Cycle 1: Disability due to back pain despite conservative therapy

1. **General reference on low back pain**
   
   **Abstract**
   Low back pain is a very common symptom. It occurs in high-income, middle-income, and low-income countries and all age groups from children to the elderly population. Globally, years lived with disability caused by low back pain increased by 54% between 1990 and 2015, mainly because of population increase and ageing, with the biggest increase seen in low-income and middle-income countries. Low back pain is now the leading cause of disability worldwide. For nearly all people with low back pain, it is not possible to identify a specific nociceptive cause. Only a small proportion of people have a well understood pathological cause—eg, a vertebral fracture, malignancy, or infection. People with physically demanding jobs, physical and mental comorbidities, smokers, and obese individuals are at greatest risk of reporting low back pain. Disabling low back pain is over-represented among people with low socioeconomic status. Most people with new episodes of low back pain recover quickly; however, recurrence is common and is a small proportion of people, low back pain becomes persistent and disabling. Initial high pain intensity, psychological distress, and accompanying pain at multiple body sites increases the risk of persistent disabling low back pain. Increasing evidence shows that central pain-modulating mechanisms and pain cognitions have important roles in the development of persistent disabling low back pain. Cost, healthcare use, and disability from low back pain vary substantially between countries and are influenced by local culture and social systems, as well as by beliefs about cause and effect. Disability and costs attributed to low back pain are projected to increase in coming decades, in particular in low-income and middle-income countries, where health and other systems are often fragile and not equipped to cope with the growing burden. Intensified research efforts and global initiatives are clearly needed to address the burden of low back pain as a public health problem.

   **Comments by Reviewer**
   Narrative review with 139 citations focused on long-term of back pain as a global health problem, variation in frequency related to demographics, direct and indirect costs, and predictors of chronic disability.

2. **General reference on low back pain**
   
   **Abstract**
   Many clinical practice guidelines recommend similar approaches for the assessment and management of low back pain. Recommendations include use of a biopsychosocial framework to guide management with initial non-pharmacological treatment, including education that supports self-management and resumption of normal activities and exercise, and psychological programmes for those with persistent symptoms. Guidelines recommend prudent use of medication, imaging, and surgery. The recommendations are based on trials almost exclusively from high-income countries, focused mainly on treatments rather than on prevention, with limited data for cost-effectiveness. However, globally, gaps between evidence and practice exist, with limited use of recommended first-line treatments and inappropriate high use of imaging, rest, opioids, spinal injections, and surgery. Doing more of the same will not reduce back-related disability or its long-term consequences. The advances with the greatest potential are arguably those that elicit practice with the evidence, reduce the focus on spinal abnormalities, and ensure promotion of activity and function, including work participation. We have identified effective, promising, or emerging solutions that could offer new directions, but that need greater attention and further research to determine how they are appropriate for large-scale implementation. These potential solutions include focused strategies to implement best practice, the redesign of clinical pathways, integrated health and occupational interventions to reduce work disability, changes in compensation and disability claims policies, and public health and prevention strategies.

   **Comments by Reviewer**
   Narrative review of credible guidelines related to treatment of low back pain with 130 citations. Practical recommendations based on Danish, US, and UK guidelines are summarized in Table 2. --> Summarizes evidence based interventions for low back pain based on broadly accepted guidelines.
Measurement of disability in patients with spine pain, visiting a university-based spine clinic. All questionnaires were collected electronically, using tablet computers.

OBJECTIVE: The aim of this study was to compare the psychometric properties of the PROMIS PF CAT with the SF-36 Physical Function Domain in the same patient population.

STUDY DESIGN: A retrospective analysis comparing 1900 patients with spine pain with respect to results of PF CAT and SF-36 PF. CAT required less time to administer, correlates with the two other pros and had better statistical attributes.

CAT performs rapidly and well as a patient reported outcome measure.

Diagnosis cohort study including prospective and retrospective cohorts in which PROMIS CAT tools were compared with ODI/NDI (Oswestry Disability Index).

Less robust study than study by Brookda, et al. suggests that PROMIS CAT tools can be administered efficiently in an outpatient setting.

Diagnostic test study comparing 1500 patients complaining of back or leg pain with regard to PROMIS SF-36 PF, SF36 PD, and SF-36 POE. CAT required less time to complete, correlates with the two other pros and had better statistical attributes.

PROMIS PF CAT performs rapidly and well as a patient reported outcome measure.
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BACKGROUND: The use of global health items permits an efficient way of gathering general perceptions of health. These items provide useful summary information about health and are predictive of health care utilization and subsequent mortality. METHODS: Analyses of self-reported global health items obtained from an internet survey as part of the Patient-Reported Outcome Measurement Information System (PROMIS) project. We derived summary scores from the global health items. We estimated the associations of the summary scores with the EQ-5D index scores and the PROMIS physical function, pain, fatigue, emotional distress, and social health domain scores. RESULTS: Exploratory and confirmatory factor analyses supported a two-factor model. Global physical health (GPH; 4 items on overall physical health, physical function, pain, and fatigue) and global mental health (GMH; 4 items on quality of life, mental health, satisfaction with social activities, and emotional problems) scales were created. The scales had internal consistency reliability coefficients of 0.81 and 0.86, respectively. GPH correlated more strongly with the EQ-5D than did GMH (r = 0.76 vs. 0.58). GPH correlated most strongly with pain impact (r = 0.75) whereas GMH correlated most strongly with depression symptoms (r = -0.71). CONCLUSIONS: Two dimensions representing physical and mental health underlie the global health items in PROMIS. These global health scales can be used to efficiently summarize physical and mental health in patient-reported outcome studies.


Berliner JL, Brodke DJ, Chan V, SooHoo NF, Bozic KJ. John Charnley Award: May;73:112-8. PMID: 26970039

Preoperative Patient-reported Outcome Measures Predict Clinically Meaningful Improvement after THA. J Clin Epidemiol. 2016 September 2014 - Bree Collaborative Lumbar Fusion Evidence Table

Study of 21,113 subjects aimed at estimating associations between PROMIS 10 global health items and the EQ-5D index scores as well as subscales of global health items related to physical functions, pain, fatigue, emotional distress and social health domains. Findings supported a new factor model of four items to reflect global physical health and four items to reflect global mental health.

"...These global health scales can be used to efficiently summarize physical and mental health in patient-reported outcome studies."

Study of 941 subjects including 114 patients with back pain were evaluated using PROMIS physical function measures during a prospective observational study. PROMIS physical function measures are sensitive to medical interventions. Study supports the conclusion that PROMIS physical function is responsive in the therapeutic interventions.

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Study of 941 subjects including 114 patients with back pain were evaluated using PROMIS physical function measures during a prospective observational study. PROMIS physical function measures are sensitive to medical interventions. Study supports the conclusion that PROMIS physical function is responsive in the therapeutic interventions.
A prospective cohort study from University of Utah of 2226 patients (mean age of 61.6, 61.6% white, 80.7% Caucasian) with unspecified proportion of patients lost to follow-up aimed at establishing minimum clinically important differences following total hip or total knee arthroplasty for a variety of conditions. Follow-up period ranged from 9.5 to 15.6 months. "The median MCID value in the range was similar to the mean change score for each measure and was 7.0 for the PF CAT, 18.0 for the HOOS JR, and 15.3 for the KOOS JR." Authors acknowledge absence of a standardized approach to measuring MCID and wide ranges with different populations and methodologies and emphasize "individual value judgements are necessary to apply MCIDs to treatment planning and guiding patient expectations of treatment change."

Study with substantial methodological limitations: offers an approach and cautious in applying MCIDs to clinical decision making and prediction.

Two-year study of lumbar degenerative spondylolisthesis with spinal stenosis. A combination of randomized and observational study with substantial cross-over and inconsistent conservative care. Precursor report to the four-year Weinstein/BA article cited elsewhere. Cohort had no sacralization or radiculopathy and was not a standardized population.

Study with substantial limitations: offers an approach and cautious in applying MCIDs to clinical decision making and prediction.

One-year crossover rates were high in the randomized cohort (approximately 40% in each direction) but moderate in the observational cohort (17% crossover to surgical care). The intention-to-treat analysis for the randomized cohort (1:1 random allocation) and the observational cohort (1:1 random allocation) showed no difference in surgery vs no surgery but this is severely limited by substantial crossover. Adjusted cohort analysis (“as-treated”) showed improved pain and function in patients treated surgically compared to those treated without surgery. All 1,970 patients receiving surgery, the intraoperative complication rate was 13%, postoperative complication rate was 13%, and rate of reoperation surgery within one year was 6%.

Study with substantial limitations: offers an approach and cautious in applying MCIDs to clinical decision making and prediction.

One-year crossover rates were high in the randomized cohort (approximately 40% in each direction) but moderate in the observational cohort (17% crossover to surgical care). The intention-to-treat analysis for the randomized cohort showed statistically significant effects for the primary outcomes. The as-treated analysis for both cohorts combined showed a significant advantage for surgery at 3 months that increased at 1 year and diminished slightly at 2 years. The treatment effects at 2 years were 18.1 for bodily pain (50% confidence interval [CI], 14.5 to 21.7), 18.3 for physical function (50% CI, 14.4 to 21.3), and -16.7 for the Oswestry Disability Index (50% CI, 21.5 to -11.9). There was little evidence of harm from either treatment. CONCLUSIONS: Establishing minimum clinically important differences following total hip or total knee arthroplasty for a variety of conditions. Follow-up period ranged from 9.5 to 15.6 months. The median MCID value in the range was similar to the mean change score for each measure and was 7.0 for the PF CAT, 18.0 for the HOOS JR, and 15.3 for the KOOS JR. Individual value judgements are necessary to apply MCIDs to treatment planning and guiding patient expectations of treatment change.

Study with substantial methodological limitations: offers an approach and cautious in applying MCIDs to clinical decision making and prediction.

BACKGROUND: Management of degenerative spondylolisthesis with spinal stenosis is controversial. Surgery is widely used, but its effectiveness in comparison with that of nonsurgical treatment has not been demonstrated in controlled trials. METHODS: Surgical candidates from 13 centers in 11 U.S. states who had at least 12 weeks of symptoms and image-confirmed degenerative spondylolisthesis were offered enrollment in a randomized cohort or an observational cohort. Treatment was standard decompressive laminectomy (with or without fusion) or usual care. The primary outcome measures were the Medical Outcomes Study 36-Item Short-Form General Health Survey (SF-36) bodily pain and physical function scores (100-point scales, with higher scores indicating less severe symptoms) and the modified Oswestry Disability Index (10-point scale, with lower scores indicating less severe symptoms) at 6 weeks, 3 months, 6 months, 1 year, and 2 years. RESULTS: We enrolled 604 patients in the randomized cohort and 369 in the observational cohort. The baseline characteristics of the two cohorts were similar. The one-year crossover rates were high in the randomized cohort (approximately 40% in each direction) but moderate in the observational cohort (17% crossover to surgical care). The intention-to-treat analysis for the randomized cohort showed statistically significant effects for the primary outcomes. The as-treated analysis for both cohorts combined showed a significant advantage for surgery at 3 months that increased at 1 year and diminished slightly at 2 years. The treatment effects at 2 years were 18.1 for bodily pain (50% confidence interval [CI], 14.5 to 21.7), 18.3 for physical function (50% CI, 14.4 to 21.3), and -16.7 for the Oswestry Disability Index (50% CI, 21.5 to -11.9). There was little evidence of harm from either treatment. CONCLUSIONS: Establishment of minimum clinically important differences for measurements in an orthopaedic patient population with joint disorders. METHODS: Adult patients aged 18 years and older seeking care for joint conditions at an orthopaedic clinic took the Patient-Reported Outcomes Measurement Information System Physical Function (PROMIS PF) computerized adaptive test (CAT), hip disability and osteoarthritis outcome score for joint reconstruction (HOOS IR), and the knee injury and osteoarthritis outcome score for joint reconstruction (KOS IR) from February 2014 to April 2017. PROMIS were calculated using anchor-based and distribution-based methods. Patient reports of meaningful change in function since their first clinic encounter were used as an anchor. RESULTS: There were 2226 patients who participated with a mean age of 61.6 (SD = 12.8) years, 41.6% male, and 80.7% Caucasian. Mean change ranged from 7.70 to 8.65 for the PROMIS PF CAT, from −1.82 to 2.02 for the HOOS IR, and from 14.51 to 18.85 for the KOS IR. ROC cut-offs ranged from 1.57 to 1.88 for the PROMIS PF CAT, 6.39 to 40.36 for the HOOS IR, and 22.18 to 43.62 for the KOS IR. Distribution-based methods estimated MCID values ranging from 1.05 to 2.15 for the PROMIS PF CAT; from 3.60 to 43.61 for the HOOS IR; and from 3.98 to 40.67 for the KOS IR. The median MCID value in the range was similar to the mean change score for each measure and was 7.0 for the PROMIS PF CAT, 18.0 for the HOOS JR, and 15.3 for the KOOS JR. CONCLUSION: This is the first comprehensive study providing a wide range of MCIDs for the PROMIS® PF, HOOS JR, and KOS IR in orthopaedic patient joint ailments.

Page 3 of 42

September 2014 - Bone Collaborative Lumbar Fusion Evidence Table
Nonsurgical treatment versus surgery


BACKGROUND: The management of degenerative spondylolisthesis associated with spinal stenosis remains controversial. Surgery is widely used and has recently been shown to be more effective than nonoperative treatment when the results were followed over two years. Questions remain regarding the long-term effects of surgery compared with those of nonoperative treatment. METHODS: Surgical candidates from thirteen centers with symptoms of at least twelve weeks duration as well as confirmatory imaging showing degenerative spondylolisthesis with spinal stenosis were offered enrollment in a randomized cohort or observational cohort. Treatment consisted of standard decompressive laminectomy (with or without fusion) or usual nonoperative care. Primary outcome measures were the Short Form-36 (SF-36) bodily pain and physical function scores and the modified Oswestry Disability Index at six weeks, three months, six months, and yearly up to four years. RESULTS: In the randomized cohort (364 patients enrolled), 86% of those randomized to receive surgery improved in four years whereas 59% of those randomized to receive nonoperative care treated surgery by four years. In the observational cohort (383 patients enrolled), 87% of those who chose surgery received it whereas 11% of those who chose nonoperative care eventually received surgery. The intent-to-treat analysis of the randomized cohort, which was limited by nonreferral to the assigned treatment, showed no significant differences in treatment outcomes between the operative and nonoperative groups at three or four years. An as-treated analysis combining the randomized and observational cohorts that adjusted for potential confounders demonstrated that the clinically relevant advantages of surgery that had previously reported were maintained through four years, with treatment effects of 15.3 (95% confidence interval, 11.2 to 19.5) for bodily pain, 18.9 (95% confidence interval, 14.8 to 23.1) for physical function, and -14.3 (95% confidence interval, -17.5 to -11.1) for the Oswestry Disability Index. Early advantages (at two years) of surgical treatment in terms of the secondary measures of bothersomeness of back and leg symptoms, overall satisfaction with current symptoms, and self-rated progress were also maintained at four years. CONCLUSIONS: Compared with patients who are treated nonoperatively, patients in whom degenerative spondylolisthesis and associated spinal stenosis are treated surgically maintain substantially greater pain relief and improvement in function for four years.


Study Design: The Oswestry Disability Index (ODI) has become one of the principal condition-specific outcome measures for the management of spinal disorders. This review is based on publications using the ODI identified from the authors’ personal databases, the Science Citation Index, and hand searches of Spine and current issues of the Journal of Orthopaedic and Sports Medicine. OBJECTIVES: To review the versions of this instrument, document methods by which it has been validated, collate data from scores found in normal and back pain populations, provide current power prevalence estimates in studies using the ODI, and maintain the ODI as a gold-standard outcome measure. Summary of Background Data. It has now been 20 years since its original publication. More than 200 citations exist in the Science Citation Index. The authors have a large correspondence file relative to the ODI, that is cited in most of the large textbooks related to spinal disorders. Methods: All the published versions of the questionnaire were identified. A systematic review of this literature was made. The various versions of validation are collated and related to a version. Results: Four versions of the ODI are available in English and in other languages. Some published versions contain misprints, and many omit the scoring system. At least 15 studies of ODI data are needed to provide both validation and standards for other users and indicate the power of the instrument for detecting change in sample populations. Conclusions: The ODI remains a valid and vigorous measure and has been a worthwhile outcome measure. The process of using the ODI is reviewed and should be the subject of further research. The receiver operating characteristics should be explored in a population with higher self-report disabilities. The behavior of the instrument is incompletely understood, particularly in sensitivity to real change.

Study review results of ODIs and measures of validity and power to detect clinically relevant change. Somewhat limited search strategy, unclear quality assessment of individual studies. “The ODI correlates with the Short Form-36 (SF-36). ODI is a better predictor of return to work than two different mechanical methods of lumbar spine assessment.” Authors key points: The ODI has stood the test of time and many uses. It is available in a wide variety of applications as a condition-specific outcome measure of spine-related disability. Results of a meta-analysis show variations in estimated population means of ODI scores for different spinal diseases and changes after treatment consistent with clinical experience.” 4 Favor standard decompressive laminectomy versus nonoperative care for patients with spinal stenosis.

Four-year study. A combination: randomized and observational study with substantial crossover. Patients with spondylolisthesis and spinal stenosis were treated surgically or with ill-defined conservative therapy. Surgical care included laminectomy with or without fusion. A randomized study of surgical versus nonoperative treatment for secondary measures such as bothersomeness, overall satisfaction with current symptoms, and self-rated progress were also maintained at four years. Analysis of observational cohort showed benefit from surgery. (see Weinstein 2007 for the 2y results)
BACKGROUND AND PURPOSE: The aim of this study was to examine 5 commonly used questionnaires for measuring disability in people with low back pain. The modified Oswestry Disability Questionnaire, the Quebec Back Pain Disability Scale, the Roland-Morris Disability Questionnaire, the Waddell Disability Index, and the physical health scales of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) were compared in patients undergoing physical therapy for low back pain. SUBJECTS AND METHODS: Patients with low back pain completed the questionnaire during initial consultation with a physical therapist and again 6 weeks later (n=100). Test-retest reliability was examined for a group of 47 subjects who were classified as "unchanged" and a subgroup of 16 subjects who were self-rated as "about the same." Responsiveness was compared using standardized response means, receiver operating characteristic curves, and the proportions of subjects who changed by at least as much as the minimum detectable change (MDC) (90% confidence interval (CI) of the standard error for repeated measures). Scale width was judged as adequate if no more than 15% of the subjects had initial scores at the upper or lower end of the scale that were insufficient to allow change to be reliably detected. RESULTS: Intraclass correlation coefficients (ICCs) calculated to measure reliability for the subjects who were classified as "unchanged" and those who were self-rated as "about the same" were greater than 0.80 for the Oswestry and Quebec questionnaires and the SF-36 Physical Functioning scale and less than 0.70 for the Waddell and Roland-Morris questionnaires and the SF-36 Role Limitations-Physical and Bodily Pain scales. None of the scales were more responsive than any other. DISCUSSION AND CONCLUSION: Measurements obtained with the modified Oswestry Disability Questionnaire, the SF-36-Physical Functioning scale, and the Quebec Back Pain Disability Scale were the most reliable and had sufficient width to reliably detect improvement or worsening in most subjects. The reliability of measurements obtained with the Waddell Disability Index was moderate, but the scale appeared to be insufficient to recommend it for clinical application. The Roland-Morris Disability Questionnaire and the SF-36 Role Limitations-Physical and Bodily Pain scales of the SF-36 appeared to lack sufficient reliability and scale width for clinical application.

