Soriano • Marcos Sendino Revuelta •
Martín Fabregate Fuente • Ignacio Cimarra Díaz •
Paloma Martínez Ureña • Roberto Deglané Meneses

Predictors of outcome after decompressive lumbar surgery and instrumented posterolateral fusion

- Review prospective database. 184 pts with decompression and fusion for variety of diagnoses
- Higher education associated with better ODI & pain scores.
- Higher expectations for improvement predictive of better VAS and ODI scores.
- Higher preop MCS predicted better improvement in ODI.

Eur Spine J (2011) 20:1626–1634

Leg pain and psychological variables predict outcome 2–3 years after lumbar fusion surgery

Allan D. Abbott · Raija Tyni-Lenné ·
Rune Hedlund

- 2 to 3 year f/u lumbar fusion from Swedish registry
- RCT comparing psychomotor, CBT vs. exercise PT.
- 107 patients. 81% f/u
- Predictors of disability, pain and QOL included pre-surgical LEP intensity, catastrophizing, control over pain, outcome expectancy, & *post op rehab*.

Does a Preoperative Cognitive-Behavioral Intervention Affect Disability, Pain Behavior, Pain, and Return to Work the First Year After Lumbar Spinal Fusion Surgery?

Nanna Rolving, PT, MHSc,* Claus Vinther Nielsen, MD, PhD,† Finn Bjarke Christensen, MD, DMSc,‡
Randi Holm, MD,§ Cody Eric Büniger, MD, DMSc,‡ and Lisa Gregersen Oestergaard, OT, PhD*

- Danish RCT. **Compared pre op CBT to control** for lumbar fusion
- 90 patients, 2:1 allocation. ≥ 1 year f/u.
- CBT four 3 hour sessions pre op and two post op.
- Primary outcome ODI. Secondary fear, pain, catastrophizing.
- **Treatment group better outcomes 3 mos; no difference 1 year.**

The Journal of Pain, Vol 17, No 1 (January), 2016: pp 76-89

Cognitive-Behavioral–Based Physical Therapy for Patients With Chronic Pain Undergoing Lumbar Spine Surgery: A Randomized Controlled Trial

Kristin R. Archer,^{*,†} Clinton J. Devin,^{*} Susan W. Vanston,^{*} Tatsuki Koyama,[‡] Sharon E. Phillips,[‡] Steven Z. George,[§] Matthew J. McGirt,[¶] Dan M. Spengler,^{*} Oran S. Aaronson,^{||} Joseph S. Cheng,^{||} and Stephen T. Wegener^{*,*}

- RCT. Lam $\pm$ fusion. USA. **Post op CBT vs. education.**
- 86 patients, 43 each group. > 85% f/u at 6 mos.
- Patients screened specifically for high fear avoidance behavior as inclusion criteria.
- Intervention at about 6 weeks post op for six weeks. One in person and 5 phone visits weekly.
- ODI and pain primary outcome. Secondary measures for performance based and psychosocial based outcomes
- **Treatment group significantly better for primary and secondary outcomes at 3 mos, but not 6 mos.**

Eur Spine J (2014) 23:87–95
**Management of catastrophizing and kinesiophobia improves
rehabilitation after fusion for lumbar spondylolisthesis
and stenosis. A randomised controlled trial**

Marco Monticone • Simona Ferrante •

Marco Teli • Barbara Rocca • Calogero Foti •

Alessio Lovi • Marco Brayda Bruno

- RCT. Italy. Lumbar fusion for spondylolisthesis. 65 each group.
- CBT plus exercise vs. exercise alone. CBT 60 minutes, 2x/wk for 4 wks. Exercise 90 minute sessions 5x/wk for 4 wks
- Outcome measures. ODI, catastrophizing, QOL, kinesiophobia, and pain. 12 month f/u
- **Both groups improved, but CBT group significantly better for primary and secondary outcomes at one year**

SPINE Volume 28, Number 17, pp 1913–1921
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**Randomized Clinical Trial of Lumbar Instrumented
Fusion and Cognitive Intervention and Exercises in
Patients with Chronic Low Back Pain and
Disc Degeneration**

