

Spinal Disease

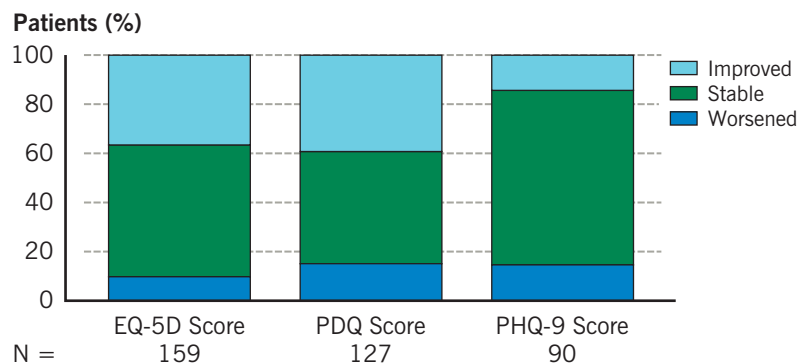
The Center for Spine Health provides comprehensive care for a continuum of spinal disorders. Comprehensive care includes medical management, physical therapy, surgical interventions, minimally invasive injection procedures, specialized exercise programs, acupuncture, osteopathic manipulation, and referral to an in-house functional restoration program, all intended to maximize return to participation in vocational, family, and recreational activities.

The Center for Spine Health consists of surgeons, all board-certified in either neurosurgery or orthopedic surgery, and medical specialists board-certified in various fields that include rheumatology, physical medicine and rehabilitation, neurology, internal medicine, sports medicine, pain medicine, psychiatry, and psychology.

Cervical Myelopathy

Change in Functional Status Following Cervical Decompression With Fusion for Myelopathy

Surgical Dates: Jan. 6, 2012 – July 1, 2014



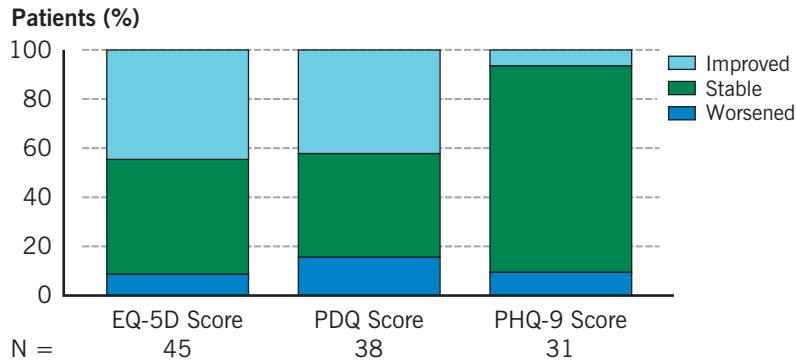
In patients undergoing cervical decompression for myelopathy, among those with EuroQol (EQ-5D™) scores < 1 (N = 159), 36% noted improvement and 10% worsened in health-related quality of life. In those with baseline impairment of physical function, defined as Pain Disability Questionnaire (PDQ) score > 16, 39% noted improvement after surgery and 15% worsened. In those with at least moderate depressive symptoms, defined as a score ≥ 10 on the Patient Health Questionnaire (PHQ-9) prior to treatment, 14% noted improvement in depressive symptoms. Median duration of follow-up after surgery was 125 days (range, 48–719). In this and subsequent graphs, clinically meaningful change was defined as a change of half a standard deviation,¹ or a total point change of 0.11, based on 2012 Neurological Institute data, for the EQ-5D, a total point change of > 16 for the PDQ, and a change of ≥ 5 points for the PHQ-9.²

1. Norman GR, Sloan JA, Wyrwich KW. Interpretation of changes in health-related quality of life: the remarkable universality of half a standard deviation. *Med Care*. 2003 May;41(5):582-592.

2. Löwe B, Unützer J, Callahan CM, Perkins AJ, Kroenke K. Monitoring depression treatment outcomes with the Patient Health Questionnaire-9. *Med Care*. 2004 Dec;42(12):1194-1201.