OBJECT: It is not known whether adding fusion to lumbar decompression is necessary for all patients undergoing surgery for degenerative lumbar spondylolisthesis with symptomatic spondylolisthesis. Screening specific radiographic traits that might predict delayed instability following decompression surgery might guide clinical decision making regarding the utility of up-front fusion in patients with degenerative-grade I spondylolisthesis. METHODS: Patients with Grade I degenerative lumbar spondylolisthesis (3-14 mm) with symptomatic spondylolisthesis were prospectively enrolled from a single site between May 2002 and September 2009 and treated with decompression laminectomy without fusion. Patients with mechanical back pain or with gross motion (≥3 mm) in flexion-extension lumbar radiographs were excluded. The baseline radiographic variables measured included amount of slippage, disc height, facet angle, motion at spondylolisthesis (flexion-extension), and sagittal endpoint angle. Data were analyzed using multivariate forward selection stepwise logistic regression, 0.05 entry, and 0.10 removal tests. Patient 1 test, and ANOVA. RESULTS: Forty patients were enrolled and treated with laminectomy without fusion, and all patients had complete radiographic data sets that were available for analysis. Reoperation was performed in 3 (7.5%) of 40 patients, with a mean follow-up duration of 3.6 years. Reoperation was performed for pain caused by instability at the index level in all 3 cases. Using multivariate stepwise logistic regression with a threshold of 0.05, motion at spondylolisthesis, disc height, and facet angle were predictors of reoperation following surgery. Facet angle >50° was associated with a 38% rate of reoperation, disc height >6.5 mm was associated with a 45% rate of reoperation, and motion at spondylolisthesis >1.25 mm was associated with a 54% rate of reoperation. Patients with all 3 risk factors for instability had a 75% rate of reoperation, whereas patients with no risk factors for instability had a 0% rate of reoperation (p = 0.14). CONCLUSION: Patients with motion at spondylolisthesis >1.25 mm, disc height >6.5 mm, and facet angle >50° are more likely to experience instability following decompression surgery. The Grade I spondylolisthesis identification of key risk factors for instability might improve patient selection for decompression without fusion surgery.
Reference Textbooks: *Textbook.* "The grade of spondylolisthesis is rated by the percentage of slippage of the vertebrae below the superior surface of the vertebral body in the frontal plane.*


Reference Textbooks: *Textbook.* "The grade of spondylolisthesis is rated by the percentage of slippage of the vertebrae below the superior surface of the vertebral body in the frontal plane. At least 5% slippage must be present for a diagnosis of spondylolisthesis to be confirmed. Slippage can be further categorized into five grades: grade I indicates slippage from 5% to 20%; grade II is 26% to 50%; grade III is 51% to 75%; grade IV is more than 75%; and grade V is complete dislocation of adjacent vertebrae, also called spondyloptosis. Most cases (60-75%) are classified as grade I, 20% to 38% are classified as grade II and less than 2% of all cases are graded III, IV, or V. J Selig of grade V or more is associated with increased risk of radicular pain or weakness, and it is always associated with moderate to severe degeneration of the lumbar spine.*

Reference Textbooks: *Textbook.* "Deflexion grades of spondylolisthesis to assist in interpreting Labor and Industries imaging standards".

Reference Textbooks: *Textbook.* "A retrospective cohort study assessing the correlation of preoperative facet joint effusion with % slip on upright X-ray on supine MRI. Study established a correlation between effusion and slippage of vertebrae. Authors acknowledge the difficulty in achieving consistent imaging findings. Did not include functional measures pre or post operatively."

Reference Textbooks: *Textbook.* "Renewed interest in lateral cross-table imaging has an adjunct in evaluation of degenerative spondylolisthesis on the basis of upright flexion, neutral and extension lateral radiographs. Supine cross table lateral imaging revealed greater mobility when compared to traditional lateral radiographs. Facet joint effusion is clearly correlated with spontaneous reduction of the extent of slippage in the supine position compared to the upright position. Also, the greater the difference in right and left facet effusion, the higher the likelihood of having a PET. Future studies should assess whether analysis of facet joint effusion measures on routine MRI can help in decision-making regarding the optimal surgical treatment to be applied (decompression alone or combined with fusion)."

Reference Textbooks: *Textbook.* "Supine cross table lateral imaging revealed greater mobility when compared to traditional lateral radiographs. Facet joint effusion is clearly correlated with spontaneous reduction of the extent of slippage in the supine position compared to the upright position. Also, the greater the difference in right and left facet effusion, the higher the likelihood of having a PET. Future studies should assess whether analysis of facet joint effusion measures on routine MRI can help in decision-making regarding the optimal surgical treatment to be applied (decompression alone or combined with fusion)."

Reference Textbooks: *Textbook.* "Accurate evaluation of segmental instability is critical to increase the amount of segmental instability seen in single-level lumbar spondylolisthesis, when compared to traditional lateral flexion-extension radiographs. We hypothesized that supine radiographs increase the amount of segmental instability seen in single-level lumbar spondylolisthesis when compared to flexion-extension. SUMMARY OF BACKGROUND DATA: Accurate evaluation of segmental instability is critical to the management of lumbar spondylolisthesis. Standing flexion-extension lateral radiographs are routinely obtained, as it is believed to precipitate the forward-backward motion of the segment; however, recent studies with magnetic resonance imaging and computed tomography have shown that the relaxed supine position can facilitate the reduction of the anterolisthetic segment. Here, we show that inclusion of supine lateral radiographs increases the amount of segmental instability seen in single-level lumbar spondylolisthesis when compared to traditional lateral flexion-extension radiographs. METHODS: Supine lateral radiographs were added to the routine evaluation (standing neutral/flexion/extension lateral radiographs) of symptomatic degenerative spondylolisthesis at our institution. In this retrospective study, 59 patients were included. The amount of slippage was measured and compared on each radiograph: standing neutral lateral ("neutral"), standing flexion lateral ("flexion"), standing extension lateral ("extension"), and supine lateral ("supine"). RESULTS: A total of 59 patients (21 women, 38 men), with a mean age of 62.3 years (18.05) were included. The mobility seen with flexion-extension was 5.53 ± 6.11. The mobility seen with flexion-supine was 7.80 ± 4.67. This difference was significant in paired t-test (P = 0.033), and independent of age and body mass index. Increased mobility was seen between flexion and supine radiographs in 37 patients, between neutral and supine radiographs in 11 cases, and between standing flexion-extension studies in 11 cases. CONCLUSION: Supine cross table lateral imaging revealed greater mobility when compared to conventional imaging positions. Did not compare findings of lateral imaging on patients with back pain but without spondylolisthesis on conventional imaging. Study did not include patients without back pain.

Reference Textbooks: *Textbook.* "Supine cross table lateral imaging has an adjunct in evaluation of patients with back pain and spondylolisthesis. Reviewers judged that imaging findings were an "intermediate outcome" rather than a clear "patient oriented outcome.""

Reference Textbooks: *Textbook.* "Facet joint effusion is clearly correlated with spontaneous reduction of the extent of slippage in the supine position compared to the upright position. Also, the greater the difference in right and left facet effusion, the higher the likelihood of having a PET. Future studies should assess whether analysis of facet joint effusion measures on routine MRI can help in decision-making regarding the optimal surgical treatment to be applied (decompression alone or combined with fusion)."

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26 Surgical procedure

1/8 NICE Guidance: Interventions procedures guidance (PG574) Lateral interbody fusion in the lumbar spine for low back pain. Published date: February 2017

Guidance evidence table can be found here:

"The NICE guidance states that lateral interbody fusion in the lumbar spine for low back pain is associated with serious but well-recognised complications. Evidence on efficacy is inadequate in quantity and quality. Therefore, this procedure may be used provided that standard arrangements are in place for clinical governance, consent and audits. 1.2 This procedure should only be done by surgeons with specific training in the technique, who should carry out their initial procedures with an experienced mentor. 1.3 Clinicians should enter details about all patients having lateral interbody fusion in the lumbar spine for low back pain onto the British Spine Registry."  

27 Surgical procedure


BACKGROUND: Hospital charges for lumbar spinal stenosis have increased significantly worldwide in recent times, with great variation in the costs and rates of different surgical procedures. There have also been significant increases in the rate of complex fusion and the use of spinal spacer implants compared to that of traditional decompression surgery, even though the former is known to incur costs up to three times higher. Moreover, the superiority of these new surgical procedures over traditional decompression surgery is still unclear.

OBJECTIVES: To determine the efficacy of surgery in the management of patients with symptomatic lumbar spinal stenosis and the comparative effectiveness between commonly performed surgical techniques to treat this condition on patient-related outcomes. We also aimed to investigate the safety of these surgical interventions by including perioperative surgical data and reoperation rates.

SEARCH METHODS: We performed systematic searching of the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, CINAHL, AMED, Web of Science, LIAC and three trials registries from their inception to 16 June 2016. Authors also conducted citation tracking on the reference lists of included trials and relevant systematic reviews. SELECTOR CRITERIA: This review included only randomised controlled trials that investigated the efficacy and safety of surgery compared with no treatment, placebo or sham surgery, or with another surgical technique in patients with lumbar spinal stenosis.

DATA COLLECTION AND ANALYSIS: Two reviewers independently assessed the studies for inclusion and performed the Risk of bias assessment, using the Cochrane Back and Neck Review Group criteria. 

MAIN RESULTS: We included a total of 24 randomised controlled trials (reported in 39 published research articles or abstracts) in this review. The trials included 4,955 patients; 2,695 were assigned to surgery and 2,260 to control group participants. There was substantial heterogeneity in the surgery interventions by including perioperative surgical data and reoperation rates. 

STUDY DESIGN: Prospective trials with nationwide inclusion and data collection. OBJECTIVE: To evaluate the effectiveness and safety of surgery compared with control group participation in patients with symptomatic lumbar spinal stenosis.

MAIN RESULTS: We included a total of 24 randomised controlled trials (reported in 39 published research articles or abstracts) in this review. The trials included 4,955 patients; 2,695 were assigned to surgery and 2,260 to control group participants. There was substantial heterogeneity in the surgery interventions by including perioperative surgical data and reoperation rates. 

28 Non-surgical treatment: Physiotherapist consultation


BACKGROUND: Hospital charges for lumbar spinal stenosis have increased significantly worldwide in recent times, with great variation in the costs and rates of different surgical procedures. There have also been significant increases in the rate of complex fusion and the use of spinal spacer implants compared to that of traditional decompression surgery, even though the former is known to incur costs up to three times higher. Moreover, the superiority of these new surgical procedures over traditional decompression surgery is still unclear.

OBJECTIVES: To determine the efficacy of surgery in the management of patients with symptomatic lumbar spinal stenosis and the comparative effectiveness between commonly performed surgical techniques to treat this condition on patient-related outcomes. We also aimed to investigate the safety of these surgical interventions by including perioperative surgical data and reoperation rates.

SEARCH METHODS: We performed systematic searching of the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, CINAHL, AMED, Web of Science, LIAC and three trials registries from their inception to 16 June 2016. Authors also conducted citation tracking on the reference lists of included trials and relevant systematic reviews. SELECTOR CRITERIA: This review included only randomised controlled trials that investigated the efficacy and safety of surgery compared with no treatment, placebo or sham surgery, or with another surgical technique in patients with lumbar spinal stenosis.

DATA COLLECTION AND ANALYSIS: Two reviewers independently assessed the studies for inclusion and performed the Risk of bias assessment, using the Cochrane Back and Neck Review Group criteria. 

MAIN RESULTS: We included a total of 24 randomised controlled trials (reported in 39 published research articles or abstracts) in this review. The trials included 4,955 patients; 2,695 were assigned to surgery and 2,260 to control group participants. There was substantial heterogeneity in the surgery interventions by including perioperative surgical data and reoperation rates. 

STUDY DESIGN: Prospective trials with nationwide inclusion and data collection. OBJECTIVE: To evaluate the effectiveness and safety of surgery compared with control group participation in patients with symptomatic lumbar spinal stenosis.

MAIN RESULTS: We included a total of 24 randomised controlled trials (reported in 39 published research articles or abstracts) in this review. The trials included 4,955 patients; 2,695 were assigned to surgery and 2,260 to control group participants. There was substantial heterogeneity in the surgery interventions by including perioperative surgical data and reoperation rates. 

29 Non-surgical treatment: Spinal fusion


Main results: 
Prospective cohort study with historical controls sponsored by a health plan and including 6 health systems that compared rates of spine surgery with or without a consultation with a physiatrist. A physiatry consultation was required to qualify as a Center of Excellence. When physiatry consultation was required the rates of spine surgery decreased. "Increased referrals to physiatrists did not result in a substantial increase in electrodiagnostic testing or surgical biopsies (P > 0.05) between the 2 time periods. "79% of patients were satisfied or very satisfied with a physiatrist.

Surgical rates decreased with a mandatory consultation with a physiatrist while maintaining satisfactory patient satisfaction.

September 2014 - Bree Collaborative Lumbar Fusion Evidence Table
A randomized control trial of 220 patients with back pain and an ODI score of 20 or higher, symptom duration of less than 16 days and without "red flag" findings that received four physical therapy sessions. Control group received educational sessions but no physical therapy.

OUTCOMES AND MEASURES: Primary outcome was change in the ODI score (range: 0-100; higher scores indicate greater disability; minimum clinically important difference, 6 points) at 3 months. Secondary outcomes included changes in the ODI score at 4-week and 1-year follow-up, and change in pain intensity. Pain Catastrophizing Scale (PCS) score, fear-avoidance beliefs, quality of life, patient-reported success, and healthcare utilization at 4-week, 3-month, and 1-year follow-up. RESULTS: One-year follow-up was completed by 207 participants (94.1%). Using analysis of covariance, early physical therapy showed improvement relative to usual care in disability after 3 months (mean ODI score: early physical therapy group, 41.3 [95% CI: 38.7 to 44.0] at baseline to 6.6 [95% CI, 4.7 to 8.5] at 3 months; usual care group, 40.0 [95% CI: 38.6 to 41.2] to baseline to 8.9 [95% CI, 7.9 to 11.7] at 3 months; between-group difference, -3.2 [95% CI, 0.5 to 5.9], P < .02). A significant difference was found between groups for the ODI score after 4 weeks (between-group difference, -3.1 [95% CI, 0.6 to 5.6], P < .05), but not at 1-year follow-up (between-group difference, -2.0 [95% CI, 0.5 to 3.5], P = .19). There was no improvement in pain intensity at 4-week, 3-month, or 1-year follow-up (between-group difference, 0.42 [95% CI, 0.00 to 0.82] at 4-week follow-up; 0.18 [95% CI, 0.04 to 0.32] at 3-month follow-up; and 0.17 [95% CI, 0.02 to 0.32] at 1-year follow-up). The PCS scores improved at 4 weeks and 3 months but not at 1-year follow-up (between-group difference, -2.7 [95% CI, 4.6 to 0.4]) at 4-week follow-up; -2.2 [95% CI, 1.9 to 4.0] at 3-month follow-up; and -0.3 [95% CI, 2.7 to 0.4] at 1-year follow-up). There were no differences in health care utilization at any point. CONCLUSIONS AND RELEVANCE: Among adults with recent-onset LBP, early physical therapy resulted in statistically significant improvement in disability, but the data does not support the value of early physical therapy in reducing improvement or healthcare utilization in patients with uncomplicated low back pain.

Abstract: We aimed to evaluate the available evidence on the effectiveness of surgical interventions for a number of conditions resulting in low back pain (LBP) or spine-related irradiating leg pain. We searched the Cochrane databases and PubMed up to June 2013. We included systematic reviews and randomised controlled trials (RCTs) on degenerative disc disease (DDD), herniated disc, spondylolisthesis and spinal stenosis due to degenerative osteoarthritis. We included comparisons between surgery and conservative care and between different techniques. The quality of the systematic reviews was evaluated using assessment of multiple systematic reviews (AMSTAR). Twenty systematic reviews were included which covered the following diagnoses: disc herniation (n = 9), spondylolisthesis (n = 2), spinal stenosis (n = 1), ODI (n = 2) and combinations (n = 2). For most of the comparisons, no significant and/or clinically relevant difference between interventions were identified. In general, surgery is only indicated for relief of leg pain in clear indications such as disc herniation, spondylolisthesis or spinal stenosis. Copyright 2013. Published by Elsevier Ltd.
BACKGROUND CONTEXT: The evidence-based clinical guideline on the diagnosis and treatment of degenerative lumbar spinal stenosis by the North American Spine Society (NASS) provides evidence-based recommendations to address key clinical questions surrounding the diagnosis and treatment of degenerative lumbar spinal stenosis. The guideline is intended to reflect contemporary treatment concepts for symptomatic degenerative lumbar spinal stenosis as reflected in the highest quality clinical literature available on this subject as of July 2010. The goals of the guideline recommendations are to assist in delivering optimum efficacious treatment and functional recovery from this spinal disorder. PURPOSE: Provide an evidence-based educational tool to assist spine care providers in improving quality and efficiency of care delivered to patients with degenerative lumbar spinal stenosis.

STUDY DESIGN: Systematic review and evidence-based clinical guidelines. METHODS: This report is from the Degenerative Lumbar Spinal Stenosis Work Group of the NASS’s Evidence-Based Clinical Guideline Development Committee. The work group consisted of multidisciplinary spine care specialists trained in the principles of evidence-based analysis. The original guideline, published in 2006, was carefully reviewed. A literature search addressing each question and using a specific search protocol was performed on English language references found in MEDLINE, EMBASE ( Drugs and Pharmocology), and four additional evidence-based databases to identify articles published since the search performed for the original guideline. The relevant literature was then independently rated by a minimum of three physician reviewers using the NASS-adopted standardized levels of evidence. An evidentiary table was created for each of the questions. Final recommendations to answer each clinical question were arrived at via work group discussion, and grades were assigned to the recommendations using standardized grades of recommendation. In the absence of Levels I to IV evidence, work group consensus statements have been developed using a modified nominal group technique, and these statements are clearly identified as such in the guideline. RESULTS: Sixteen key clinical questions were assessed, addressing issues of natural history, diagnosis, and treatment of degenerative lumbar spinal stenosis. The answers are summarized in this document. The respective recommendations were graded by the strength of the supporting literature that was stratified by levels of evidence.

CONCLUSIONS: Reasonably well-detailed methods section on: evidence grading and guideline development. Cohort is patients with spinal stenosis in 10 years and older with a chief complaint of degenerative disc disease or spondylolisthesis. Among the recommendations are: 4-level recommendation that validated criteria should be used for interpreting imaging studies. Work Group consensus that physical therapy is an option for patients with lumbar spinal stenosis, unsupplemented by reliable evidence. 4-level recommendation for the use of laminae screw to increase walking distance and decrease pain in patients with lumbar spinal stenosis. Insufficient evidence to support use of traction, electrical stimulation, TENS, or acupuncture. Cervical evidence that medical interventional treatment may provide improvement for 0-10 years. 4-level recommendation that decompressive surgery may improve outcomes in patients with moderate to severe symptoms of lumbar spinal stenosis. 4-level recommendation that decompression alone is suggested for patients with leg predominant symptoms without instability. One Kreiner article on possible updated edition of this document. 9 Society guideline on management of lumbar stenosis emphasizing standards on interpretation of imaging, conservative care and decompressive surgery in the absence of spinal instability.

Degeneration of the lumbar spine is described as: lumbar spondylosis, degenerative disc disease and may lead to spinal stenosis (narrowing of the spinal canal), vertebral instability and/or enlargement, which may be associated with back pain and/or leg symptoms. This review considers the available evidence on the procedures to spinal decompression (widening the spinal canal or laminectomy), nerve root decompression (of one or more individual nerves) and fusion of adjacent vertebrae.


Cohort is patients with spinal stenosis in 18 years and older with a chief complaint of degenerative disc disease, for spondylolisthesis, considerable uncertainty exists due to lack of data, particularly for older patients.

Evidence based clinical guideline

Promotes an update to the NASS Guidelines, 2011, cited below.

The guideline reflects contemporary treatment concepts for symptomatic degenerative lumbar spinal stenosis as reflected in the highest quality clinical literature available on the subject as of July 2010.