Jens Ivar Brox, MD, PhD,* Roger Sørensen, MD,* Astrid Friis, PT,*
Øystein Nygaard, MD, PhD,† Aage Indahl, MD, PhD,‡ Anne Keller, MD,§
Tor Ingebrigtsen, MD, PhD,|| Hege R. Eriksen, PhD,¶ Inger Holm, PT,*
Anne Kathrine Koller, PT,* Rolf Riise, MD,* and Olav Reikerås, MD*

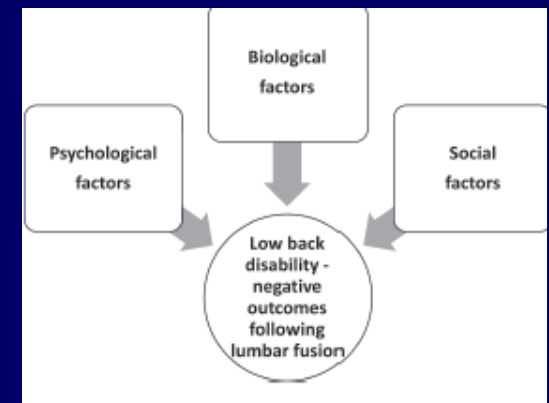
- RCT. Norway. Degenerative disease with primarily LBP
- 34 fusion, 26 CBT. One year f/u
- CBT average 25 hours per week for 3 weeks
- Surgical group had variable PT at 3 mos post op.
- Primary outcome ODI. Same for 2 groups at one year.
- In secondary measures, LEP significantly better for surgery, and fear avoidance significantly better for non op group.

The Biopsychosocial Model of Low Back Pain and Patient-Centered Outcomes Following Lumbar Fusion

Maureen P. Lall ▼ Elizabeth Restrepo

Orthopaedic Nursing • May/June 2017 • Volume 36 • Number 3 213

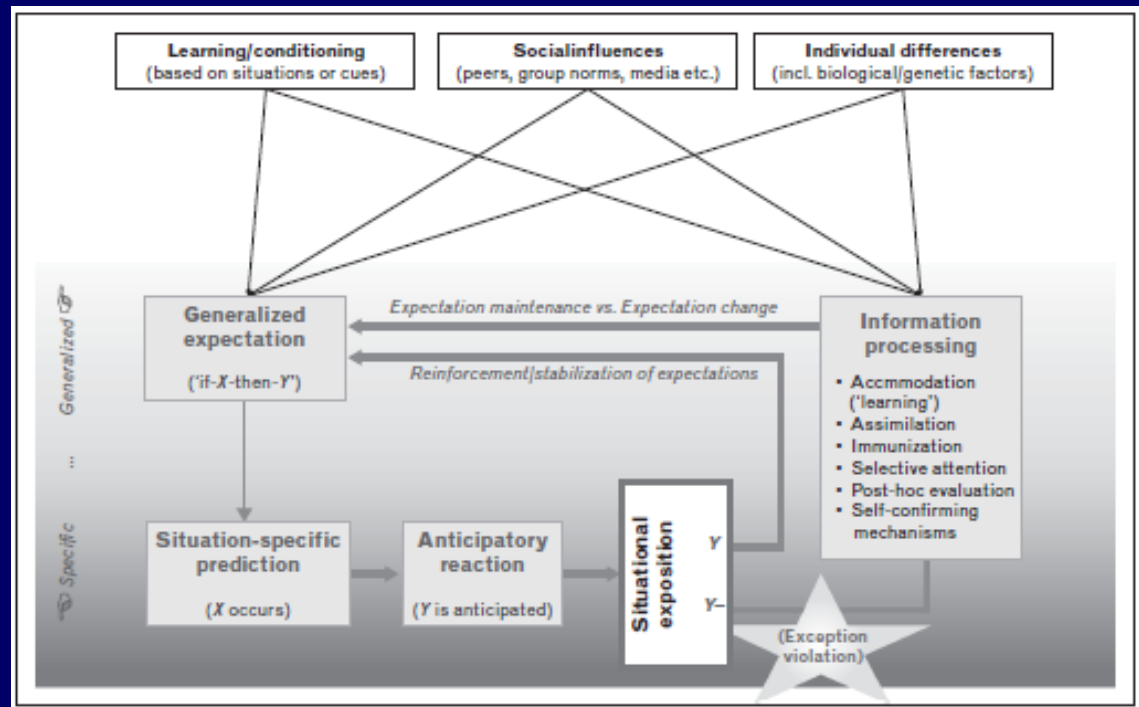
- Review.
- Disability an illness resulting from interplay of biological, psychological, and social factors
- Improved function associated with higher education, higher expectation, better coping
- Negative predictors included complications, reoperation, duration off work prior to surgery, smoking, opiate intake



Expectancies as core features of mental disorders

Winfried Rief, Julia A. Glombiewski, Mario Gollwitzer, Anna Schubö,
Rainer Schwarting, and Anna Thorwart

- Psychological interventions can alter expectations and improve outcomes.