Change in Functional Status Following Single-Level Cervical Decompression Without Fusion for Myelopathy

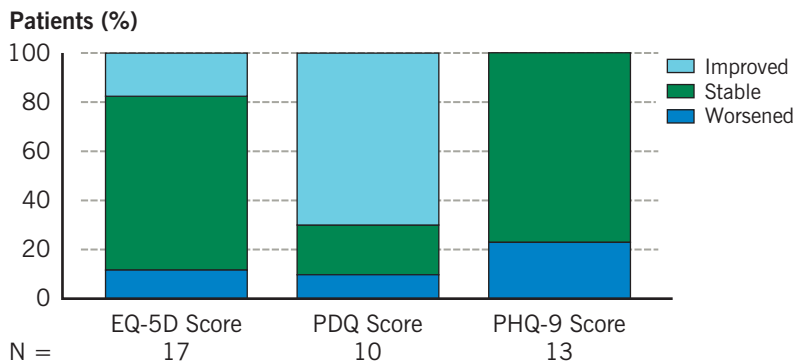
Surgical Dates: Feb. 16, 2012 – June 5, 2014



Among patients undergoing single-level decompression without fusion for cervical myelopathy, 96% (N = 45) had EQ-5D < 1; 44% noted improvement and 9% worsened in health-related quality of life. In those with baseline impairment of physical function (N = 38), defined as PDQ > 16, 42% noted improvement after surgery and 15% worsened. Among patients undergoing single-level decompression without fusion for cervical myelopathy, 75% (N = 31) had at least moderate depressive symptoms (PHQ-9 ≥ 10) prior to treatment; 6.5% noted improvement and 10% worsened in depressive symptoms. Median duration of follow-up after surgery was 161 days (range, 48–668).

Change in Functional Status Following Multilevel Cervical Decompression Without Fusion for Myelopathy

Surgical Dates: Jan. 4, 2012 – Aug. 1, 2014

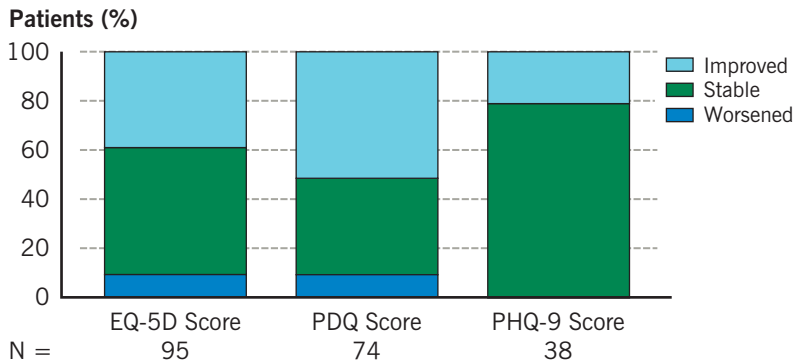


Among patients undergoing multilevel decompression without fusion for cervical myelopathy, 95% (N = 17) had EQ-5D < 1; 18% noted improvement, 71% remained stable, and 12% worsened in health-related quality of life. Among patients with baseline impairment of physical function (PDQ > 16), 70% noted improvement after surgery and 10% worsened. Among patients who had at least moderate depressive symptoms (PHQ-9 ≥ 10) prior to surgery, 77% remained stable and 23% worsened in depressive symptoms. Median duration of follow-up after surgery was 161 days (range, 83–238).

Cervical Disc Herniation

Change in Functional Status Following Cervical Decompression With Fusion for Cervical Disc Herniation

Surgical Dates: Nov. 22, 2011 – July 1, 2014



In patients who underwent surgery for symptoms of cervical disc herniation, 39% of those with EQ-5D < 1 (N = 95) noted improvement and 9.5% noted worsening in health-related quality of life. In those with baseline impairment of physical function, as measured by the PDQ, 51% noted improvement after surgery and 9.5% worsened. In those with at least moderate depressive symptoms (PHQ-9 \geq 10) prior to treatment, 21% noted improvement in depressive symptoms and the rest remained stable. Median duration of follow-up after surgery was 127 days (range, 55–497).