The guideline is intended to reflect contemporary treatment concepts for symptomatic degenerative lumbar spinal stenosis by the North American Spine Society (NASS) provides evidence-based recommendations to address key clinical questions surrounding the diagnosis and treatment of degenerative lumbar spinal stenosis. The guideline is intended to reflect contemporary treatment concepts for symptomatic degenerative lumbar spinal stenosis as reflected in the highest quality clinical literature available on this subject as of July 2010. The goals of the guideline recommendations are to assist in delivering optimum efficacious treatment and functional recovery from this spinal disorder. PURPOSE: Provide an evidence-based educational tool to assist spine care providers in improving quality and efficiency of care delivered to patients with degenerative lumbar spinal stenosis.

Degenerative lumbar spinal stenosis was defined as: Pain or at least pain and at least one of: radicular pain, at least one leg weakness, at least one leg numbness, at least one leg sensory loss, or at least one leg increasing pain with standing and walking. Non-painful criteria alone were not required. Patients were required to have at least one leg symptom with degenerative lumbar spinal stenosis. Patients were required to have at least one radicular pain with degenerative lumbar spinal stenosis.

The guideline is intended to reflect contemporary treatment concepts for symptomatic degenerative lumbar spinal stenosis as reflected in the highest quality clinical literature available on this subject as of July 2010. The goals of the guideline recommendations are to assist in delivering optimum efficacious treatment and functional recovery from this spinal disorder. PURPOSE: Provide an evidence-based educational tool to assist spine care providers in improving quality and efficiency of care delivered to patients with degenerative lumbar spinal stenosis.

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Evidence based clinical guideline

Promotes an update to the NASS Guidelines, 2011, cited below.
Nonsurgical treatment


RECOMMENDATION 1: Clinicians should conduct a focused history and physical examination to help place patients with low back pain into 1 of 3 broad categories: nonspecific low back pain, back pain potentially associated with radiculopathy or spinal stenosis, or back pain potentially associated with another specific spinal cause. The history should include assessment of psychosocial risk factors, which predict risk for chronic disabling back pain (strong recommendation, moderate-quality evidence). RECOMMENDATION 2: Clinicians should not routinely obtain imaging or other diagnostic tests in patients with nonspecific low back pain (strong recommendation, moderate-quality evidence). RECOMMENDATION 3: Clinicians should perform diagnostic imaging and testing for patients with low back pain when severe or progressive neurologic deficits are present or when serious underlying conditions are suspected on the basis of history and physical examination (strong recommendation, moderate-quality evidence). RECOMMENDATION 4: Clinicians should evaluate patients with persistent low back pain and signs or symptoms of radiculopathy or spinal stenosis with magnetic resonance imaging (preferred) or computed tomography only if they are potential candidates for surgery or epidural steroid injection (for suspected radiculopathy) (strong recommendation, moderate-quality evidence). RECOMMENDATION 5: Clinicians should provide patients with evidence-based information on low back pain with regard to their expected course, advise patients to remain active, and provide information about effective self-care options (strong recommendation, moderate-quality evidence). RECOMMENDATION 6: For patients with low back pain, clinicians should consider the use of medications with proven benefits in conjunction with back-care information and self-care. Clinicians should assess severity of baseline pain and functional deficits, potential benefits, risks, and relative lack of long-term efficacy and safety data before initiating therapy (strong recommendation, moderate-quality evidence). For most patients, first-line medication options are acetaminophen or nonsteroidal anti-inflammatory drugs. RECOMMENDATION 7: For patients who do not improve with self-care options, clinicians should consider the addition of nonpharmacologic therapy with proven benefits for acute low back pain, spinal manipulation; for chronic or subacute low back pain, interdisciplinary rehabilitation, exercise therapy, acupuncture, massage therapy, spinal manipulation, cognitive behavioral therapy, or progressive relaxation (weak recommendation, moderate-quality evidence).

Efficacy of paracetamol for acute low-back pain: a double-blind, randomised controlled trial. Lancet. 2014 Nov 1;384(9954):1586-96. PMID: 25064594

Abstract: Background: Regular paracetamol is the recommended first-line analgesic for acute low-back pain; however, no high-quality evidence supports this recommendation. We aimed to assess the efficacy of paracetamol taken regularly or as needed to improve time to recovery from pain, compared with placebo. Methods: We did a multicentre, double-blind, randomised, placebo-controlled trial across 233 primary care centres in Sydney, Australia, from Nov 11, 2009, to March 5, 2013. We randomly allocated patients with acute low-back pain in a 1:1:1 ratio to receive up to 4 weeks of regular doses of paracetamol (three times per day; equivalent to 3990 mg paracetamol per day), as-needed doses of paracetamol (taken when needed for pain relief; maximum 4000 mg paracetamol per day), or placebo. Randomisation was done according to a centralised randomisation schedule prepared by a researcher who was not involved in patient recruitment or data collection. Patients and staff at all sites were masked to treatment allocation. All participants received best-evidence advice and were followed up for 3 months. The primary outcome was time to recovery from low back pain, with recovery defined as a pain score of 1 or 2 (on a 0-5 pain scale) sustained for 7 consecutive days. All data were analysed by intention to treat. This study is registered with the Australian and New Zealand Clinical Trial Registry, number ACTN 12609000966291. Findings: 550 participants were assigned to the regular group (550 analysed), 549 were assigned to the as-needed group (546 analysed), and 553 were assigned to the placebo group (547 analysed). Median time to recovery was 17 days (IQR 14–19) in the regular group, 17 days (15–20) in the as-needed group, and 16 days (14–20) in the placebo group. The median time to recovery was 17 days (IQR 14–19) in the regular group, 17 days (15–20) in the as-needed group, and 16 days (14–20) in the placebo group (placebo hazard ratio 0·99, 95% CI 0·87–1·14; as-needed vs placebo 1·05, 0·92–1·19; regular vs placebo 0·99, 95% CI 0·87–1·11; regular vs as-needed 1·06, 0·92–1·22). We recorded no difference between treatment groups for time to recovery (adjusted p=0·79). Adherence to regular tablets (median tablets consumed per participant per day of maximum 6; 4·0 [IQR 1·6–5·7] in the regular group, 3·9 [1·5–5·6] in the as-needed group, and 4·0 [1·5–5·7] in the placebo group), and number of participants reporting adverse events (99 [18·5%] in the regular group, 98 [18·7%] in the as-needed group, and 98 [18·7%] in the placebo group) were similar between groups. Interpretation: Our findings suggest that regular or as-needed dosing with paracetamol does not affect recovery time compared with placebo in low back pain, and question the universal endorsement of paracetamol in this patient group. Funding: National Health and Medical Research Council of Australia and Waikato Apollo Aotearoa.

High-quality RCT, blinded with concealed allocation, intention to treat analysis, adequate statistical power, and follow up (12 weeks). Paracetamol was found to be neither standard in reducing time to recovery from pain, nor does not support the use of paracetamol for patients with low back pain. Authors speculate that resources had a positive benefit to patients with low back pain. Given safety profile and cost, not an unreasonable option to trial but likely ineffective.
BACKGROUND: Back pain remains a challenge for primary care internationally. One model that has not been tested is stratification of the management according to the patient's prognosis (low, medium, or high-risk). We compared the clinical effectiveness and cost-effectiveness of stratified primary care (intervention) with non-stratified current best practice (control). METHODS: 1075 adults (aged 34 years) with back pain (with or without radiologically) consultation, at ten general practices in England responded to invitations to attend an assessment clinic. Eligible participants were randomly assigned by use of computer-generated stratified blocks with a 2:1 ratio to intervention or control group. Primary outcome was the effect of treatment on the Roland Morris Disability Questionnaire (RMDQ) score at 12 months. In the economic evaluation, we focused on estimating incremental quality-adjusted life years (QALYs) and health care costs related to back pain. Analysis was by intention to treat. This study was registered, number CR000711,120653. FINDINGS: 815 patients were assigned to the intervention (n=494) and control group (n=321). Overall, adjusted mean changes in RMDQ scores were significantly higher in the intervention group than in the control group at 4 months (4.7 [SD 1.5] vs 4.3 [SD 1.5]), between group difference 1.81 [95% CI 0.62-3.0] and at 12 months (3.4 [SD 2.3] vs 3.9 [SD 2.1], 1.04 [0.32-1.86]), equating to effect sizes of 0.32 (95% [0.09-0.55]) and 1.09 (0.46-1.73), respectively. At 12 months, stratified care was associated with a mean increase in generic health benefit (€105 additional QALY) and cost savings (€240 IG vs €274 IG) compared with the control group. INTERPRETATION: The results show that a stratified approach, by use of prognostic screening with matched pathways, will have important implications for the future management of back pain in primary care. FUNDING: Arthritis Research UK.

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 73%, 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 65% of all surgical procedures. Of 740 patients surveyed, 68% were satisfied or very satisfied with the physiatry consultation. Only 40% of patients who underwent previous spine surgery were satisfied. Although surgical rates decreased at 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 decreased overall cost. Although spinal fusion rates dropped, the percentage of fusion operations increased from 55% to 65% of all surgical procedures. Of 740 patients surveyed, 68% were satisfied or very satisfied with the physiatry consultation. Only 40% of patients who underwent previous spine surgery were satisfied. Although surgical rates decreased at regional hospitals and all surgical groups, there were substantial shifts in market share.

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: 1573 adults (aged ≥18 years) with back pain (with or without radiculopathy) consultations at ten general practices in England responded to invitations to attend an assessment clinic. Eligible participants were randomly assigned by use of computer-generated stratified blocks with a 2:1 ratio to intervention or control group. Primary outcome was the effect of treatment on the Roland Morris Disability Questionnaire (RMDQ) score at 12 months. In the economic evaluation, we focused on estimating incremental quality-adjusted life years (QALYs) and health care costs related to back pain. Analysis was by intention to treat. This study was registered, number CR000711,120653. FINDINGS: 815 patients were assigned to the intervention (n=494) and control group (n=321). Overall, adjusted mean changes in RMDQ scores were significantly higher in the intervention group than in the control group at 4 months (4.7 [SD 1.5] vs 4.3 [SD 1.5]), between group difference 1.81 [95% CI 0.62-3.0] and at 12 months (3.4 [SD 2.3] vs 3.9 [SD 2.1], 1.04 [0.32-1.86]), equating to effect sizes of 0.32 (95% [0.09-0.55]) and 1.09 (0.46-1.73), respectively. At 12 months, stratified care was associated with a mean increase in generic health benefit (€105 additional QALY) and cost savings (€240 IG vs €274 IG) compared with the control group. INTERPRETATION: The results show that a stratified approach, by use of prognostic screening with matched pathways, will have important implications for the future management of back pain in primary care. FUNDING: Arthritis Research UK.
Nonsurgical treatment


INTRODUCTION: One objective of the present research was to examine the degree to which psychological risk factors could be reduced through participation in a community-based psychosocial intervention for work-related musculoskeletal disorders. A second objective was to examine whether psychosocial risk reduction had an effect on the probability of return to work. METHODS: Participants were 215 Workers Compensation Board claimants with work-related musculoskeletal disorders who had been absent from work for an average of approximately 7 months (M = 28.6 weeks, range = 4-120 weeks) and were referred to a community-based multidisciplinary secondary prevention program in Nova Scotia, Canada. RESULTS: In the current sample, 42.7% of participants returned to work within 4 weeks of treatment termination. The percentage reductions in targeted risk factors from pretreatment to posttreatment were as follows: catastrophizing (28%), fear of movement (54%), fear of re-injury (11%), and perceived disability (20%). Logistic regression indicated that elevated pretreatment scores on fear of movement and re-injury (OR = 1.58, 95% CI = 1.03-2.40) and pain severity (OR = 1.64, 95% CI = 1.04-2.59) were associated with a lower probability of return to work. A second logistic regression addressing the relationship between risk factor reduction and return to work revealed that only reductions in pain catastrophizing (OR = 0.17, 95% CI = 0.01-0.46) were significant predictors of return to work. CONCLUSIONS: The results of the present study provide further evidence that risk factor reduction can impact positively on short term return to work outcomes. SIGNIFICANCE: Outcomes of rehabilitation programs for work disability might be improved by incorporating interventions that specifically target catastrophic thinking. Community-based models of psychosocial intervention might represent a viable approach to the management of work disability associated with musculoskeletal disorders.

RCT of pts age 25-60 w/ chronic LBP and isolated disc degeneration, comparing lumbar fusion (and post-op PT) to cognitive intervention w/ individualized goals and exercise plans. Randomized, concealed allocation, single-blinded (outcome assessors), intention-to-treat, near complete CI, but small cohort and some cross-over of patients between treatment groups. No difference in primary outcome (ODI) w/ moderately wide confidence intervals, though confidence intervals do exclude a statistically meaningful effect on ODI (noted in the paper to be >12 points). Surgical complication rate was 18%. Fear avoidance beliefs and fingertip-floor distance were reduced more after non-surgical treatment, and lower limb pain was reduced more after surgery. The success rate according to an independent observer was 78% after surgery and 76% after cognitive interventions and exercise. A supports conclusion that lumbar fusion offers no greater benefit than non-surgical care for patients with low back pain and disc degeneration. Complication rate of 18% (CI 95%) included wound infection, bleeding, venous thrombosis and dural tear.

Chronic low back pain and disc degeneration. Complication rate of 18% (CI 95%) included wound infection, bleeding, venous thrombosis and dural tear. Not available without a subscription. For more information, please contact your local library or obtain a copy of this article.


E supports use of behavior therapy in patients with workers' compensation claims.

B supports use of behavior therapy in patients with workers' compensation claims.

STUDY DESIGN: Prospective population-based cohort study. OBJECTIVE: To identify early predictors of chronic work disability after work-related back injury. SUMMARY OF BACKGROUND DATA: Identification of early predictors of prolonged disability after back injury could improve understanding concerning the development of chronic, disabling pain, and aid in secondary prevention. Few studies have examined predictors across multiple domains in large, population-based samples. METHODS: Workers (N = 1805) were interviewed 2 weeks (average) after submitting a lost work-time claim for a back injury, sociodemographic, employment-related, pain and function, clinical, health care, administrative/legal, health behavior, and psychological domain variables were assessed via worker interviews, medical records, and administrative databases. Logistic regression analyses identified early predictors of work disability compensation 1 year after claim submission. RESULTS: Significant baseline predictors of 1 year work disability in the final multivariable model were injury severity (rated from medical records), specialty of the first health care provider seen for the injury (obtained from administrative data), and worker-reported physical disability (Roland-Morris disability questionnaire), number of pain sites, "very hectic" job, no offer of a job accommodation (e.g., light duty), and previous injury involving a month or more off work. The model showed excellent ability to discriminate between workers who were not disabled at 1 year (area under the receiver operating characteristic curve = 0.86, 95% CI [0.82-0.90]). CONCLUSION: Among workers with new lost work-time back injury claims, risk factors for chronic disability include radiculopathy, substantial functional disability, and a less severe, more widespread pain and previous injury with extended time off work. The roles of employers and health care providers also were important, supporting the need to incorporate factors external to the worker in models of the development of chronic disability and in disability prevention efforts.

OBJECTIVES: To assess the clinical effectiveness of surgical stabilization (spinal fusion) compared with intensive rehabilitation for patients with chronic low back pain. DESIGN: Multicentre randomised controlled trial. SETTING: 15 secondary care orthopaedic and rehabilitation centres across the United Kingdom. PARTICIPANTS: 349 patients aged 18-55 who had chronic low back pain of at least one year duration who were considered candidates for spinal fusion. INTERVENTION: Lumbar spine fusion or an intensive rehabilitation programme based on principles of cognitive behaviour therapy. MAIN OUTCOME MEASURE: The primary outcomes were the Oswestry disability index and the shuttle walking test measured at baseline and two years after randomisation. The SF-36 instrument was used as a secondary outcome measure. RESULTS: 177 patients were assigned to surgery and 173 to rehabilitation. 254 (91%) provided follow-up data at 24 months. The mean Oswestry disability index changed favourably from 46.5 (SD 14.4) to 34.0 (SD 21.5) in the surgery group and from 44.8 (SD 14.8) to 36.1 (SD 20.6) in the rehabilitation group. No significant differences between the treatment groups were observed in the shuttle walking test or any of the other outcome measures. CONCLUSIONS: Both groups reported reductions in disability during two years of follow-up; possibly unrelated to the interventions. The statistical difference between treatment groups is in one of the two primary outcome measures was marginal and only just reached the predefined minimal clinical difference, and the potential risk and additional costs of surgery also need to be considered. No clear evidence emerged that primary spinal fusion surgery was any more beneficial than intensive rehabilitation.
BACKGROUND: Chiropractors commonly use a combination of interventions to treat people with low-back pain (LBP). OBJECTIVES: To determine the effects of combined chiropractic interventions (that is, a combination of therapies, other than spinal manipulation alone) on pain, disability, back-related function, overall improvement, and patient satisfaction in adults with LBP, aged 18 and older. SEARCH STRATEGY: We searched The Cochrane Back Review Group Trials Register (May 2009), CENTRAL (The Cochrane Library 2009, Issue 2), and NEDLS/D (from January 1966), Embase (from January 1980), CINAHL (from January 1982), MANTIS (from Inception) and the Index to Chiropractic Literature (from Inception) to May 2009. We also screened references of identified articles and contacted chiropractic researchers. SELECTION CRITERIA: All randomised trials comparing the use of combined chiropractic interventions (rather than spinal manipulation alone) with no treatment or other therapies. DATA COLLECTION AND ANALYSIS: At least two review authors selected studies, assessed the risk of bias, and extracted the data using standardised forms. Both descriptive synthesis and meta-analyses were performed. MAIN RESULTS: We included 12 studies involving 2887 participants with LBP. Three studies had low risk of bias. Included studies evaluated a range of chiropractic procedures in a variety of subpopulations of people with LBP. No trials were located of combined chiropractic interventions compared to no treatment. For acute and subacute LBP, chiropractic interventions improved short- and medium-term pain (SMD 0.25 (95% CI 0.16 to 0.34) and MD 0.08 (95% CI 1.60 to 0.18)) compared to other treatments, but there was no significant difference in long-term pain (MD 0.14 (95% CI 1.18 to 0.26)). Short-term improvement in disability was greater in the chiropractic group compared to other therapies (SMD 0.36 (95% CI 0.70 to 0.02)). However, the effect was small and all studies contributing to these results had high risk of bias. There was no difference in medium- and long-term disability. No difference was demonstrated for combined chiropractic interventions for chronic LBP and for studies that had a mixed population of LBP. AUTHORS' CONCLUSIONS: Combined chiropractic interventions slightly improved pain and disability in the short term and in pain in the medium-term for acute and subacute LBP. However, there is currently no evidence that supports or refutes that these interventions provide a clinically meaningful difference for pain or disability in people with LBP when compared to other treatments. Future research is very likely to change the estimate of effect and our confidence in the results.