Summary of Psychological Comorbidity

- Psychological impairment common in surgical spine patients
- Depression most common finding
- Outcomes significantly affected by anxiety, depression, fear avoidance and coping skills
- Outcomes affected negatively or positively by expectancy.
- CBT to address psych impairment is effective
- Advantages of prehab cognitive therapy uncertain
- Successful CBT time consuming; requires patient compliance

- Predictors of outcomes
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Clinical Depression Is a Strong Predictor of Poor Lumbar Fusion Outcomes Among Workers' Compensation Subjects

Joshua T. Anderson, BS,* Arnold R. Haas, BS, BA,† Rick Percy, PhD,† Stephen T. Woods, MD,†
Uri M. Ahn, MD‡ and Nicholas U. Ahn, MD§

- Taking opioids > 1 year prior to surgery negative predictor of outcomes.

Preoperative Opioid Use as a Predictor of Adverse Postoperative Self-Reported Outcomes in Patients Undergoing Spine Surgery

Dennis Lee, MD, Sheyan Armaghani, MD, Kristin R. Archer, PhD, DPT, Jesse Bible, MD, David Shau, BS, Harrison Kay, BS, Chi Zhang, BA, Matthew J. McGirt, MD, and Clinton Devin, MD

J Bone Joint Surg Am. 2014;96:e89(1-8)

- Retrospective review of registry data from single center
- 583 patients with variety of spine surgery
- The following predicted worse PRO
 - Increased pre op opioid consumption
 - Severity of anxiety and depression
- **Suggest benefit of psychological and opiate screening as well as better management of opiate intake pre and post op**

Preoperative Opioid Use is a Predictor of Poor Return to Work in Workers' Compensation Patients After Lumbar Discectomy

Jeffrey A. O'Donnell, BS,* Joshua T. Anderson, BS,[†] Arnold R. Haas, BS, BA,[‡] Rick Percy, PhD,[‡] Stephen T. Woods, MD,[‡] Uri M. Ahn, MD,[§] and Nicholas U. Ahn, MD[¶]

- Review of Ohio Bureau of Worker's Comp data.
- Pre op Preoperative opioid use negative predictor RTW following lumbar discectomy.
- Long-term pre op opioid use associated with higher medical costs, psychiatric illness, and postoperative opioid use.
- **Even short course pre op opiates associated with worse outcomes compared with no use**

Prescription Opioid Dependence Is Associated With Poorer Outcomes in Disabling Spinal Disorders

Jeffrey Dersh, PhD,* Tom G. Mayer, MD,† Robert J. Gatchel, PhD,‡ Peter B. Polatin, MD,*
Brian R. Theodore, MS,* and Eric A. K. Mayer, MD*

- 1200 patients completed functional restoration program
- Post injury opiate dependent patient's less likely to return to work and retain work.
- Higher utilization of healthcare resources

Risk Factors for Prolonged Opioid Use Following Spine Surgery, and the Association with Surgical Intensity, Among Opioid-Naïve Patients

Andrew J. Schoenfeld, MD, MSc, Kenneth Nwosu, MD, Wei Jiang, MS, Allan L. Yau, BS, Muhammad Ali Chaudhary, MD, Rebecca E. Scully, MD, Tracey Koehlmoos, PhD, MHA, James D. Kang, MD, and Adil H. Haider, MD, MPH

Investigation performed at the Center for Surgery and Public Health, Brigham and Women's Hospital, and Harvard Medical School, Boston, Massachusetts

- Review military health system database.
- 9991 patient status post spine surgery.
- **By 6 months postop, 0.1% of pre op opiate naïve patients continued opiate use.**
- **Lower socioeconomic status and depression significantly associated with decreased likelihood of discontinuing opiates**