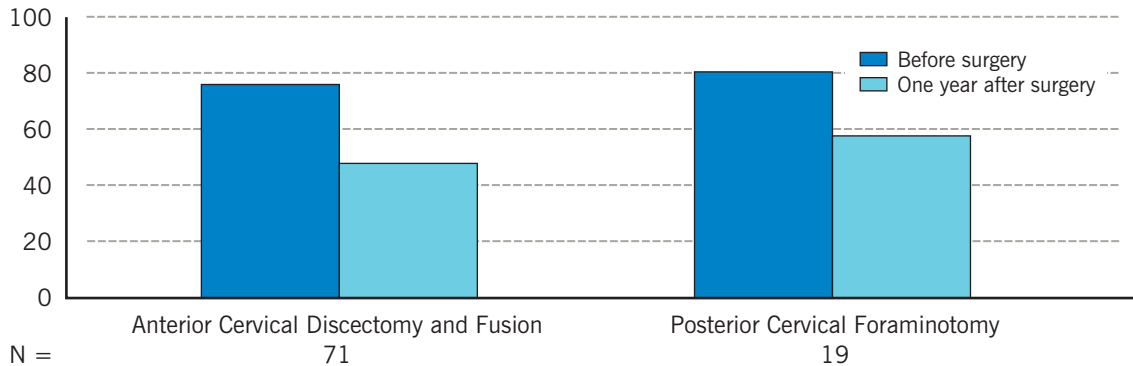
Cost-Effectiveness in Cervical Spine Surgery

Cleveland Clinic's Center for Spine Health recognizes the drive to document value and has engaged in a program to measure, compare, and intervene to improve value. The center recently published a comparison of 2 surgeries commonly performed in the cervical spine: anterior cervical discectomy and fusion with plating (ACDFP) and posterior cervical foraminotomy (PCF).¹ Both surgeries produced meaningful postoperative improvement in physical function and health-related quality of life, but PCF costs about 23% less than ACDFP. Further work is needed to determine appropriate indications for each surgery and predictors of cost variance.

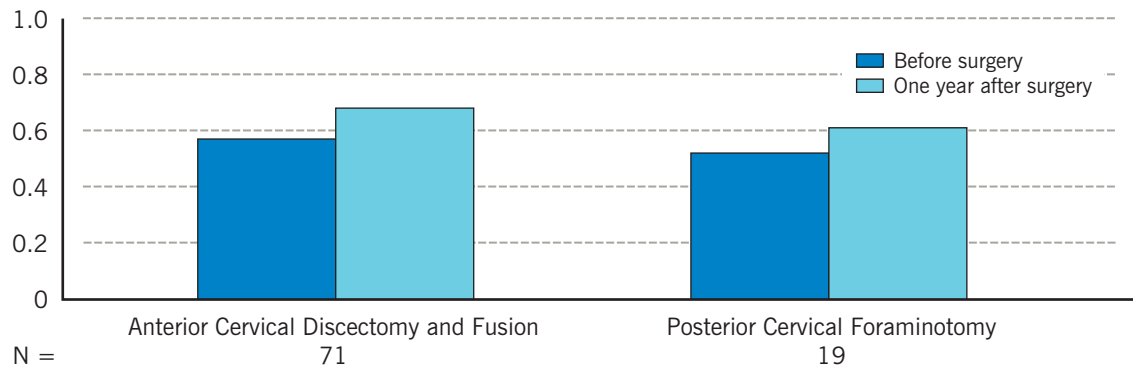
Change in Physical Function and Quality of Life Following Cervical Spine Surgeries