BACKGROUND: Many therapies exist for the treatment of low-back pain including spinal manipulative therapy (SMT), which is a worldwide, extensively practiced intervention. OBJECTIVES: To assess the effects of SMT for chronic low-back pain. SEARCH STRATEGY: An updated search was conducted by an experienced librarian to June 2009 for randomised controlled trials (RCTs) in CENTRAL (The Cochrane Library 2009, Issue 2), MEDLINE, EMBASE, CINAHL, PsycINFO, and the Index to Chiropractic Literature. SELECTION CRITERIA: RCTs which examined the effectiveness of spinal manipulation or mobilisation in adults with chronic low-back pain were included. No restrictions were placed on the setting or type of pain; studies which exclusively examined sciatica were excluded. The primary outcomes were pain, functional status and perceived recovery. Secondary outcomes were return-to-work and quality of life. DATA COLLECTION AND ANALYSIS: Two review authors independently conducted the study selection, risk of bias assessment and data extraction. GRADE was used to assess the quality of the evidence. Sensitivity analysis and investigation of heterogeneity were performed, where possible. For the meta-analyses, MAIN RESULTS: Eight RCTs including 4520 participants were included. Participants were predominantly male and the average age was 44 years. All studies were at high risk of bias. The primary outcomes were pain, functional status and perceived recovery. Secondary outcomes were return-to-work and quality of life. EFFECTS OF TREATMENT: Effect sizes varied from 0.1 to 1.3. There was evidence that SMT has a clinically significant short-term effect on pain relief and functional status when added to other interventions. There was very low quality evidence that SMT is less effective than inert interventions or sham SMT for chronic low-back pain or functional status. Data were particularly sparse for recovery, return-to-work, quality of life, and costs of care. No serious complications were observed with SMT. AUTHORS' CONCLUSIONS: High quality evidence suggests that there is no clinically relevant difference between SMT and other interventions for reducing pain and improving function in patients with chronic low-back pain. Determining cost-effectiveness ofcare is high priority. Further research is likely to have an important impact on our confidence in the estimate of effect in relation to inert interventions and sham SMT, and data related to recovery.
Acupuncture for chronic low back pain is one of the most common reasons that people seek medical treatment, and the consequent disability creates a great financial burden on individuals and society. The etiology of chronic low back pain is not a single cause, which means it is often refractory to treatment. Acupuncture has been reported to be effective in providing symptomatic relief of chronic low back pain. However, it is not known whether the effects of acupuncture are due to the needle itself or nonspecific effects arising from the manipulation. To determine the effectiveness of acupuncture therapy, a meta-analysis was performed to compare acupuncture with sham acupuncture and other treatments. Overall, 2678 patients were identified from thirteen randomized controlled trials. The meta-analysis was performed by a random model (Cochrane’s test), using the I² square test for heterogeneity and Fig.2 test to assess for publication bias. Clinical outcomes were evaluated by pain intensity, disability, spinal flexibility, and quality of life. Compared with no treatment, acupuncture achieved better outcomes in terms of pain relief, disability recovery, and better quality of life, but these effects were not observed when compared to sham acupuncture. Acupuncture achieved better outcomes when compared with other treatments. No publication bias was detected. Acupuncture is an effective treatment for chronic low back pain, but this effect is likely to be produced by the nonspecific effects of manipulation.

Acupuncture is a popular complementary and alternative treatment for chronic back pain. Recent European trials suggest similar short-term benefits from real and sham acupuncture needling. This trial addresses the importance of needle placement and skin penetration in eliciting acupuncture effects for patients with spinal stenosis. METHODS: A total of 638 adults with chronic mechanical low back pain were randomized to individualized acupuncture, standardized acupuncture, simulated acupuncture, or usual care. Ten treatments were provided over 7 weeks by experienced acupuncturists. The primary outcomes were back-related dysfunction (Roland-Morris Disability Questionnaire score, range, 0-22) and symptom bothersomeness (0-10 scale). Outcomes were assessed at baseline and after 8, 26, and 52 weeks. RESULTS: In 48 weeks, mean dysfunction scores for the individualized, standardized, and simulated acupuncture groups improved by 4.4, 4.5, and 4.4 points, respectively, compared with 2.1 points for those receiving usual care (P < .001). Participants receiving real or simulated acupuncture were more likely than those receiving usual care to experience statistically meaningful improvements on the dysfunction scale (60% vs 39%; P < .001). Symptoms improved by 1.6 to 1.9 points in the treatment groups compared with 0.7 points in the usual care group (P < .001). After 5 years, participants in the treatment groups were more likely than those receiving usual care to experience clinically meaningful improvements: in dysfunction (59% vs 42% vs 39%, respectively; P < .02) but not in symptoms (P > .05). CONCLUSIONS: Although acupuncture was found effective for chronic low back pain, tailoring needling down to each patient and penetration of the skin appear to be important in eliciting therapeutic benefits. These findings raise questions about acupuncture’s purported mechanisms of action. It remains unclear whether acupuncture or our simulated method of acupuncture provide physiologically important stimulation or represent placebo or nonspecific effects.
Epidural injection

The Steroid Effect on Infection Risk and Inflammation

OBJECTIVE: Lumbar epidural steroid injections (LESIs) are performed for both diagnostic and therapeutic purposes for a variety of indications, including low-back pain, the leading cause of disability and expense due to work-related conditions in the US. The steroid agent used in epidural injections is reported to relieve nerve root inflammation, local ischemia, and resultant pain, but the injection may also have an adverse impact on spinal surgery performed thereafter. In particular, the possibility that preoperative epidural injections may increase the risk of surgical-site infection after lumbar spinal fusion has been reported but has not been studied in detail. The goal of the present study was to use a large national insurance database to evaluate the association of preoperative LESIs with surgical-site infection after lumbar spinal fusion. METHODS: A nationwide insurance database of patient records was used for this retrospective analysis. Current Procedural Terminology codes were used to query the database for patients who had undergone LESIs and 1- or 2-level lumbar posterior fusion procedures. The rate of postoperative infection after 1- or 2-level posterior spinal fusion was analyzed. These study patients were then divided into 3 separate cohorts: 1) lumbar spinal fusion performed within 1 month after LESI, 2) fusion performed between 1 and 3 months after LESI, and 3) fusion performed between 3 and 6 months after LESI. The study patients were compared with a control cohort of patients who underwent lumbar fusion without previous LESIs. RESULTS: The overall 3-month infection rate after lumbar spinal fusion procedure was 1.4% (411 of 30,540 patients). The infection risk increased in patients who received LESIs within 1 month (OR 2.6, p = 0.0001) or 1-3 months (OR 1.4, p = 0.0002) prior to surgery compared with controls. The infection risk was not significantly different from controls in patients who underwent lumbar fusion more than 3 months after LESI. CONCLUSIONS: Lumbar spinal fusion performed within 3 months after LESIs may be associated with an increased rate of postoperative infection. This association was not found when lumbar fusion was performed more than 3 months after LESIs.

Collaborative Conference

The Neutralization of Lumbar Spine Fusion: An Observational Cohort Pilot Study

STUDY DESIGN: Observational cohort pilot study. OBJECTIVE: To determine the impact of a multidisciplinary conference on treatment decisions for lumbar degenerative spine disease. SUMMARY OF BACKGROUND DATA: Multidisciplinary decision making improves outcomes in many disciplines. The lack of integrated systems for comprehensive care for spinal disorders has contributed to the inappropriate overutilization of spine surgery in the United States. METHODS: We implemented a multidisciplinary conference involving physiatrists, anesthesiologists, pain specialists, neurosurgeons, orthopaedic spine surgeons, physical therapists, and nursing staff. Over 10 months, we presented patients being considered for spinal fusion or who had a complex history of prior spinal surgery. We compared the decision to proceed with surgery and the proposed surgical approach proposed by outside surgeons with the consensus of our multidisciplinary conference. We also assessed comprehensive demographics and comorbidities for the patients and examined outcomes for surgical patients. RESULTS: A total of 157 consecutive patients were reviewed at our multidisciplinary conference during the 10-month period. Of these, 155 patients had been recommended for lumbar spine surgery by an outside surgeon. Consensus opinion of the multidisciplinary conference advocated for nonoperative management in 58 patients (38%) who had previously been recommended for spinal fusion at another institution (x² = 96.4, P < 0.001). Furthermore, the surgical treatment plan was revised at the conference in 29% (56 patients) of the patients who ultimately underwent surgery (x² = 46.6, P < 0.001). We had zero 30-day complications in surgical patients. CONCLUSIONS: Isolated surgical decision making may result in suboptimal treatment recommendations. Multidisciplinary conferences can reduce the utilization of lumbar spinal fusion, possibly resulting in more appropriate use of surgical interventions with better candidate selection while providing patients with more diverse nonoperative treatment options. Although long-term patient outcomes remain to be determined, such multidisciplinary care will likely be essential to improving the quality and value of spine care.

LEVEL OF EVIDENCE: 3.
Background context: Prior studies on the impact of obesity on spine surgery outcomes have focused mostly on lumbar fusions, do not examine lumbar discectomies or decompressions, and have shown mixed results regarding complications. Differences in sample sizes and body mass index (BMI) thresholds for the definition of the obese versus comparison cohorts could account for the inconsistencies in the literature. Purpose: The purpose of the study was to analyze whether different degrees of obesity influence the complication rates in patients undergoing lumbar spine surgery. Study design/setting: This was a retrospective cohort analysis of prospectively collected data using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database from 2005 to 2010. Patient sample: Patients in the de-identified, risk-adjusted, and multi-institutional ACS NSQIP database undergoing lumbar anterior fusion; posterior fusion; transforaminal lumbar interbody fusion/posterior lumbar interbody fusion (TLIF-PLIF), discosint, or decompression were included. Outcome measures: Primary outcome measures were 30-day postoperative complications, including pulmonary embolism and deep vein thrombosis, death, system-specific complications (wound, pulmonary, urinary, central nervous system, and cardiac), septic complications, and having one or more complications overall. Secondary outcomes were time spent in the operating room, blood transfusions, length of stay, and reoperation within 30 days. Methods: Patients undergoing lumbar anterior fusion, posterior fusion, TLIF-PLIF, discectomy, or decompression in the ACS NSQIP, 2005 to 2010, were categorized into four BMI groups: nonobese (18.5-29.9 kg/m2), Obese I (30.0-34.9 kg/m2), Obese II (35.0-39.9 kg/m2), and Obese III (greater than or equal to 40 kg/m2). Obese I to III patients were compared with patients in the nonobese category using chi-square test and analysis of variance. Multivariate binary logistic regression models were used to adjust for preoperative risk factors. Results: Data were available for 10,387 patients undergoing lumbar surgery. Of these, 4.6% underwent anterior fusion, 17.9% posterior fusion, 6.3% TLIF/PLIF, 40.7% discectomy, and 30.5% decompression. Among all patients, 25.6% were in the Obese I group, 11.5% Obese II, and 6.9% Obese III. On multivariate analysis, Obese I and III had a significantly increased risk of urinary complications, and Obese II and III patients had a significantly increased risk of wound complications. Only Obese III patients, however, had a statistically increased risk of having increased time spent in the operating room, an extended length of stay, urinary complications, and having one or more complications (all p<0.01). Conclusions: Patients with high BMI appear to have higher complication rates after lumbar surgery than patients who are nonobese. However, the Obesity does not affect the clinical outcome of operative treatment of SpS. There are higher rates of infection and reoperation and less improvement from baseline in the SF-36 physical function score in obese patients after surgery for DS. Nonoperative treatment may not be as effective in obese patients with SpS or DS.

"p<0.05".
BACKGROUND: Smokers have a substantially increased risk of postoperative complications. Preoperative smoking intervention may reduce postoperative morbidity, and we recommend, on the basis of our results, this programme be adopted by hospitals to reduce postoperative morbidity.

OBJECTIVES: The objective of this review was to assess the effect of preoperative smoking intervention on smoking cessation at the time of surgery and 12 months postoperatively and on the incidence of postoperative complications.

SEARCH STRATEGY: The specialized register of the Cochrane Tobacco Addiction Group was searched using the free text and keywords (surgery) or tobacco- and surgery-related terms. Most recent search April 2010.

SELECTION CRITERIA: Randomized controlled trials that recruited people who smoked prior to surgery, offered a smoking cessation intervention, and measured preoperative and long-term abstinence from smoking and/or the incidence of postoperative complications were included. In addition, studies were excluded if they did not assess smoking cessation, if they did not assess postoperative complications, or if they used the wrong population (with no smoking prior to surgery).

DATA COLLECTION AND ANALYSIS: The authors independently assessed studies to determine whether they met their inclusion criteria and used standard methods to extract data and measure study heterogeneity. They contacted investigators for additional information if necessary.

RESULTS: Thirty-four articles underwent full-text review. Variations were noted among these studies in relation to the type of surgery, smoking status, smoking cessation interventions, and measures of abstinence. Five studies were excluded because they did not assess postoperative complications. Twenty-eight studies met the inclusion criteria. One of these did not report cessation as an outcome. Two trials initiated preoperative smoking cessation but did not assess postoperative complications. The remaining 25 trials were included in the meta-analyses.

Seven trials assessed the effect of preoperative smoking intervention on smoking cessation at the time of surgery (RR 2.96 [95% CI 1.57 to 5.55, two trials]). Five trials examined the effect on long-term smoking cessation (RR 1.61 [95% CI 1.12 to 2.33]). Five trials examined the effect on long-term smoking cessation (RR 1.61 [95% CI 1.12 to 2.33]). In four trials, nicotine replacement therapy was offered or recommended to all participants in the intervention group and to some or all participants in the control group. Nine trials assessed the effect of preoperative smoking intervention on postoperative complications.

CONCLUSION: Smoking cessation was more common among patients who received preoperative smoking intervention than among those who did not. Smoking intervention reduced the incidence of postoperative complications; pooled RR 0.70 (95% CI 0.51 to 0.95) for wound complications. Exploratory subgroup analyses showed a significant effect of preoperative smoking cessation at the time of surgery, but not at 12 months postoperatively (RR 1.41 [95% CI 1.22 to 1.63, five trials]). The median length of stay was 11 days (range 7-20) in the intervention group and 13 days (8-65) in the control group. INTERPRETATION: An effective smoking intervention programme 6 weeks before surgery reduces postoperative morbidity, and we recommend, on the basis of our results, this programme be adopted by hospitals to reduce postoperative morbidity.

A meta-analysis of 12 retrospective studies that included variable cut-off standards for BMI supports the association between BMI and surgical site infection.

High quality systematic review rating overall quality of evidence as moderate.

Supports the conclusion that smoking intervention prior to surgery reduces postoperative morbidity.

Cohort in patients undergoing hip or knee replacement.

BMI-obesity

### References


Tier-1 Source

Onlinelibrary.wiley.com/doi/abs/10.1002/smj.6736(02)07369-5

The BMJ 2014; 349: g5209

Tier-1 Source

October 2014 - Bree Collaborative Lumbar Fusion Evidence Table

Page 20 of 42 September 2014 - Bree Collaborative Lumbar Fusion Evidence Table
Smoking cessation

Objective: To determine whether an intervention with smoking cessation starting 4 weeks before general and orthopedic surgery would reduce the frequency of postoperative complications.

Methods: A randomized controlled trial, conducted between February 2006 and December 2006 at 4 university-affiliated hospitals in the Stockholm region, Sweden. The outcome assessment was blinded. The follow-up period for the primary outcome was 30 days. Eligibility criteria were active daily smokers, aged 18 to 75 years. Of the 208 patients assigned, 76 refused participation, and 127 men and women undergoing surgery for primary/repair, laparoscopic cholecystectomy, or a hip or knee prosthesis were enrolled.

Results: Smoking cessation therapy with individual counseling and nicotine substitution started 4 weeks before surgery and continued 4 weeks postoperatively. The control group received standard care. The main outcome measure was frequency of any postoperative complication. Results: An intention-to-treat analysis showed that the overall complication rate in the control group was 43%, and in the intervention group, it was 22% (P < 0.001). Relative risk reduction for the primary outcome of any postoperative complication was 49% and number needed to treat was 5 (95% CI, 3-48). As analysis per protocol showed that abaters had fewer complications (15%) than those who continued to smoke or only reduced smoking (35%), while the difference was not statistically significant. Conclusion: Perioperative smoking cessation seems to be an effective tool to reduce postoperative complications even if it is introduced as late as 4 weeks before surgery.

RCT at four Swedish hospitals of patients undergoing orthopedic or general surgery. Relative risk reduction for any postoperative complication was 49% and number needed to treat was 5. Supports the conclusion that smoking cessation prior to surgery reduces postoperative complications if smoking discontinued as late as four weeks prior to surgery.

Smoking cessation

Objective: To document the widely assumed, but unquantified benefit of early smoking cessation on fusion rates and clinical outcome after spinal surgery.

Methods: This study retrospectively identified 357 patients who underwent a posterior instrumented fusion at either L4-5 or L4-5 between 1992 and 1996. Analysis of the medical record and follow-up telephone surveys were conducted. Clinical outcome and fusion status was analyzed in relation to preoperative and postoperative smoking parameters.

Results: In this study, the nonunion rate was 14.2% for nonsmokers and 26.5% for patients who continued to smoke after surgery (P = 0.05). Patients who quit smoking after surgery for longer than 6 months had a nonunion rate of 17.2%. The nonunion rate was not significantly affected by either the quantity that a patient smoked before surgery or the duration of preoperative smoking abatement. Return-to-work was achieved in 75% of nonsmokers, 53% of nonquitters, and 75% of patients who quit smoking for more than 6 months after surgery.

Discussion: These results validate the hypothetical assumption that postoperative smoking cessation helps to reverse the impact of cigarette smoking on outcome after spinal fusion.

Smoking history was self-reported and nonsmoking status was not confirmed biochemically. Smoking was found to have an adverse effect on outcomes of lumbar fusion.

Second hand smoke exposure

Objective: To determine whether smoking has an adverse effect on outcomes of lumbar fusion.

Methods: This study retrospectively identified 357 patients who underwent instrumented spinal fusion. Smoking history was self-reported and nonsmoking status was not confirmed biochemically. Smoking was found to have an adverse effect on outcomes of lumbar fusion.

Results: In this study, the nonunion rate was 14.2% for nonsmokers and 26.5% for patients who continued to smoke after surgery (P = 0.05). Patients who quit smoking after surgery for longer than 6 months had a nonunion rate of 17.2%. The nonunion rate was not significantly affected by either the quantity that a patient smoked before surgery or the duration of preoperative smoking abatement. Return-to-work was achieved in 75% of nonsmokers, 53% of nonquitters, and 75% of patients who quit smoking for more than 6 months after surgery.

Discussion: These results validate the hypothetical assumption that postoperative smoking cessation helps to reverse the impact of cigarette smoking on outcome after spinal fusion.

Supports the conclusion that smoking cessation prior to surgery reduces postoperative complications if smoking discontinued as late as four weeks prior to surgery.

Second hand smoke exposure

Objective: To determine whether second hand smoke exposure can increase serum cotinine levels.

Methods: A retrospective cohort study of 351 patients, either smokers or non-smokers, undergoing spinal fusion between 1992 and 1996 were compared with regard to rate of surgical nonunion. Smoking history was self-reported and nonsmoking status was not confirmed biochemically. Smokers had a higher rate of nonunion.

Results: Supports the conclusion that smoking has an adverse effect on outcomes of lumbar fusion.
Glycemic control


BACKGROUND: Patients with diabetes mellitus are at increased risk of postoperative complications. Data from randomized clinical trials and meta-analyses point to a potential benefit of intensive glycemic control, targeting near-normal blood glucose, in patients with hyperglycaemia (with and without diabetes mellitus) being submitted to surgical procedures. However, there is limited evidence concerning this question in patients with diabetes mellitus undergoing surgery.

OBJECTIVES: To assess the effects of perioperative glycemic control for diabetic patients undergoing surgery.

SEARCH METHODS: Trials were obtained from searches of The Cochrane Library, MEDLINE, EMBASE, LILACS, CINAHL and ISIS (all up to February 2012).

SELECTION CRITERIA: We included randomized controlled clinical trials that prespecified different targets of perioperative glycemic control (intensive versus conventional or standard care) and a P value of <.05. We summarized studies using meta-analysis or descriptive methods.