- In multiple national databases, opioid abuse associated with
 - Higher length of stay
 - Higher cost and utilization of healthcare resources
 - Higher frequency of infection and device related complications
 - Higher 30-day readmission rates
 - Higher inpatient mortality and aggregate morbidity
 - Increased emergency room visits
 - » Gupta A. Anesthesiology. 2018
 - » Tank A. Spine. 2018
 - » Menendez M. CORR. 2015
 - » Jain N. Spine. 2018

Preoperative Opioid Use and Its Association With Perioperative Opioid Demand and Postoperative Opioid Independence in Patients Undergoing Spine Surgery

Sheyan J. Armaghani, MD,* Dennis S. Lee, MD,* Jesse E. Bible, MD,* Kristin R. Archer, PhD, DPT,*
David N. Shau, BS,* Harrison Kay, BS,* Chi Zhang, BA,* Matthew J. McGirt, MD,† and Clinton J. Devin, MD*

- Prospective spine registry. 583 patients.
- Independent risk factors of increased post op opioid demand were younger age, anxiety, and greater pre op opioid use.
- Decreased opioid independence associated with more invasive surgery, higher anxiety, revision surgery, and greater pre op opioid use.
- At 12 mos, 74% opioid naïve patients pre op were opioid free vs 41% who were taking opioids pre op.
- 35% on pre op opioids with depression opioid free at 12 mos vs. 62% on pre op opioids without depression

Review Article

Approach to Pain Management in Chronic Opioid Users Undergoing Orthopaedic Surgery

- Optimize psych comorbidity, particularly depression
- Pre op estimation and reduction of opioid requirement
 - Referrals to addiction specialists
- Discussion & optimization pain beliefs & coping behavior.
- Epidural or intrathecal blockade (regional blockade in limbs)
- Ketamine
- Multimodal post op drug regimen
 - Acetaminophen, NSAIDs, Anticonvulsants/Calcium channel blocker

- Devin C. JAAOS. 2014

Summary of Opiates and Surgery

- Reduced frequency opiate use post op in opiate naïve patients
- Long term opiate use pre op predicts opiate use post op
- Opiate use associated with a variety of worse outcomes
 - Cost. Utilization of health resources. RTW.
 - LOS. Readmission. ER visits
 - Higher infection rates. Medical comorbidities and mortality.
 - Psychological comorbidity associated with more difficult weaning

- He survived the Columbine High School mass shooting, but a 20-year battle with drug addiction that followed, one that Austin Eubanks had publicly said started with pills given to ease his pain from bullet wounds suffered in the 1999 rampage, has now cost him his life, his family said. Eubanks had seemed to be in recovery from his addiction, speaking to millions of people across the nation about the ravages of opioids and the "emotional pain" he said doctors were failing to treat. I had just been shot and I witnessed my best friend murdered right in front of me as we were huddled together waiting for help to come. I often think back to my pain that day. And if I were to rate it on a pain scale, my physical pain would have been a 3 or a 4, and that was likely the response I offered when I was asked. But my emotional pain was an absolute 10. I was in agony beyond comprehension. But that was never asked, it was never talked about." Within an hour, he was given sedatives in a hospital to relieve his pain. "I was addicted before I even knew what was happening," adding that prior to the day of the attack he had never drank alcohol or smoked marijuana. "I was 29 years old before I found lasting sobriety and I think it took a level of maturity and willingness on my part to do what it takes and, for me, I had to change pretty much everything about my life," he told KMGH. "I think that it's really important that -- not as survivors of trauma but survivors of addiction -- speak out and they share their story. Just because you never know when your story is going to change the life of somebody else."

- Patient testimonial 3 months after revision spine surgery (Weaned pre op)
- After surgery, I needed the pain meds again. I knew I couldn't trust myself so I gave them to my wife, but I was trying to steal them anyway. I finally told myself that I needed to enroll in an addiction center. I got off all narcotics over a month. Today, I feel better than have felt since before my first surgery. I now realize that I wasn't really in pain after this last operation. I just needed the pain medicine. I am only taking occasional ibuprofen now, and I feel great.

Conclusions

- There are opportunities to optimize outcomes around spine surgery
 - Medical comorbidities – bone health, obesity, smoking, DM.
 - Psych – Emotional component critical, both for precipitation and perpetuation
 - Depression, expectancy, cognitive behavioral components
 - Medications
 - Opiates clearly associated with worse outcomes
 - Importance of pre op treatment of meds and psych factors not clear

THANK YOU