Surgical Dates: 2009 – 2011

Mean PDQ Score



Mean EQ-5D Score



1. Alvin MD, Lubelski D, Abdullah KG, Whitmore RG, Benzel EC, Mroz TE. Cost-utility analysis of anterior cervical discectomy and fusion with plating (ACDFP) versus posterior cervical foraminotomy (PCF) for patients with single-level cervical radiculopathy at 1-year follow-up. *J Spinal Disord Tech.* 2014 Mar 27. [Epub ahead of print]

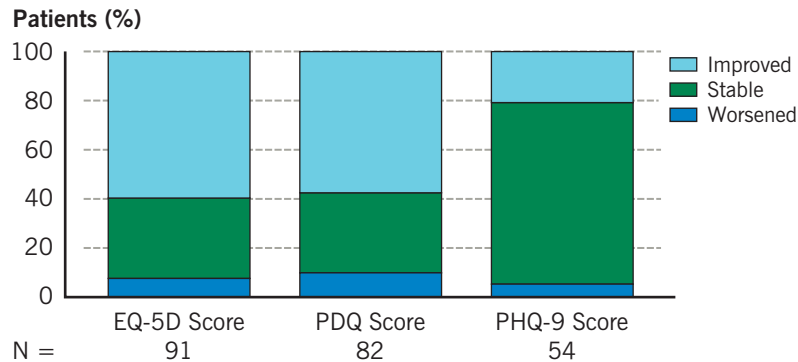
Lumbar Spinal Stenosis

Surgical Treatment

Spinal stenosis results in narrowing of the spinal canal, which often causes leg pain that can impair walking, standing, and many aspects of daily function. For symptomatic patients, the goal of surgery is to decompress the spinal canal to eliminate neural compression and relieve leg pain; this may or may not require instrumented fusion of the operated levels.

Change in Functional Status Following Lumbar Decompression With Fusion for Spinal Stenosis

Surgical Dates: Dec. 30, 2011 – Jan. 2, 2014



Among 91 patients undergoing lumbar decompression with fusion, all had EQ-5D < 1; 59% noted improvement and 8% worsened in health-related quality of life after surgery. Clinically meaningful change was defined as half a standard deviation,¹ or a total point change of 0.11. Of the patients who had baseline impairment of physical function (PDQ > 16), 57% noted improvement after surgery and 10% worsened. Clinically meaningful change was defined as a total point change of > 16. Among patients reporting at least moderate depressive symptoms (PHQ-9 ≥ 10) prior to surgery, 20% noted improvement and 6% worsened in depressive symptoms. Clinically meaningful change was defined as a total point change of 5.² Median duration of follow-up was 150 days after surgery (range, 45–524).

1. Norman GR, Sloan JA, Wyrwich KW. Interpretation of changes in health-related quality of life: the remarkable universality of half a standard deviation. *Med Care*. 2003 May;41(5):582-592.
2. Löwe B, Unützer J, Callahan CM, Perkins AJ, Kroenke K. Monitoring depression treatment outcomes with the Patient Health Questionnaire-9. *Med Care*. 2004 Dec;42(12):1194-1201.

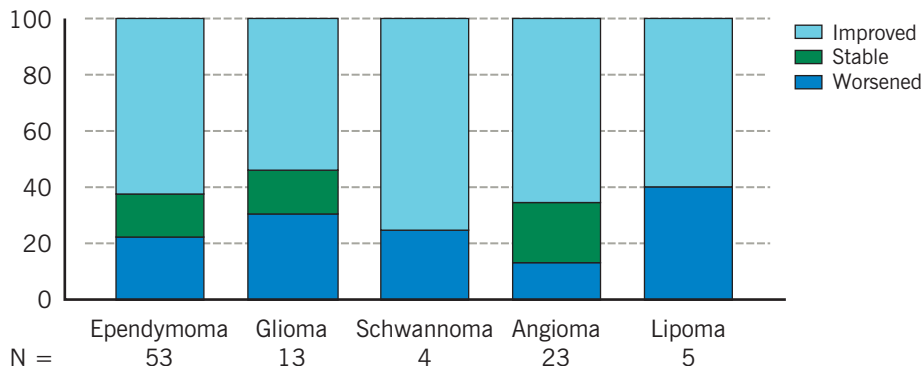
Spinal Disease

Intramedullary Spinal Cord Tumors

Change in Functional Status Following Surgery for Intramedullary Spinal Cord Tumors (N = 98)