MAIN RESULTS: Twelve trials randomized 694 diabetic participants to intensive control and 709 diabetic participants to conventional control. The duration of the intervention ranged from just the duration of the surgical procedure up to 90 days. The number of participants ranged from 13 to 421, and the mean age was 64 years. Comparison of intensive with conventional glycemic control demonstrated the following results: for our predefined primary outcomes: analysis restricted to studies with low or unclear detection or attrition bias for infectious complications showed a risk ratio (RR) of 0.46 (95% confidence interval [CI]: 0.18 to 1.18), P = .24; 1365 participants, 11 trials, high quality of the evidence (grading of recommendations assessment, development and evaluation - (GRADE)). Evaluation of death from any cause revealed a RR of 1.19 (95% CI: 0.89 to 1.59), P = .24; 627 participants, eight trials, moderate quality of the evidence (GRADE). On the basis of a posthoc analysis, there is the hypothesis that intensive glycemic control may increase the risk of hypoglycemia (RR 4.80, 95% CI 2.06 to 11.00), P = .01, 627 participants, eight trials, moderate quality of the evidence (GRADE). Evaluation of death from any cause revealed a RR of 1.19 (95% CI: 0.89 to 1.59), P = .24; 1365 participants, 11 trials, high quality of the evidence (GRADE). On the basis of a posthoc analysis, there is the hypothesis that intensive glycemic control may increase the risk of hypoglycemia (RR 4.80, 95% CI 2.06 to 11.00), P = .01, 627 participants, eight trials, moderate quality of the evidence (GRADE). For our predefined secondary outcomes revealed the following findings: cardiovascular events had a RR of 1.03 (95% CI 0.21 to 5.13), P = .97, 682 participants, six trials, moderate quality of the evidence (GRADE). For our predefined secondary outcomes revealed the following findings: cardiovascular events had a RR of 1.03 (95% CI 0.21 to 5.13), P = .97, 682 participants, six trials, moderate quality of the evidence (GRADE).

CONCLUSION: Good preoperative glycemic control (hemoglobin A1c [HbA1c] levels <7%) is associated with decreased postoperative infections. DESIGN: Retrospective observational study using Veterans Affairs National Surgical Quality Improvement Program data from the Veterans Affairs Connecticut Healthcare System from January 1, 2000, through September 30, 2010. SETTING: Veterans Affairs Connecticut Healthcare System, a tertiary referral center and major university teaching site. PATIENTS: Six hundred forty-seven diabetic patients underwent major noncardiac surgery during the study period. 18 were excluded because the HbA1c levels were more than 180 days prior to surgery; 19 were excluded for other reasons; 404 diabetic patients were analyzed. The study patients were predominantly nondiabetic men with a median age of 71 years. MAIN OUTCOME MEASURES: Primary outcomes were infectious complications, including pneumonia, wound infection, urinary tract infection, or sepsis. Bivariate analysis was used first to determine the association of each independent variable (age, race, diabetes treatment, American Society of Anesthesiologists classification, Activities of Daily Living assessment, elective vs emergent procedure, wound classification, operation length, and HbA1c levels) with outcome. Factors significant at P<.05 were used in a multivariable logistic regression model. RESULTS: In the multivariable model, age, American Society of Anesthesiologists class, operation length, wound class, and HbA1c levels were significantly associated with postoperative infections. Emergency/urgent cases and dependence in Activities of Daily Living were significant in bivariate analysis but failed to reach statistical significance in the multivariable model. An HbA1c level of less than 7% was significantly associated with decreased infectious complications with an adjusted odds ratio of 2.13 (95% confidence interval, 1.23-3.76) and P value of .007. CONCLUSION: Good preoperative glycemic control (HbA1c levels <7%) is associated with a decrease in infectious complications across a variety of surgical procedures.

Cohort includes only male patients.

Meta-analysis of 12 randomized trials. "11 trials included patients requiring admission to the ICU and eight included patients undergoing cardiovascular surgical interventions." Does not support a conclusion that intensive glycemic control is associated with a higher number of patients experiencing hypoglycemic episode.
Glycemic control


STUDY DESIGN: Retrospective database analysis.

OBJECTIVE: To assess the effect of glycemic control on perioperative morbidity and mortality in patients undergoing elective degenerative lumbar spine surgery.

SUMMARY OF BACKGROUND DATA: Diabetes mellitus (DM) is a prevalent disease of glucose dysregulation that has been demonstrated to increase morbidity and mortality after spine surgery. However, there is limited understanding of whether glycemic control influences surgical outcomes in patients with DM undergoing lumbar spine procedures for degenerative conditions.

METHODS: The Nationwide Inpatient Sample was analyzed from 2002 to 2011. Hospitalizations were isolated on the basis of International Classification of Diseases, Ninth Revision, Clinical Modification, procedural codes for lumbar spine surgery and diagnostic codes for degenerative conditions of the lumbar spine. Patients were then classified into 3 cohorts: controlled diabetic, uncontrolled diabetic, and nondiabetic. Patient demographic data, operative complications, and hospitalization outcomes were determined for each cohort.

RESULTS: A total of 460,285 (15.7%) controlled diabetic patients and 191,831 (9.7%) uncontrolled diabetic patients underwent degenerative lumbar spine surgery from 2002 to 2011. Relative to nondiabetic patients, uncontrolled diabetic patients had significantly increased odds of in-hospital complications, deep venous thrombosis, and postoperative death. In addition, uncontrolled diabetic patients also had an increased mean length of stay (approximately 2.5 d), greater costs (3.7-fold), and a greater risk of inpatient mortality (odds ratio=2.6, 95% confidence interval=1.5-4.8, P<0.0009). Controlled diabetic patients also had increased risk of acute complications and inpatient mortality when compared with nondiabetic patients, but not as high as the same magnitude as uncontrolled diabetic patients.

CONCLUSION: Suboptimal glycemic control in diabetic patients undergoing degenerative lumbar spine surgery leads to increased risk of acute complications and poor outcomes. Patients with uncontrolled DM, or poor glycemic control, may benefit from improving glycemic control prior to surgery.

BACKGROUND: Diabetes mellitus (DM) is reported to be a risk factor for surgical site infection (SSI), which is a serious complication after spinal surgery. The effect of DM on SSI after instrumented spinal surgery remains to be clarified. The aim was to elucidate perioperative risk factors for infection at the surgical site after posterior thoracic and lumbar spinal arthrodesis with instrumentation in patients with DM.

METHODS: Consecutive patients who underwent posterior instrumented thoracic and lumbar spinal arthrodesis during the years 2005-2011, who could be followed for at least 1 year after surgery, were included. These included 36 patients with DM (10 males and 16 females; mean age 64.3 years). The patients' medical records were retrospectively reviewed to determine the SSI rate. The characteristics of the DM patients were examined in detail, including the levels of serum glucose and HbA1c, which indicate the level of diabetes control.

RESULTS: Patients with DM had a higher rate of SSI (6 of 36 patients, 16.7%) than patients without DM (10 of 309 patients, 3.2%). Although the perioperative serum glucose level did not differ between DM patients that did or did not develop SSI, the preoperative HbA1c value was significantly higher in the patients who developed SSI (7.6%) than in those who did not (6.9%). SSI developed in 0.0% of the patients with controlled diabetes, 3.2% of the patients with uncontrolled diabetes, and 3.1% of the patients with controlled diabetes.

CONCLUSIONS: DM patients with preoperative HbA1c greater than 7% had a greater rate of surgical site infections. Patients with HbA1c greater than 7% had a rate of surgical site infections of 35%. Perioperative serum glucose was not related to surgical site infections.

CONCLUSION: Suboptimal glycemic control in diabetic patients undergoing degenerative lumbar spine surgery leads to increased risk of acute complications and poor outcomes. Patients with uncontrolled DM, or poor glycemic control, may benefit from improving glycemic control prior to surgery.
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OBJECTIVE: To evaluate the relationship between preoperative A1C and clinical outcomes in individuals with diabetes mellitus undergoing noncardiac surgical procedures. RESEARCH DESIGN AND METHODS: Data were obtained from the National Surgical Quality Improvement Program database and the Research Patient Data Registry of the Brigham and Women’s Hospital. Patients admitted to the hospital for ≥3 days after undergoing noncardiac surgery from 2005 to 2010 were included in the study. RESULTS: Of 1,775 patients with diabetes, 422 patients (24%) had an A1C value available within 3 months before surgery. After excluding same-day surgeries, patients with diabetes were divided into four groups (A1C <6.5% [N = 202]; >6.5-8% [N = 191]; >8-10% [N = 47] and compared with age-, sex-, and BMI-matched nondiabetic control subjects [N = 47]). Individuals with A1C values between 6.5 and 8% had a hospital length of stay (LOS) similar to the matched control group (P = 0.5). However, in individuals with A1C values ≥8%, the hospital LOS was significantly longer compared with the control group (P = 0.05). Multivariate regression analysis demonstrated that a higher A1C was associated with increased hospital LOS after adjustments for age, sex, BMI, race, type of surgery, Charlson Comorbidity Index, smoking status, and glucose level on the day of surgery (P = 0.05). There were too few events to meaningfully evaluate for death, infections, or reoperation rate. CONCLUSIONS: Our study suggests that chronic hyperglycemia (A1C ≥8%) is associated with poor surgical outcomes (longer hospital LOS). Providing a preoperative intervention to improve glycemie control in individuals with A1C values ≥8% may improve surgical outcomes, but prospective studies are needed.

BACKGROUND—Unhealthy alcohol use is prevalent but under-diagnosed in primary care settings. OBJECTIVE: To validate, in primary care, a single-item screening test for unhealthy alcohol use recommended by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). DESIGN: Cross-sectional study. PARTICIPANTS: Adult English-speaking patients recruited from primary care waiting rooms. MEASUREMENTS: Participants were asked the single-screening question, "How many times in the past year have you had 5 or more drinks in a day?" Whatever it is for men and 4 for women, and a response of 1 or greater (corrected) is considered positive. Unhealthy alcohol use was defined as the presence of an alcohol disorder, as determined by a standardized diagnostic interview, or risk consumption, as determined using a validated 30-day calendar method. MAIN RESULTS: Of 622 eligible primary care patients, 364 (59%) completed the interview. The single-question screen was 83.8% sensitive (95% confidence interval [CI] 72.5% to 88.5%) and 79.3% specific (95% CI 73.1% to 84.4%) for the detection of unhealthy alcohol use. It was slightly more sensitive (87.9%, 95% CI 73.7% to 92.6%) but was less specific (68.8%, 95% CI 60.8% to 72.9%) for the detection of a current alcohol use disorder. Test characteristics were similar to that of a commonly used three-item screen, and were affected very little by subject demographic characteristics. CONCLUSIONS: The single-screening question recommended by the NIAAA accurately identified unhealthy alcohol use in this sample of primary care patients. These findings support the use of the brief screen in primary care.

BACKGROUND—Screening for cognitive impairment is recommended for primary care patients in order to identify patients with cognitive impairment, have surrogates designate a contact person for medical decision making, and/or prevent adverse events related to cognitive impairment. The Montreal Cognitive Assessment (MoCA) is a brief instrument developed for the screening of milder forms of cognitive impairment, having surpassed the well-known limitations of the Mini-Mental State Examination (MMSE). The aim of the present study was to validate the MoCA as a cognitive screening test for behavioral variant frontotemporal dementia (bv-FTD) by examining its psychometric properties and diagnostic accuracy. Three matched subgroups of participants were considered: bv-FTD (n = 135), Alzheimer disease (n = 50), and a control group of healthy adults (n = 150). Compared with the MMSE, the MoCA demonstrated considerably superior psychometric properties and discriminant capacity, providing comprehensive information about the patients’ cognitive profiles. The diagnostic accuracy of MoCA for bv-FTD was extremely high (area under the curve AUC [MoCA] = 0.934, 95% confidence interval [CI] 0.866-0.974; AUC [MMSE] = 0.772, 95% CI 0.677-0.868). With a cutoff at 27 points, the MoCA results for sensitivity, specificity, positive predictive value, negative predictive value, and classification accuracy were significantly superior to those of the MMSE. The MoCA is a sensitive and accurate instrument for screening the patients with bv-FTD and represents a better option than the MMSE.
Dementia


Study design: Retrospective analysis of a prospectively collected, national inpatient hospital database.

Objective: We aimed to investigate comorbid psychiatric disorders in the adult spinal deformity (ASD) population. We hypothesized that a high incidence of comorbid psychiatric disorders in ASD would negatively impact perioperative outcomes.

Summary of background data: Patients with adult spinal fusion (ASF) suffer from severe back pain and other depression. Psychiatric comorbidities in the ASD population are not well understood despite the apparent psychological effects of spinal deformity-related self-image.

Methods: The Nationwide Inpatient Sample databases from 2006 to 2015 were queried for patients aged 18 years or older with in-hospital stays including a spine arthrodesis. Patients were divided into two groups: ASD (diagnosis of scoliosis, including neuromuscular and congenital) and all other AIS. Subjects were further stratified by presence of comorbid psychiatric diagnosis. Differences between each surgical group in psychiatric frequency and complications were calculated using analysis of variance, adjusted for operative complexity. A binary logistic regression analysis was performed to determine the association between psychiatric diagnosis and likelihood of complications.

Results: A total of 3,366,352 AIS and 219,875 ASD patients were identified. The rate of comorbid psychiatric diagnoses in ASD was significantly higher (23.5%) compared to AIS patients (19.9%, P < 0.001). Complication rates were higher for ASD compared to AIS: patients without a psychiatric diagnosis had lower (or comparable) complication rates than psychiatric patients, across all disorder categories. Patients with psychiatric disorders and dementia showed more complications than controls; patients with mood, anxiety and alcohol disorders showed fewer.

Conclusion: Psychiatric comorbidities are more common in the ASD population than in adult fusion patients. ASD and AIS patients with the most common psychiatric disorders (mood, anxiety, and alcohol abuse) are at an increased risk for complications compared to controls. These patients with psychiatric disorders and dementia are at a significant risk for increased complications and surgeons should be aware of these specific risks.

Depression


Study design: Retrospective cohort study of Nationwide Inpatient Sample database that compared the occurrence of psychiatric disorders on outcomes for patients with adult spinal deformity versus patients with adult spinal fusion. Among the findings was the observation that patients "with dementia patients also showed significantly higher complication rates in both diagnosis groups, with a nearly 30% overall risk increase in surgical complications compared to nonpsychiatric patients." Diagnosis of dementia presumably made on the basis of claims data.

Supports the conclusion that dementia is associated with a higher rate of complications in patients undergoing spine surgery.
Depression and Psychiatric disorders and outcomes


Objective: The aim of the paper was to use a prospective, longitudinal, multicenter outcome registry of patients undergoing surgery for lumbar degenerative disease in order to assess the incidence and factors associated with 30-day reoperation and 90-day readmission. METHODS: Prospectively collected data from IRIS patients from the Quality and Outcomes Database (QOD; formerly known as the N2QOD [National Neurosurgery Quality and Outcomes Database]) lumbar spine registry were retrospectively analyzed. Multivariate binomial regression analysis was performed to identify factors associated with 30-day reoperation and 90-day readmission after surgery for lumbar degenerative disease. A subgroup analysis of Medicare patients stratified by age (< 65 and 65-65 years old) was also performed. Continuous variables were compared using unpaired t-tests, and proportions were compared using Fisher's exact test. RESULTS: There was a 2% reoperation rate within 30 days. Multivariate analysis revealed prolonged operative time during the index case as the only independent factor associated with 30-day reoperation. Other factors such as prescriptive diagnosis, body mass index (BMI), American Society of Anesthesiologists (ASA) class, diabetes, and use of spinal implants were not associated with reoperations within 30 days. Medicare patients < 65 years had a 30-day reoperation rate of 8.7%, whereas those ≥ 65 years had a 30-day reoperation rate of 2.2% (p < 0.001). Medicare beneficiaries younger than 65 years undergoing reoperation within 30 days were more likely to be women (p = 0.008), have a higher BMI (p = 0.006), and have higher rates of depression (p < 0.0001). The 90-day readmission rate was 6.3%. Multivariate analysis demonstrated that higher ASA class (OR 1.46 per class, 95% CI 1.25-1.70), and history of depression (OR 1.27, 95% CI 1.04-1.54) were factors associated with 30-day readmission. Medicare beneficiaries had a higher reoperation rate of 30-day readmissions compared with those who had private insurance (OR 1.43, 95% CI 1.17-1.70). Medicare patients < 65 years of age were more likely to be readmitted within 60 days after their index surgery compared with those ≥ 65 years (2.6% vs 0.7%, p < 0.001). Medicare patients < 65 years of age had a significantly higher BMI (p < 0.001) and higher rates of depression (p < 0.001). CONCLUSIONS: In this analysis of a large prospective, multicenter registry of patients undergoing lumbar degenerative disease surgery, multivariate analysis revealed that prolonged operative time was associated with 30-day reoperation. The authors found that factors associated with 90-day readmission included higher ASA class and a history of depression. The 90-day readmission rates were higher for Medicare beneficiaries than for those who had private insurance. Medicare patients < 65 years of age were more likely to be readmitted within 30 days after their index surgery compared with those ≥ 65 years (2.6% vs 0.7%, p < 0.001). Medicare patients < 65 years of age had a significantly higher BMI (p < 0.001) and higher rates of depression (p < 0.001).

Support the conclusion that 30-day readmissions were associated with higher ASA class and depression.

Psychiatric disorders and outcomes


Objective: To evaluate the influence of preoperative depression, anxiety, schizophrenia, or dementia on in-hospital (1) adverse events, (2) mortality, and (3) nonroutine discharge in patients undergoing major spine surgery. SUMMARY OF BACKGROUND DATA: Psychiatric comorbidity is a known risk factor for impaired health-related quality of life and poor long-term outcomes after spine surgery, yet little is known about its impact in the perioperative spine surgery setting. METHODS: Using the National Hospital Discharge Survey database, all patients undergoing either spinal fusion or laminectomy between 1990 and 2007 were identified and separated into groups with and without psychiatric disorders. Multivariable regression analysis was performed for each of the outcome variables. RESULTS: Between 1990 and 2007, a total estimated number of 5,382,341 spinal fusions and laminectomies were performed. The prevalence of diagnosed depression, anxiety, and schizophrenia among the study population increased significantly over time. Depression, anxiety, schizophrenia, and dementia were associated with higher rates of nonroutine discharge. Depression, schizophrenia, and dementia were associated with higher rates of adverse events. Dementia was the only psychiatric disorder associated with a higher risk of in-hospital mortality. CONCLUSION: Patients with preoperative psychiatric disorders undergoing major spine surgery were at increased risk for perioperative adverse events and posthospitalization care, but its effect in perioperative mortality is more limited. Preoperative psychological screening of candidates undergoing spine surgery might ultimately lead to the enhancement of perioperative outcomes in this growing segment of the US population.

Support the conclusion that patients with psychiatric conditions undergoing spine surgery have an increased rate of adverse events and a requirement for posthospitalization care.
Depression screening


PURPOSE: The aim of this study was to evaluate the prevalence of depressive symptoms and disability pre-operatively, at 3 months and at 1 year after lumbar spine fusion surgery.  METHODS: Data was extracted from a dedicated lumbar spine fusion register, giving 232 patients (mean age 42 years, 158 females) who had undergone instrumented lumbar spine fusion.  The frequency of depressive symptoms and disability was evaluated using the Depression Scale (DFLU) and Oswestry Disability Index (ODI).  RESULTS: Depressive symptoms were found in 36, 31, and 31% of the patients pre-operatively, at 3 months and at 1 year after surgery, respectively.  The mean DFLU score decreased from 56 to 46 (p < 0.001) in patients who had depression symptoms pre-operatively, and from 61 to 54 (p < 0.001) in those patients without pre-operative depressive symptoms.  The mean ODI values pre-operatively, at 3 months and at 1 year after surgery were 55, 50, and 22, respectively, in patients without pre-operative depressive symptoms and 61, 51, and 20 in those patients without pre-operative depressive symptoms.  The differences between the groups were statistically significant at all time points (p < 0.01).  CONCLUSIONS: One-third of our patients with chronic back pain undergoing spinal fusion had depressive symptoms pre-operatively.  The prevalence of depressive symptoms decreased after surgery.  Although disability remained higher in those patients who had reported depressive symptoms pre-operatively, disability did decrease significantly in both groups post-operatively.  Thus, there is no need to exclude depressive patients from operation, but screening measures and appropriate treatment decisions throughout both pre-operative and post-operative periods are encouraged.

Screen for osteoporosis

Schneider I, Hughes AP, Tafere F, Girard RP.  An association can be found between hounsfield units and success of lumbar spine fusion.  Spine J. 2014 Jan;14(1):120-4.  PMID: 23880360

METHODS: The CT scans of 28 patients with a combined 52 levels of stand-alone LIF were evaluated at a minimum of 12 weeks postoperatively. Coronal and sagittal images were evaluated for evidence of fusion, and HU values were collected from axial images.  HU measurements were also taken from vertebral bodies proximal to the construct to evaluate global bone quality.  RESULTS: Of the 52 LIF levels, 73% were assessed as fused and measured lower HU values than the nonunion levels (203.3 vs. 139.8, p < 0.001).  Patients with successful fusion constructs had higher bone density as assessed with HU, both globally and within the fusion construct, as compared to patients with CT evidence of nonunion.

Screening study for depression and hip fractures

Suominen H, Lehto M, Vartiainen E, Tuominen V, Koiranen M.  Depression is associated with poorer outcome of lumbar spinal surgery.  Eur Spine J. 2014 Sep;23(1):129-34.  PMID: 23880866

The objective of this observational prospective study was to investigate the effect of depression on short-term outcome after lumbar spinal stenosis (LSS) surgery.  Surgery was performed on 99 patients with clinically and radiologically defined LSS, representing ordinary LSS patients treated at the secondary care level.  They completed questionnaires before surgery and 3 months postoperatively.  Depression was assessed with the 21-item Beck Depression Inventory (BDI).  Physical functioning and pain were assessed with Oswestry disability index, Stucki Questionnaire, self-reported walking ability, visual analogue scale (VAS) and pain drawing.  Prospectively, 30% of the patients had depression.  In logistic regression analyses, significant associations were seen between preoperative depression and postoperative high Oswestry disability and Stucki severity scores and high intensity of pain (VAS score).  In subsequent analyses, the patients with continuous depression, measured with BDI (60% of the patients who had preoperative depression), showed fewer improvements in oswestry disability, disability score, pain intensity and walking capacity than the patients who did not experience depression at any phase. In those patients who recovered from depression, according to BDI-scores (35% of the patients with preoperative depression), the postoperative improvement was rather similar to the improvements seen in the normal mood group. In the surgical treatment of LSS, we recommend that the clinical practice should include an assessment of depression.

Depression screening

Schreiber JJ, Hughes AP, Taher F, Girardi FP.  An association can be found between hounsfield units and success of lumbar spine fusion.  HSS J. 2014 Feb;10(1):25-9.  PMID: 24482618

 METHODS: The CT scans of 28 patients with spinal fusion with subsequent measurement of bone quality as judged by CT scans (Hounsfield units).  Patients with successful fusion had higher global bone density than patients with nonfusion, as measured at minimum 12 weeks postoperatively.

Prospective cohort study from 2 Finnish hospitals with good follow-up.  High prevalence of depression prior to lumbar fusion, improves following surgery, but remains above control population.

Supports the conclusion that depression is common in patients prior to and following lumbar fusion.
The purpose of this study is to evaluate the incidence of osteoporosis in patients requiring spine surgery. Among patients older than 50 years, the rate of osteoporosis in males was 14.5% and the rate of osteoporosis in females was 52.0%. We strongly recommend an evaluation and treatment for osteoporosis in the patients requiring spine surgery, especially in females over 50 years old.

INTRODUCTION: Because lifespan is increasing, there is an increase in the incidence of osteoporosis in elderly spine surgery patients. The osteoporosis may adversely influence the fusion rate and the surgical outcome. The purpose of this study is to evaluate the incidence of osteoporosis in patients requiring spine surgery.

METHODS: A total of 1,321 patients underwent spine surgery at our institute from January 1, 2005 to December 31, 2005. Among them, there were 562 patients (42.5%) younger than 50 years old, and 759 patients (57.5%) older than 50 years old. Prior to operation, we evaluated the patients for osteoporosis on both the femur head and lumbar spine by measuring the bone mineral density (BMD) by the dual-energy X-ray absorptiometry (DXA). Based on the World Health Organization (WHO) criteria for osteoporosis, we chose the T-score to determine normal (>-1), osteopenia (-2.5 to -1), and osteoporosis (< or = -2.5). Among the 562 patients younger than 50 years, DXA was performed in 446 (66.0%) patients, 193 males and 253 females. Among the 759 patients older than 50 years, DXA was performed on 516 (68.0%) patients, 193 males and 323 females. Prior to operation, we evaluated the patients for osteoporosis on both the femur head and lumbar spine by measuring the bone mineral density (BMD) by the dual-energy X-ray absorptiometry (DXA). Based on the World Health Organization (WHO) criteria for osteoporosis, we chose the T-score to determine normal (>-1), osteopenia (-2.5 to -1), and osteoporosis (< or = -2.5). Among the 562 patients younger than 50 years, DXA was performed in 446 (66.0%) patients, 193 males and 253 females. Among the 759 patients older than 50 years, DXA was performed on 516 (68.0%) patients, 193 males and 323 females.

RESULTS: Among 759 patients older than 50 years, DXA was performed on 516 (68.0%) patients, 193 males and 323 females. Among these patients, 80 (36.6%) patients had osteopenia and 26 (14.6%) patients had osteoporosis. Among the female patients, there were 134 (45.4%) with osteopenia and 166 (51.3%) with osteoporosis. The incidence of osteoporosis was higher in females and significantly increased with increasing age. Among 759 patients older than 50 years, 67 patients underwent a major spine operation without fusion. Among these patients, DXA was performed in 40 (60.0%) patients and there were 10 (14.0%) patients with osteopenia and 6 (9.0%) patients with osteoporosis.

CONCLUSIONS: We significantly lowered both locally and globally in the fracture cohort. Because computed tomographic scans are frequently part of preoperative planning for spinal fusion, this information should be incorporated in preoperative planning. Studies to prospectively validate HU as a predictor of adjacent segment fracture risk and to assess the effect of increasing HU prospectively with medications for osteoporosis are needed.

CONCLUSION: HU was significantly lower both locally and globally in the fracture cohort. Because computed tomographic scans are frequently part of preoperative planning for spinal fusion, this information should be incorporated in preoperative planning. Studies to prospectively validate HU as a predictor of adjacent segment fracture risk and to assess the effect of increasing HU prospectively with medications for osteoporosis are needed.

SUMMARY OF BACKGROUND DATA: Adjacent segment fracture is a potentially devastating complication after spinal fusion.

STUDY DESIGN: Retrospective case-control study.

OBJECTIVE: To determine the association of Hounsfield unit (HU) measurements with adjacent segment fractures after spinal fusion.

METHODS: Patients with adjacent segment fractures after spinal fusion were identified from a prospectively collected patient database and matched 1:1 with nonfracture controls on the basis of age, sex, and fusion construct. Minimum follow-up was 6 months. Patients with metabolic bone disease other than osteoporosis or those taking medications known to negatively alter bone strength were excluded. HU assessment was done according to the previously published protocol using the preoperative computed tomography.

RESULTS: Twenty patients had complete imaging data and could be matched to nonfracture controls. The groups were well matched with respect to age, sex, body mass index, and number of levels fused. Following the index surgical procedure, the fracture group had more positive sagittal balance than the control group (10.7 mm vs. 9.1 cm). Analysis of HU values at the fracture level showed a significantly lower value in the fracture group than in the controls (454 vs. 198, P < 0.001). Similarly, global assessment of HU across the thoracic and lumbar spines was significantly lower in the fracture group (1359 vs. 1743, P < 0.022).

CONCLUSIONS: HU was significantly lower both locally and globally in the fracture cohort. Because computed tomographic scans are frequently part of preoperative planning for spinal fusion, this information should be incorporated in preoperative planning. Studies to prospectively validate HU as a predictor of adjacent segment fracture risk and to assess the effect of increasing HU prospectively with medications for osteoporosis are needed.
BACKGROUND: Patients with liver cirrhosis have high surgical risks due to malnutrition, impaired immunity, coagulopathy, and encephalopathy. However, there is no information in English literature about the results of liver cirrhosis patients who underwent instrumented lumbar surgery. The purpose of this study is to report the perioperative complications, clinical outcome and determine the surgical risk factors in cirrhosis patients.

METHODS: We retrospectively reviewed 29 patients with liver cirrhosis who underwent instrumented lumbar surgery between 1997 and 2009. The hepatic functional reserves of the patients were recorded according to the Child-Turcotte-Pugh scoring system. Besides, fourteen other variables and perioperative complications were also collected. To determine the risks, we divided the patients into two groups according to whether or not perioperative complications developed.

RESULTS: Of the 29 patients, 22 (76%) belonged to Child class A and 7 (24%) belonged to Child class B. Twelve patients developed one or more complications. Patients with Child class A had a significantly higher incidence of complications than those with Child class A (p = 0.011). In the Child class A group, patients with 6 points had a significantly higher incidence of complications than those with 5 points (p = 0.035). A low level of albumin was significantly associated with higher risk, and a similar trend was also noted for the presence of ascites although statistical difference was not reached.

CONCLUSION: The study concludes that patients with liver cirrhosis who have undergone instrumented lumbar surgery carry a high risk of developing perioperative complications, especially in those with a Child-Turcotte-Pugh score of 6 or more.

Opioids

The Washington State Department of Labor and Industries (L&I, or the department) is officially adopting the Opioid Guideline as developed by the Agency Medical Directors' Group (AMDG Guideline) and revised in June 2010 [1]. The AMDG Guideline represents the best practices and universal precautions necessary to safely and effectively prescribe opioids to treat patients with chronic non-cancer pain. This guideline is a supplement to both the AMDG Guideline and the Department of Health's (DOH) pain-management rules, and provides information specific to treating injured workers covered by Washington State workers' compensation [3].

Focus is pre-operative nutritional state as a risk factor for complications for patients 65 years of age or older.

Recommends preoperative use of opioids should be limited to no longer than six weeks. Also includes recommendations for perioperative management of patients on chronic opioid therapy.

Nutritional status, reduced serum albumin

BACKGROUND: Poor nutrition status is considered a risk factor for postoperative complications in the adult population. In elderly patients, who often have a poor nutrition status, this relationship has not been substantiated. Thus, the aim of this systematic review was to assess the merit of preoperative nutrition parameters used to predict postoperative outcome in elderly patients undergoing general surgery. METHODS: A systematic literature search of 10 consecutive years, 1998-2008, in PubMed, EMBASE, and Cochrane databases was performed. Search terms used were nutrition status, preoperative assessment, postoperative outcome, and surgery (hip or general). Limits used in the search were human studies, published in English, and age (65 years or older). Articles were screened using inclusion and exclusion criteria. A total of 70 articles were screened on methodology and graded. RESULTS: Of N = 68 articles found, 15 were included. They showed profound heterogeneity in the parameters used for preoperative nutrition status and postoperative outcome. The only significant preoperative predictor of postoperative outcome in elderly general surgery patients was serum albumin and ≥ 20% weight loss in the previous 6 months. CONCLUSIONS: This systematic review revealed only 2 preoperative parameters used to predict postoperative outcome: reduced serum albumin and weight loss over previous six months predicts postoperative complications for elderly general surgery patients.
Shared decision-making


EVIDENCE-BASED CLINICAL PRACTICE GUIDELINES

IHM Tier 2 Source

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4857133/

STUDY DESIGN: Clinical practice guidelines. OBJECTIVE: To develop evidence-based recommendations on use of interventional diagnostic tests and therapies, surgeries, and interdisciplinary rehabilitation for low back pain of any duration, with or without leg pain. SUMMARY OF BACKGROUND DATA: Management of patients with persistent and disabling low back pain remains a clinical challenge. A number of interventional diagnostic tests and therapies and surgery are available and their use is increasing, but in some cases their utility remains uncertain or controversial. Interdisciplinary rehabilitation has also been proposed as a potentially effective noninvasive intervention for persistent and disabling low back pain. METHODS: A multidisciplinary panel was convened by the American Pain Society. Its recommendations were based on a systematic review that focused on evidence from randomized controlled trials. Recommendations were graded using methods adapted from the US Preventive Services Task Force and the Grading of Recommendations, Assessment, Development, and Evaluation Working Group. RESULTS: Investigation reviewed 244 abstracts. A total of 161 randomized trials were deemed relevant to the recommendations in this guideline. The panel developed a total of 8 recommendations. CONCLUSIONS: Recommendations on use of interventional diagnostic tests and therapies, surgery, and interdisciplinary rehabilitation are presented. Due to important trade-offs between potential benefits, harms, costs, and barriers of alternative options, shared decision making is an important component of a number of the recommendations.

Well-defined methodology and grading scheme

Recommendation #1: In patients with nonnonsurgical low back pain who do not respond to usual noninterdisciplinary interventions, it is recommended that clinicians consider interdisciplinary rehabilitation with a cognitive/behavioral emphasis (strong recommendation, high-quality evidence).

Recommendation #4: “It is recommended that shared decision-making regarding surgery for nonspecific low back pain include a specific discussion about interventional interdisciplinary rehabilitation as a similarly effective option, the small to moderate average benefit from surgery versus noninterdisciplinary nonmedical therapy, and the fact that the majority of such patients who undergo surgery do not experience an optimal outcome (defined as minimum or no pain, discontinuation or occasional pain medication use, and return of high level function).”

Recommendation #7: “It is recommended that shared decision-making regarding surgery include a specific discussion about moderate average benefits, which appear to decrease over time in patients who undergo surgery.”

Supports shared decision making.

A Support of shared decision-making to avoid surgery that the patient with otherwise not choose.

A Support of shared decision-making to avoid surgery that the patient with otherwise not choose.
Shared decision-making

BACKGROUND: Decision aids are interventions that support patients by making their decision explicit, providing information about options and associated benefits/harms, and helping clarify congruence between decisions and personal values.

OBJECTIVES: To assess the effects of decision aids in people facing treatment or screening decisions.


SELECTION CRITERIA: We included published randomized controlled trials comparing decision aids to usual care and/or alternative interventions. For this update, we excluded studies comparing detailed versus simple decision aids.

DATA COLLECTION AND ANALYSIS: Two reviewers independently screened citations for inclusion, extracted data, and assessed risk of bias. Primary outcomes, based on the International Patient Decision Aid Standards (IPDAS), were attributes related to the choice made and the decision-making process. Secondary outcomes were behavioral, health, and health system effects (like pooled results using mean differences (MDs) and risk ratios (RR), applying a random-effects model. We conducted a subgroup analysis of studies that used the patient decision aid to prepare for the consultation and of those that used it in the consultation. We used GRADE to assess the strength of the evidence.

MAIN RESULTS: We included 105 studies involving 31,043 participants. This update added 18 studies and removed 28 previously included studies comparing detailed versus simple decision aids. During the ‘Risk of bias’ assessment, we rated two items (selective reporting and blinding of participants/personnel) as mostly unclear due to inadequate reporting. Twelve of 105 studies were at high risk of bias. With regard to the attributes of the decision made, decision aids increased participants’ knowledge (MD = 2.27; 95% confidence interval (CI): 1.32 to 3.23; 52 studies; N = 13,106; high-quality evidence), accuracy of risk perceptions (RR 2.10; 95% CI: 1.64 to 2.64; 17 studies; N ≥ 500; moderate-quality evidence), and congruency between informed values and care choices (RR 2.46; 95% CI: 1.46 to 3.91; 10 studies; N = 4,603; low-quality evidence) compared to usual care. Regarding attributes related to the decision-making process and compared to usual care, decision aids increased decisional conflict related to feeling informed (MD = -0.20 to -0.60; 27 studies; N = 1,507; high-quality evidence), indecision about personal values (MD = -0.20 to 0.00; 95% CI: -1.99 to -0.60; 23 studies).

A meta-analysis of 105 studies and 31,043 participants evaluating the utility of shared decision-making. Study quality was generally good (high-quality evidence that decision aids improved knowledge and reduced decision conflict, moderate-quality evidence that decision aids decreased risk of participation in decision making, but low-quality evidence that decision aids improved the congruence between the chosen option and informed values) and involved a mix of medical and surgical interventions but none of the included studies was focused on spinal surgery.

> Supports the use of decision aids in a variety of medical and surgical interventions.

Spinal surgery
North Zealand, Denmark. Prospective cohort study with follow-up at 6 months. No abstract available.

-- High quality guideline for “routine preoperative tests for elective surgery.”

SB / 4 / 3

Advance directives
Nicholas LH, Langa KM, Iwashyna TJ. Regional variation in the association between advance directives and end-of-life Medicare expenditures. JAMA, 2011 Apr 12;305(14):1647-53. PMID: 21372306

CONTENT: It is unclear if advance directives (living wills) are associated with end-of-life expenditures and regional variation in the association between treatment-limiting advance directive use, end-of-life Medicare expenditures, and use of palliative and intensive treatments. DESIGN, SETTING, AND PARTICIPANTS: Prospective cohort study of the Medicare beneficiaries who died between 1998 and 2007 linked to Medicare claims and the National Death Index. Multivariable regression models examined associations between advance directives, end-of-life Medicare expenditures, and treatments by level of Medicare spending in the decedent’s hospital referral region. MAIN OUTCOME MEASURES: Medicare expenditures, life-sustaining treatments, hospice care, and in-hospital death over the last 6 months of life. RESULTS: Advance directives specifying limits in care were associated with lower spending in hospital referral regions with high average levels of end-of-life expenditures ($5585 per decedent; 95% CI, -$10,903 to -$267), but there was no difference in spending in hospital referral regions with low or medium levels of end-of-life expenditures. Directives were associated with lower spending in hospital referral regions with higher levels of in-hospital death (-9.8%; 95% CI, -16% to -3%) in high-spending regions; -5.3%; 95% CI, -10% to -0.4% in medium-spending regions). Advance directives were associated with higher adjusted probabilities of hospice use in high- and medium-spending regions (3%; 95% CI, 1% to 6% in high-spending regions; 5%; 95% CI, 3% to 7% in medium-spending regions). Advance directives were associated with higher adjusted probabilities of hospice use in high- and medium-spending regions (3%; 95% CI, 1% to 6% in high-spending regions; 5%; 95% CI, 3% to 7% in medium-spending regions), but not in low-spending regions. CONCLUSION: Advance directives specifying limitations in end-of-life care were associated with significantly lower levels of Medicare spending, lower likelihood of in-hospital death, and higher use of hospice care in regions characterized by higher levels of end-of-life spending.

Prospective study of the effect of advance directives on end of care.

Supports the use of advance directives to reduce the use of inappropriate and costly end-of-life care.
90 8/2014 - Bree Collaborative Lumbar Fusion Evidence Table

**Fitness for surgery:**  Cardiopulmonary fitness


**High quality society guideline with evidence appraisals**

> "The focus of this clinical practice guideline is the perioperative cardiovascular evaluation and management of the adult patient undergoing noncardiac surgery."

91 8/31/14 - Bree Collaborative Lumbar Fusion Evidence Table

**Nasal culture; chlorhexidine**


BACKGROUND: Nasal carriers of Staphylococcus aureus are at increased risk for health care–associated infections with this organism. Decolonization of nasal and extranasal sites on hospital admission may reduce this risk. METHODS: In a randomized, double-blind, placebo-controlled, multicenter trial, we assessed whether rapid identification of S. aureus nasal carriers by means of a real-time polymerase-chain-reaction (PCR) assay, followed by treatment with mupirocin nasal ointment and chlorhexidine soap, reduces the risk of hospital–associated S. aureus infection. RESULTS: From October 2005 through June 2007, a total of 5971 patients were screened on admission. A total of 1270 nasal swabs from 1251 patients were positive for S. aureus. We enrolled 667 of these patients in the intention-to-treat analysis, of whom 808 (88.1%) underwent a surgical procedure. All the S. aureus strains identified on PCR assay were susceptible to methicillin and mupirocin. The rate of S. aureus infection was 3.4% (17 of 504 patients) in the mupirocin-chlorhexidine group, as compared with 7.7% (32 of 413 patients) in the placebo group (relative risk of infection, 0.42; 95% confidence interval [CI], 0.23 to 0.75). The effect of mupirocin-chlorhexidine treatment was most pronounced for deep surgical-site infections (relative risk, 0.21; 95% CI, 0.07 to 0.62). There was no significant difference in all-cause in-hospital mortality between the two groups. The time to the onset of nosocomial infection was shorter in the placebo group than in the mupirocin-chlorhexidine group (P=0.01). CONCLUSIONS: Rapid PCR testing followed by decolonization of S. aureus nasal carriers on admission can reduce the risk of S. aureus surgical-site infections. (Current Controlled Trials number, ISRCTN56186788. Cohort included a variety of surgical procedures, as well as patients hospitalized for medical issues.}

92 8/7/14 - Bree Collaborative Lumbar Fusion Evidence Table

**Reducing nasal colonization; reducing skin colonization; chlorhexidine**


Abstract: We quantified surgical site infections (SSIs) after preoperative screening/selective decolonization before elective total joint arthroplasty (TJA) with 2-year follow-up and 2 controls. Concurrent controls (n = 2284) were patients of surgeons not participating in screening/decolonization. Preintervention controls (n = 741) were patients of participating surgeons who underwent TJA the previous year. Staphylococcus aureus nasal carriers (321/1285 [25%]) used intranasal mupirocin and chlorhexidine baths as outpatients. Staphylococcal SSIs occurred in no intervention patients (0/321) and 19 concurrent controls. If all SSIs occurred in carriers and 25% of controls were carriers, staphylococcal SSI rate would have been 3.3% in controls (19/571; P = .001). Overall SSI rate decreased from 2.7% (20/741) in reintervention controls to 1.2% (17/1440) in intervention patients (P = .009). Preoperative screening/selective decolonization was associated with fewer SSIs after elective TJA. (Cohort is patients undergoing total joint replacement.)

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Supports the use of mupirocin nasal swabs and chlorhexidine bath to reduce surgical site infections after total joint surgery.
Deltirium & adverse outcomes


CONCLUSION: Delirium is a common and serious complication in elderly patients. Evidence suggests that delirium is associated with long-term poor outcome but delirium often occurs in individuals with more severe underlying disease. OBJECTIVE: To assess the association between delirium in elderly patients and long-term poor outcome, defined as mortality, institutionalization, or dementia, while controlling for important confounders.

METHODS: A systematic search of studies published between 1 January 2000 and 31 October 2010 was conducted using the databases of MEDLINE, EMBASE, PsychINFO, and Cinahl. 3705 (10.7%) and dementia (27%).

RESULTS: A total of 578,457 LDs and LFs were identified in the United States from 2002-2009. Of these, 292,177 were LDs and 286,280 were LFs. The overall incidence of delirium was 8.4 events per 1000 cases. Patients undergoing LF had a statistically greater incidence of delirium than patients undergoing LD (11.8 vs. 5.0 per 1000; P < 0.001). Logistic regression demonstrated that independent predictors of delirium included older age (2.3; 95% confidence interval (CI), 2.1-2.5), IQ, and dementia (2 studies; average follow-up, 4.1 years; 278 patients (62.4%) with delirium and 218 controls (52.0%); HR, 1.64 (95% CI, 1.32-2.03); IQ, 44(0)). Moreover, patients who had experienced delirium were at an increased risk of institutionalization (7 studies; average follow-up, 24.6 years; 17637 patients (33.4%) with delirium and 21920 controls (30.7%); odds ratio (OR), 2.41 (95% CI, 1.77-3.29); IQ, 44(0)) and dementia (2 studies; average follow-up, 4.1 years; 278 patients (62.4%) with delirium and 218 controls (52.0%); HR, 1.64 (95% CI, 1.32-2.03); IQ, 44(0)). The sensitivity, trim-and-fill, and secondary analyses with unadjusted high-quality risk estimates stratified according to the study characteristics confirmed the robustness of these results.

CONCLUSION: This retrospective cohort study from the Nationwide Inpatient Sample including 578,457 lumbar decompressions and lumbar fusions. Logistic regression analysis identified odds ratio for delirium of 2.3 For patients with alcohol abuse versus no alcohol abuse. Criteria for “alcohol abuse” not specified and may have been taken from coding data from NIS.

Dental screening


CONCLUSION: This is the opinion of the work group that patients with prosthetic joint implants or other orthopaedic implants maintain appropriate oral hygiene. Grade of Recommendation: Consensus

The intent of this project is to recommend appropriate oral hygiene in the absence of reliable evidence linking poor oral health to prosthetic joint infection. It is the opinion of the work group that patients with prosthetic joint implants or other orthopaedic implants maintain appropriate oral hygiene. Grade of Recommendation: Consensus

Recommendaion #4: In the absence of reliable evidence linking poor oral health to prosthetic joint infection, it is the opinion of the work group that patients with prosthetic joint implants or other orthopaedic implants maintain appropriate oral hygiene. Grade of Recommendation: Consensus

Supports patients with implants maintaining good oral health.

Dental screening

Cohort is elderly patients treated in hospital or acute care setting for medical or surgical conditions.
Patient reported outcomes


OBJECTIVE: Patient-reported outcomes (PROs) are essential when evaluating many new treatments in health care, yet current measures have been limited by a lack of precision, comparability, and comparability of scores across studies and diseases. The Patient-Reported Outcomes Measurement Information System (PROMIS) provides item banks that offer the potential for efficient (examinem item number without compromising reliability), flexible (enables optional use of interchangeable items), and precise (has minimal error in estimates) measurement of commonly studied PROs. We report results from the first large-scale testing of PROMIS items. STUDY DESIGN AND SETTING: Fourteen item pools were tested in the U.S. general population and clinical groups using an online panel and clinic recruitment. A scale-setting subsample was created reflecting demographics proportional to the 2000 U.S. census. RESULTS: Using item-response theory (graded response model), 11 item banks were calibrated in a sample of 23,123, measuring components of self-reported physical, mental, and social health, along with a 10-item Global Health scale. Short forms from each bank were developed and compared with the overall bank and with other well validated and widely accepted "legacy" measures. All item banks demonstrated good reliability across most of the score distributions. Construct validity was supported by moderate to strong correlations with legacy measures. CONCLUSION: PROMIS item banks and their short forms provide evidence that they are reliable and precise measures of generic symptoms and functional reports comparable to legacy instruments. Further testing will continue to validate and test PROMIS items and banks in diverse clinical populations.

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Abstract Study Design: Retrospective case review pre- and postintervention. Objectives: To determine the effects of the interventions. Summary of Background Data: Complication rates in adult spinal deformity surgery are unacceptable. System approach are necessary to increase patient safety. This group examined the dualeattending surgeon approach, a multidisciplinary preoperative screening conference, and the intraoperative protocol for the management of coagulopathy. The outcomes were demonstrated by complication rates before and after the institution of this protocol. Methods: Forty consecutive patients in Group A were managed with the 3-pronged approach. A total of 124 consecutive patients in Group B had a dualeattending surgeon approach, were presented and shared by the multidisciplinary preoperative conference, and were managed according to the intraoperative protocol. Results: Group A had an average age of 52 years (range, 30-84 years). Group B had an average age of 44 years (range, 18-86 years). Most patients in both groups had fusions from 9 to 15 levels. Complication rates in Group A were significantly lower (16% vs. 30%) (p < .05). Group B showed significantly lower return rates to the operating room during the perioperative 90-day period (13% vs. 25%) (p < .05). Group B also had lower rates of wound infection requiring debridement (1.6% vs. 7.5%), lower rates of deep vein thrombosis/pulmonary embolism (3.2% vs. 10%), and lower rates of postoperative neurological complications (0.5% vs. 2.0%) (not significant). Group B had significantly lower rates of urinary tract infection requiring antibiotics (1.6% vs. 3.2%) (p < .01). Conclusions: These data suggests that a novel approach consisting of a dualeattending surgeon approach in the operating room, a live preoperative screening conference, and an intraoperative protocol for managing coagulopathy will significantly reduce perioperative complication rates and enhance patient safety in patients undergoing complex spinal reconstructions for adult spinal deformity. 2014 Scboschi Research Society

Retrospective cohort study demonstrating substantial reduction in complications for patients undergoing multilevel fusions. Interventions included dual surgeons, live multidisciplinary conference, and intraoperative management of coagulopathy. Most patients had 9 to 15 fusions.

The three interventions were associated with a dramatic reduction in complications in patients with multilevel fusions.

Surgical team


Abstract: OBJECTIVE: To identify factors that account for variation in complication rates across hospitals and surgeons performing lumbar spinal fusion surgery. DATA SOURCES: Discharge registry including all nonfederal hospitals in Washington State from 2004 to 2007. STUDY DESIGN: We identified adults (n = 6,091) undergoing multilevel fusions during the 4-year study period. Within each hospital, we identified 124 consecutive patients in both intervention and control groups. Results: Group A had an average age of 52 years (range, 30-84 years). Group B had an average age of 44 years (range, 18-86 years). Most patients in both groups had fusions from 9 to 15 levels. Complication rates in Group A were significantly lower (16% vs. 30%) (p < .05). Group B showed significantly lower return rates to the operating room during the perioperative 90-day period (13% vs. 25%) (p < .05). Group B also had lower rates of wound infection requiring debridement (1.6% vs. 7.5%), lower rates of deep vein thrombosis/pulmonary embolism (3.2% vs. 10%), and lower rates of postoperative neurological complications (0.5% vs. 2.0%) (not significant). Group B had significantly lower rates of urinary tract infection requiring antibiotics (1.6% vs. 3.2%) (p < .01). Conclusions: These data suggests that a novel approach consisting of a dualeattending surgeon approach in the operating room, a live preoperative screening conference, and an intraoperative protocol for managing coagulopathy will significantly reduce perioperative complication rates and enhance patient safety in patients undergoing complex spinal reconstructions for adult spinal deformity. 2014 Scboschi Research Society.

level 1: prospective study – large, representative population, objective and reasonable definitions of exposure and outcome, excellent (f) cohort study of patients undergoing lumbar fusion that measures complication rates related to hospital- or surgeon-factors. Hospital effects accounted for 88% of the total variability, and surgeon effects accounted for 14%. Surgeon-factors account for 54% of the variation in hospital reoperation rates, and 47.2% of the variation in hospital complication rates. Low volume quartile for surgical volume defined as 0-19 surgeons in previous year.

Suggest that QP effort should be targeted at the individual surgeon level rather than hospital level to reduce complication rate. Compared to stratified surgery, surgical volume in this citation were much higher.

STUDY DESIGN: Retrospective review. OBJECTIVE: To determine the correlation of surgeon/hospital volume with complications/mortality rates and in hospital health care utilization in lumbar spine surgery.

SUMMARY BACKGROUND DATA: Studies have shown improved outcomes in patients treated by high-volume surgeons and hospitals. To our knowledge, no studies examine this relationship for lumbar spine surgery.

METHODS: To evaluate the 1992-2005 data in the National Inpatient Sample, we used the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes for lumbar spine surgery to identify relevant hospitalizations. We assessed 1,266,648 hospitalization records listed as posterolateral lumbar decompression with fusion and/or exploration decompression of the spinal canal. Annual surgeon and hospital volumes were stratified into quintiles using identifier codes. Patient demographics and comorbidities were recorded for each group. Mortality and morbidity were primary endpoints. We used the Shapiro-Wilk test for normality of the distribution of variables; one-way analysis of variance to assess continuous measures; γ statistics for categorical measures; and logistic regression for the effect of procedure volume on the probability of mortality and morbidity, adjusting for confounding variables, including patient demographics. Logistic regression data were tabulated as odd ratios (ORs) and 95% confidence intervals (CIs) (statistical significance, P < 0.05). RESULTS: When controlled for other variables, mortality was significantly lower in the highest volume hospitals (OR, 0.70; 95% CI 0.64 to 0.88) and among the highest volume surgeons (OR, 0.75; 95% CI 0.63 to 0.90) than in their lowest volume counterparts. The complication rate was slightly lower in the highest volume hospitals (OR, 0.94; 95% CI 0.81 to 0.99) and significantly lower among the highest volume surgeons (OR, 0.75; 95% CI 0.63 to 0.91) than in their lowest volume counterparts. CONCLUSIONS: The morbidity and complication rates associated with lumbar spine surgery are lower when patients are treated by high-volume surgeons and hospitals.


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OBJECTIVE: To examine the association between surgical start time and mortality and morbidity for non-emergent procedures. SUMMARY BACKGROUND DATA: Patients require medical services 24 hours a day. Several studies have demonstrated a difference in outcomes over the course of the day for anesthetic adverse events, death in the ICU, and mortality risk. The relationship between operation start time and patient outcomes is not well-defined. METHODS: We performed a retrospective cohort study of 146,743 non-emergent general and vascular surgical procedures performed within the VA Medical System 2000-2004 and entered into the National Surgical Quality Improvement Program Database. Operation start time was the independent variable of interest. Logistic regression was used to adjust for patient and procedural characteristics and to determine the association between start time and, in 2 independent models, mortality and morbidity. RESULTS: Unadjusted later start time was significantly associated with higher surgical mortality and morbidity. After adjustment for patient and procedure characteristics, mortality was not significantly associated with start time. However, after appropriate adjustment, operations starting between 6 pm and 8 pm were associated with an elevated risk of mortality (OR = 1.25, P or = 0.005) over those starting between 7 am and 4 pm as were operations starting between 6 pm and 11 pm (OR = 1.40, P or = 0.005). CONCLUSIONS: When considering a non-emergent procedure, surgeons must bear in mind that cases that start after regular "business" hours within the VA System may face an elevated risk of complications that warrants further evaluation.

Supports starting surgeries during "business hours" rather than after-hours to reduce risk of complications.

Cohort comprised of general and cardiovascular surgery in VA system.
Multimodal anesthesia; intravenous analgesics

- Chlorhexidine; reducing nasal skin colonization
- Measures 1-4: Surgical Care Improvement Project measures. CMS, revised 2011.
- Technical specifications for ACE Demonstration Quality Monitoring Program.

246 8/6/1/A/B Multimodal anesthesia; intravenous analgesics

- The authors analyzed data from 12 randomized placebo-controlled trials (8 NSAIDs, testing acetaminophen, nonsteroidal antiinflammatory drugs, or selective cyclooxygenase-2 inhibitors) given in conjunction with morphine after surgery. The median of the average 24-h morphine consumption in controls was 40 mg (range, 15-117 mg), which was significantly decreased with all regimens by 15-55%. There was evidence of a reduction in nausea/vomiting from 28% to 22% (number needed to treat, 12) and of sedation from 16% to 12.7% (number needed to treat, 17) but increased the risk of severe bleeding from 0.1% to 1.7% (number needed to treat, 58). Selective cyclooxygenase-2 inhibitors increased the risk of renal failure in cardiac patients from 0.1% to 0.4% (number needed to treat, 7x). A decrease in morphine consumption is not a good indicator of the usefulness of a supplemental analgesic. There is evidence that the combination of nonsteroidal antiinflammatory drugs, or selective cyclooxygenase-2 inhibitors given in conjunction with morphine after surgery, reduced perioperative opiate consumption in a variety of chronic/surgical interventions with variable routes of administration, little is known regarding its efficacy in opioid-dependent patients with a history of chronic pain. We hypothesized that ketamine would reduce postoperative opioid consumption in this patient population. METHODS: This was a randomized, prospective, double-blinded, and placebo-controlled trial involving opioid-dependent patients undergoing major lumbar spine surgery. Fifty-two patients in the intervention group were administered 0.5 mg/kg intravenous ketamine on induction of anesthesia, and a continuous infusion at 10 microg/kg (5 ml) per h began on induction and terminated at wound closure. Forty patients in the placebo group received saline of equivalent volume. Patients were observed for 48 h postoperatively and followed up at 6 weeks. The primary outcome was 48-h morphine consumption. NSAIDs final morphine consumption (morphine equivalence) was significantly reduced in the treatment group 48 h after the procedure. It was also reduced at 24 h and at 6 weeks. The average reported pain intensity was significantly reduced in the postanesthesia care unit and at 6 weeks. The groups had no differences in known ketamine- or opioid-related side effects. CONCLUSIONS: Intravenous ketamine reduces opioid consumption in the 48-h postoperative period in opioid-dependent patients with chronic pain. Ketamine may also reduce opioid consumption and pain intensity throughout the postoperative period in this patient population. This benefit is without an increase in side effects.

- Advantage of multimodal analgesia to reduce opioid need.
- Morphine and fentanyl are the most frequent opioids used in the treatment of chronic pain. Morphine is the only WHO analgesic classed as an agonist, while fentanyl is a partial agonist. However, the WHO recommends the combination of opioids in the treatment of chronic pain. There is evidence that the combination of nonsteroidal antiinflammatory drugs, or selective cyclooxygenase-2 inhibitors given in conjunction with morphine after surgery, reduced perioperative opiate consumption in a variety of chronic/surgical interventions with variable routes of administration, little is known regarding its efficacy in opioid-dependent patients with a history of chronic pain. We hypothesized that ketamine would reduce postoperative opioid consumption in this patient population. METHODS: This was a randomized, prospective, double-blinded, and placebo-controlled trial involving opioid-dependent patients undergoing major lumbar spine surgery. Fifty-two patients in the intervention group were administered 0.5 mg/kg intravenous ketamine on induction of anesthesia, and a continuous infusion at 10 microg/kg (5 ml) per h began on induction and terminated at wound closure. Forty patients in the placebo group received saline of equivalent volume. Patients were observed for 48 h postoperatively and followed up at 6 weeks. The primary outcome was 48-h morphine consumption. NSAIDs final morphine consumption (morphine equivalence) was significantly reduced in the treatment group 48 h after the procedure. It was also reduced at 24 h and at 6 weeks. The average reported pain intensity was significantly reduced in the postanesthesia care unit and at 6 weeks. The groups had no differences in known ketamine- or opioid-related side effects. CONCLUSIONS: Intravenous ketamine reduces opioid consumption in the 48-h postoperative period in opioid-dependent patients with chronic pain. Ketamine may also reduce opioid consumption and pain intensity throughout the postoperative period in this patient population. This benefit is without an increase in side effects.

- COX-2 inhibitors increase the risk of renal failure in cardiac patients.

247 8/6/1/A/B Multimodal anesthesia

- In another study, the NICE guidelines recommend the use of multimodal analgesia to reduce opioid need.
- The authors analyzed data from 12 randomized placebo-controlled trials (8 NSAIDs, testing acetaminophen, nonsteroidal antiinflammatory drugs, or selective cyclooxygenase-2 inhibitors) given in conjunction with morphine after surgery. The median of the average 24-h morphine consumption in controls was 40 mg (range, 15-117 mg), which was significantly decreased with all regimens by 15-55%. There was evidence of a reduction in nausea/vomiting from 28% to 22% (number needed to treat, 12) and of sedation from 16% to 12.7% (number needed to treat, 17) but increased the risk of severe bleeding from 0.1% to 1.7% (number needed to treat, 58). Selective cyclooxygenase-2 inhibitors increased the risk of renal failure in cardiac patients from 0.1% to 0.4% (number needed to treat, 7x). A decrease in morphine consumption is not a good indicator of the usefulness of a supplemental analgesic. There is evidence that the combination of nonsteroidal antiinflammatory drugs, or selective cyclooxygenase-2 inhibitors given in conjunction with morphine after surgery, reduced perioperative opiate consumption in a variety of chronic/surgical interventions with variable routes of administration, little is known regarding its efficacy in opioid-dependent patients with a history of chronic pain. We hypothesized that ketamine would reduce postoperative opioid consumption in this patient population. METHODS: This was a randomized, prospective, double-blinded, and placebo-controlled trial involving opioid-dependent patients undergoing major lumbar spine surgery. Fifty-two patients in the intervention group were administered 0.5 mg/kg intravenous ketamine on induction of anesthesia, and a continuous infusion at 10 microg/kg (5 ml) per h began on induction and terminated at wound closure. Forty patients in the placebo group received saline of equivalent volume. Patients were observed for 48 h postoperatively and followed up at 6 weeks. The primary outcome was 48-h morphine consumption. NSAIDs final morphine consumption (morphine equivalence) was significantly reduced in the treatment group 48 h after the procedure. It was also reduced at 24 h and at 6 weeks. The average reported pain intensity was significantly reduced in the postanesthesia care unit and at 6 weeks. The groups had no differences in known ketamine- or opioid-related side effects. CONCLUSIONS: Intravenous ketamine reduces opioid consumption in the 48-h postoperative period in opioid-dependent patients with chronic pain. Ketamine may also reduce opioid consumption and pain intensity throughout the postoperative period in this patient population. This benefit is without an increase in side effects.

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- Supports use of multimodal analgesia to reduce opioid need.

249 8/6/2/A/B Intravenous catheter: > 48 hours

- Technical specifications for ACE Demonstration Quality Monitoring Program.
- Measures 1-4: Surgical Care Improvement Project measures. CMS, Ireland 2011.

- CMS standard for measures to prevent infection and venous thromboembolism for surgical patients.

250 8/6/2/A/B Intravenous catheter: > 48 hours

- CMS standard for measures to prevent infection and venous thromboembolism for surgical patients.

251 8/6/2/A/B Vascular catheter: > 48 hours

- CMS standard for measures to prevent infection and venous thromboembolism for surgical patients.

252 8/6/2/A/B Vascular catheter: > 48 hours

- CMS standard for measures to prevent infection and venous thromboembolism for surgical patients.
Tranexamic acid to reduce bleeding  


BACKGROUND: Tranexamic acid (TXA) is well-established as a versatile oral, intramuscular, and intravenous (IV) antifibrinolytic agent. However, the efficacy of IV TXA in reducing perioperative blood transfusion in spinal surgery is poorly documented. METHODOLOGY: We conducted a meta-analysis of randomized controlled trials (RCTs) and quasi-randomized (q-RCTs) trials that included patients for various spinal surgeries, such as adolescent scoliosis surgery administered with perioperative IV TXA according to Cochrane Collaboration guidelines using electronic PubMed, Cochrane Central Register of Controlled Trials, and Embase databases. Additional journal articles and conference proceedings were manually located by two independent researchers. RESULTS: Totally, nine studies were included, with a total sample size of 581 patients. Mean blood loss was decreased in patients treated with perioperative IV TXA by 128.28 ml intraoperatively (ranging from 33.84 to 222.73 ml), 98.49 ml postoperatively (ranging from 83.22 to 113.77 ml), and 389.21 ml combined (ranging from 173.48 to 600.60 ml). The mean volume of transfused packed cells were reduced by 134.55 ml (ranging 51.64 to 217.46) (95% CI; P = 0.0001). Overall, the number of patients treated with TXA who required blood transfusions was lower by 30% than that of patients treated with the comparator and who required blood transfusions (RR 0.70; 95% CI; 0.53 to 0.91; P<0.001). A dose-independent beneficial effect of TXA was observed, and confirmed in subgroup and sensitivity analyses. A total of seven studies reported DVT data. The study containing only a single DVT case was not combined. CONCLUSIONS: The blood loss was reduced in spinal surgery patients with perioperative IV TXA treatment. Also the percentage of spinal surgery patients who required blood transfusion was significantly decreased. Further evaluation is required to confirm our findings before TXA can be safely used in patients undergoing spine surgery.

Meta-analysis of high-quality studies. Heterogeneity of some outcomes. Insufficient safety data. Are blood loss and transfusion needs intermediate or patient-oriented outcomes? → Provides modest support for use of TXA to reduce blood loss and transfusion need in spinal surgery.

Tranexamic acid to reduce bleeding  


BACKGROUND: Spinal reconstructive surgery in adults can be associated with significant blood loss, often requiring allogeneic blood transfusion. The objective of this randomized, prospective, double-blind, multicenter study was to evaluate the efficacy of tranexamic acid (TXA) in reducing perioperative blood loss and transfusion in adult patients having elective posterior thoracic/lumbar instrumented spinal fusion surgery. METHODS: One hundred fifty-one adult patients were randomized to receive either a bolus of 10 mg/kg IV of TXA after induction followed by a maintenance infusion of 1 mg/kg/hr of TXA, or an equivalent volume of placebo (normal saline). The primary outcome was the total perioperative estimated and calculated blood loss intraoperatively and 24 h postoperatively. Secondary outcomes were incidence of allogeneic blood exposure, and duration of hospital stay. RESULTS: Four patients were withdrawn for identifiable surgical bleeding, therefore 147 patients were included in the analysis. The total estimated and calculated perioperative blood loss was approximately 20% and 30% lower in patients given TXA versus placebo (1592 +/- 1315 mL vs 2138 +/- 1607 mL, P = 0.026; 3079 +/- 2558 vs 4363 +/- 3030, P = 0.017), respectively. There was no difference in the amounts of blood products transfused, and length of stay between the two groups. TXA, surgical duration, and number of vertebrae fused were independent factors related to perioperative blood loss. Predictors for the need for allogeneic red blood cell transfusion were ASA classification, surgical duration and number of levels fused. CONCLUSIONS: TXA significantly reduced the estimated and calculated total amount of perioperative blood loss in adult patients having elective posterior thoracic/lumbar instrumented spinal fusion surgery.

High-quality RCT showing that tranexamic acid reduces blood loss in patients undergoing spinal fusion surgery. 2/B grade based on: the outcome was intermediate (blood loss), insufficient safety data (see citation #60). → Provides modest support for use of TXA to reduce blood loss in spinal fusion surgery.
Tranexamic acid to reduce bleeding


BACKGROUND: Concerns regarding the safety of transfused blood have led to the development of a range of interventions to minimize blood loss during major surgery. Anti-fibrinolytic drugs are widely used, particularly in cardiac surgery, and previous reviews have found them to be effective in reducing blood loss, the need for transfusion, and the need for re-operation due to continued or recurrent bleeding. In the last few years questions have been raised regarding the comparative performance of the drugs. The safety of the most popular agent, aprotinin, has been challenged, and it was withdrawn from world markets in May 2008 because of concerns that it increased the risk of cardiovascular complications and death. OBJECTIVES: To assess the comparative effects of the anti-fibrinolytic drugs aprotinin, tranexamic acid (TXA), and epsilon aminocaproic acid (EACA) on blood loss during surgery; the need for red blood cell (RBC) transfusion; and adverse events, particularly vascular occlusion, renal dysfunction, and death. SEARCH STRATEGY: We searched the Cochrane Injuries Group’s Specialised Register (July 2010), Cochrane Central Register of Controlled Trials (The Cochrane Library 2010, issue 3); MEDLINE (Ovid SP) (2000 to July 2010); EMBASE (Ovid SP) 1980 to July 2010. Reference lists of identified trials and review articles were checked and trial authors were contacted to identify any additional studies. The searches were last updated in July 2010. SELECTION CRITERIA: Randomised controlled trials (RCTs) of anti-fibrinolytic drugs in adults scheduled for non-emergent surgery. Eligible trials compared anti-fibrinolytic drugs with placebo (or no treatment), or with each other. DATA COLLECTION AND ANALYSIS: Two authors independently assessed trial quality and extracted data. This version of the review includes a sensitivity analysis excluding trials authored by Prof. Joachim Boldt. MAIN RESULTS: This review summarises data from 252 RCTs that recruited over 25,000 participants. Data from the head-to-head trials suggest an advantage of aprotinin over the lysine analogues TXA and EACA in terms of reducing perioperative blood loss, but the differences were small. Compared to control, aprotinin reduced the probability of needing RBC transfusion by a relative 34% (relative risk [RR] 0.66, 95% confidence interval [CI] 0.60 to 0.72). The RR for RBC transfusion with TXA was 0.61 (95% CI 0.53 to 0.70) and was 0.63 (95% CI 0.47 to 0.98) with EACA. When the pooled estimates from the head-to-head trials of the two lysine analogues were compared and compared to aprotinin alone, aprotinin appeared more effective in reducing the need for RBC transfusion (RR 0.89; 95% CI 0.80 to 0.99). Aprotinin reduced the need for re-operation due to bleeding by a relative 34% (RR 0.64, 95% CI 0.56 to 0.72). This translates into an absolute risk reduction of 2% and a number needed to treat (NNT) of 50 (95% CI 33 to 100). A similar trend was found for patients undergoing hip surgery, and the RRs of the effects of aprotinin, TXA, and EACA on blood loss during surgery, the need for blood transfusion, and adverse events, particularly vascular occlusion, renal dysfunction, and death are similar. Anti-fibrinolytic therapy has a role in reducing blood loss but there are concerns about the safety of aprotinin. Future research is needed to better inform this decision. Overall, the results of this review suggest that antifibrinolytic therapy can reduce the need for RBC transfusion, and the need for re-operation due to continued or recurrent bleeding. We recommend that, on admission to the ICU, all patients be assessed for their risk of VTE, and that most receive thromboprophylaxis (Grade 1A). We recommend anticoagulant therapy for elective surgical patients with emphasis on patients undergoing joint surgery.
III / B / 5 Glucose control


OBJECTIVE: Hospital hyperglycemia, in individuals with and without diabetes, has been identified as a marker of poorer clinical outcome in cardiac surgery patients. However, the impact of perioperative hyperglycemia on clinical outcome in general and noncardiac surgery patients is not known. RESEARCH DESIGN AND METHODS: This was an observational study with the aim of determining the relationship between pre- and post-surgery blood glucose levels and hospital length of stay (LOS), complications, and mortality in 1,844 noncardiac surgery patients consecutively admitted to Surrey University Hospital (Surrey, GA) between 1 January 2007 and 30 June 2007. RESULTS: The overall 30-day mortality was 2.1%, with survivors having significantly higher blood glucose levels before and after surgery (both P = 0.005) than survivors. Perioperative hyperglycemia was associated with increased hospital and intensive care unit LOS (P < 0.001) as well as higher numbers of postoperative care of pneumonia (P = 0.001), systemic blood infection (P = 0.001), urinary tract infection (P = 0.001), acute renal failure (P = 0.001) and acute myocardial infarction (P = 0.001). Multivariate analysis (adjusted for age, sex, race, and surgery severity), the risk of death increased in proportion to perioperative glucose levels; however, this association was significant only for patients without a history of diabetes (P = 0.008) compared with patients with known diabetes (P = 0.748). CONCLUSIONS: Perioperative hyperglycemia is associated with increased LOS, hospital complications, and mortality after noncardiac surgery general. Randomized controlled trials are needed to determine whether perioperative diabetes management improves clinical outcome in noncardiac surgery patients.

IV / B Discharge process

Wagner C, Zabari M. Reducing readmissions: care transitions toolkit. Washington State's Health Technology Assessment is a respected source supported by high-quality evidence appraisal.

→ Abstract: A consensus document that proposes a community standard for hospital discharge.

→ Backgrounder: Abstract suggests early ambulation is associated with reduced length of stay in patients following spinal surgery.

IV / A / 1 Early mobilization


BACKGROUND CONTEXT: Recovery after spinal fusion continues to be refined through better multidisciplinary care. Various recovery protocols exist, all which incorporate and emphasize early and immediate postoperative mobilization. Mobilizing patients on the day of surgery is thought to improve functional recovery of range of motion and reduce hospital length of stay (LOS). METHODS: All patients undergoing elective primary or revisional spinal fusion between August 2010 and June 2011, within a four-hospital health system were retrospectively reviewed. Patients evaluated by physical therapy (PT) the day of surgery were included in the study analysis. Mobilization was attempted the day of surgery with PT, or if without the use of assistive devices. If a distance of at least 30 feet was not reached, a questionnaire indicating the reason(s) was completed. Distance ambulated on the day of surgery, obstacles impeding ambulating 30 feet, and LOS were recorded. Patients reaching the in-patient unit after 1500 hours were excluded. RESULTS: Seventy percent of patients (320/457) successfully ambulated at least 30 feet on the day of surgery. Forty-six patients were not evaluated secondary to personnel related factors. A total of 85 patients ambulated under 30 feet, citing most commonly: orthopedic/urogenital 20.4% (25/126), dressing 20.5% (26/126), nausea 23.6% (12/51), pain 16.8% (10/51), fatigue 3.9% (2/51), and post (10/51), limiting reasons. The average LOS of patients ambulating at least 30 feet the day of surgery was 1.85 days versus 2.79 days in those ambulating less (P < 0.05). CONCLUSIONS: The benefits of early postoperative mobilization are well recognized and this study highlights major obstacles limiting early ambulation after spinal fusion. Focusing continued multidisciplinary efforts towards such factors as postoperative hypertension, nausea, dressing, and pain after postoperative spinal fusion may further improve our development of rapid recovery programs. Furthermore, ambulating a distance of at least 30 feet the day of surgery correlates with a statistically significant shorter LOS.

IV / C / 1 Glycemic control


OBJECTIVE: Hospital hyperglycemia, in individuals with and without diabetes, has been identified as a marker of poorer clinical outcome in cardiac surgery patients. However, the impact of perioperative hyperglycemia on clinical outcome in general and noncardiac surgery patients is not known. RESEARCH DESIGN AND METHODS: This was an observational study with the aim of determining the relationship between pre- and post-surgery blood glucose levels and hospital length of stay (LOS), complications, and mortality in 1,844 noncardiac surgery patients consecutively admitted to Surrey University Hospital (Surrey, GA) between 1 January 2007 and 30 June 2007. RESULTS: The overall 30-day mortality was 2.1%, with survivors having significantly higher blood glucose levels before and after surgery (both P = 0.005) than survivors. Perioperative hyperglycemia was associated with increased hospital and intensive care unit LOS (P < 0.001) as well as higher numbers of postoperative care of pneumonia (P = 0.001), systemic blood infection (P = 0.001), urinary tract infection (P = 0.001), acute renal failure (P = 0.001) and acute myocardial infarction (P = 0.001). Multivariate analysis (adjusted for age, sex, race, and surgery severity), the risk of death increased in proportion to perioperative glucose levels; however, this association was significant only for patients without a history of diabetes (P = 0.008) compared with patients with known diabetes (P = 0.748). CONCLUSIONS: Perioperative hyperglycemia is associated with increased LOS, hospital complications, and mortality after noncardiac surgery general. Randomized controlled trials are needed to determine whether perioperative diabetes management improves clinical outcome in noncardiac surgery patients.

Cycle 4: Post-operative Care and Return to Function

14 / 8 / 5 Glycemic control


BACKGROUND CONTEXT: Recovery after spinal fusion continues to be refined through better multidisciplinary care. Various recovery protocols exist, all which incorporate and emphasize early and immediate postoperative mobilization. Mobilizing patients on the day of surgery is thought to improve functional recovery of range of motion and reduce hospital length of stay (LOS). METHODS: All patients undergoing elective primary or revisional spinal fusion between August 2010 and June 2011, within a four-hospital health system were retrospectively reviewed. Patients evaluated by physical therapy (PT) the day of surgery were included in the study analysis. Mobilization was attempted the day of surgery with PT, or if without the use of assistive devices. If a distance of at least 30 feet was not reached, a questionnaire indicating the reason(s) was completed. Distance ambulated on the day of surgery, obstacles impeding ambulating 30 feet, and LOS were recorded. Patients reaching the in-patient unit after 1500 hours were excluded. RESULTS: Seventy percent of patients (320/457) successfully ambulated at least 30 feet on the day of surgery. Forty-six patients were not evaluated secondary to personnel related factors. A total of 85 patients ambulated under 30 feet, citing most commonly: orthopedic/urogenital 20.4% (25/126), dressing 20.5% (26/126), nausea 23.6% (12/51), pain 16.8% (10/51), fatigue 3.9% (2/51), and post (10/51), limiting reasons. The average LOS of patients ambulating at least 30 feet the day of surgery was 1.85 days versus 2.79 days in those ambulating less (P < 0.05). CONCLUSIONS: The benefits of early postoperative mobilization are well recognized and this study highlights major obstacles limiting early ambulation after spinal fusion. Focusing continued multidisciplinary efforts towards such factors as postoperative hypertension, nausea, dressing, and pain after postoperative spinal fusion may further improve our development of rapid recovery programs. Furthermore, ambulating a distance of at least 30 feet the day of surgery correlates with a statistically significant shorter LOS.

13 / 8 / 6 BMP in surgery


Institute for Healthcare Improvement, and the Commonwealth Fund as Washington was one of three states to advance this work including a five-year partnership between the Washington State Hospital Association, the Washington State Care Transitions Improvement Initiative began in 2005 as a regional initiative to foster safe, timely, effective and coordinated care as patients move between settings. Several initiatives have helped strengthen through Qualis Health's care transitions community coalition efforts initiated in 2008 with the Commonwealth Fund as Washington was one of three states selected to participate in the State Action on Avoidable Readmissions (STAA) initiative. The work was strengthened through Qualis Health's care transitions community coalition efforts initiated in 2008 with the Centers for Medicare & Medicaid Services (CMS) pilot community.

Washington State's Health Technology Assessment is a respected source supported by high-quality evidence appraisal.

9 / 8 / 8 Discharge process


"Replaces the 2013 version."
BACKGROUND: Emergency department visits and rehospitalization are common after hospital discharge.

OBJECTIVE: To test the effects of an intervention designed to minimize hospital utilization after discharge.

DESIGN: Randomized trial using block randomization of 6 and 8. Randomly arranged index cards were placed in opaque envelopes labeled consecutively with study numbers, and participants were assigned a study group by revealing the index card. SETTING: General medical service at an urban, academic, safety-net hospital.

PATIENTS: 749 English-speaking hospitalized adults (mean age, 49.9 years).

INTERVENTION: A nurse discharge advocate worked with patients during their hospital stay to arrange follow-up appointments, confirm medication reconciliation, and conduct patient education with an individualized instruction booklet that was sent to their primary care provider. A clinical pharmacist called patients 2 to 4 days after discharge to reinforce the discharge plan and review medications. Participants and providers were not blinded to treatment assignment.

MEASUREMENTS: Primary outcomes were emergency department visits and hospitalizations within 30 days of discharge. Secondary outcomes were self-reported preparedness for discharge and frequency of primary care providers' follow-up within 30 days of discharge.

RESULTS: Participants in the intervention group (n = 370) had a lower rate of hospital utilization than those receiving usual care (n = 368) (0.314 vs. 0.451 visit per person per month; incidence rate ratio, 0.695 [95% CI, 0.515 to 0.937]; P = 0.009). The intervention was most effective among participants with hospital utilization in the 6 months before index admission (P = 0.014). Adverse events were not assessed; these data were collected but are still being analyzed.

LIMITATION: This was a single-center study in which not all potentially eligible patients could be enrolled, and outcome assessment sometimes relied on participant report.

CONCLUSION: A package of discharge services reduced hospital utilization within 30 days of discharge.

FUNDING: Agency for Healthcare Research and Quality and National Heart, Lung, and Blood Institute, National Institutes of Health.

Study cohort is general medicine patients. Several substantial deficiencies in execution of study protocol limit the value of this citation.

Supports the value of a systematic approach to discharge process to reduce aggregate hospital readmissions.

We found that specially designed exercise programmes for people who have had back decompression surgery can help to reduce back pain and can improve their ability to carry out everyday tasks. This was true both in the short term (within six months of surgery) and over the long term (at 12 months). Because only three studies were suitable to be included, we cannot be certain that future studies will not change these conclusions.

Respected source.

A very limited evidence concerning benefit of exercise programs following back decompression surgery.
Methods:
Evidence appraisal follows the SORT tool available at:

Tier-1 Sources include: Systematic Reviews, Technology Assessments, and Statements Originated from National Government Organizations
Tier-2 Sources include: Clinical Guidelines, Meta-Analyses, Systematic Reviews, Randomized Control Trials

Tier-3 Sources include: Primary Literature and other documents