1999 – 2014

Patients (%)



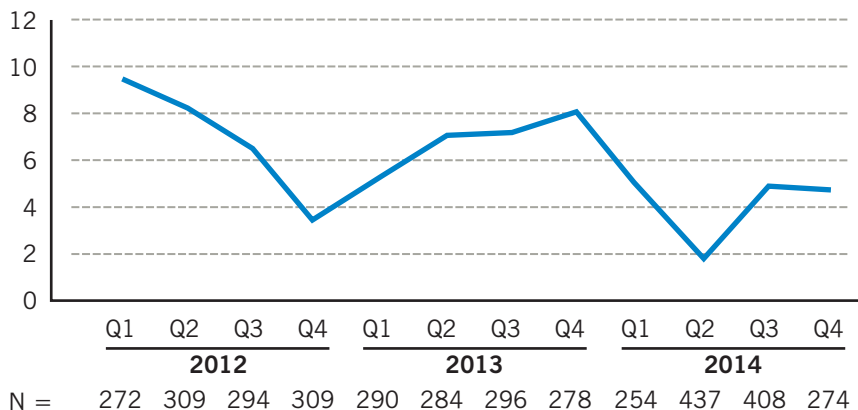
Intramedullary spinal cord tumors are uncommon, but potentially catastrophic. Among 98 consecutive patients operated on over 15 years, 54% to 75% achieved functional improvement after surgery and 13% to 40% of patients had worsening of functional status after surgery, as measured with the Modified McCormick Scale, which grades neurological function in spinal cord disorders. Mean duration of follow-up was 65 months.

Readmissions and Mortality

30-Day Unplanned Readmission Rate Among Spine Center Patients (N = 3705)

2012 – 2014

Readmission Rate (%)

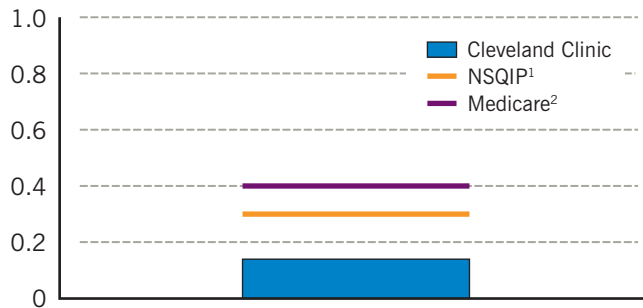


New protocols were initiated in 2012 in an effort to reduce unplanned 30-day readmissions. These new protocols included a Discharge Call Program to contact patients 48 hours after discharge to review disease symptoms, medications, and follow-up plans and to address any questions the patient may have about the plan of care. Patients readmitted for planned surgery or other planned procedures were excluded. N = total number of patients discharged per quarter.

30-Day Postoperative Mortality Rate Following Spinal Surgery (N = 3468)

2014

Mortality Rate (%)



The 30-day postoperative mortality rate following spinal surgery in 2014 was 0.14%, compared with a rate of 0.30% for the National Surgical Quality Improvement Program (NSQIP)¹ database and a rate of 0.40% for the Medicare database.²

1. Schoenfeld AJ, Ochoa LM, Bader JO, Belmont PJ. Risk factors for immediate postoperative complications and mortality following spine surgery: a study of 3475 patients from the National Surgical Quality Improvement Program (NSQIP). *J Bone Joint Surg Am.* 2011 Sep 7;93(17):1577-1582.

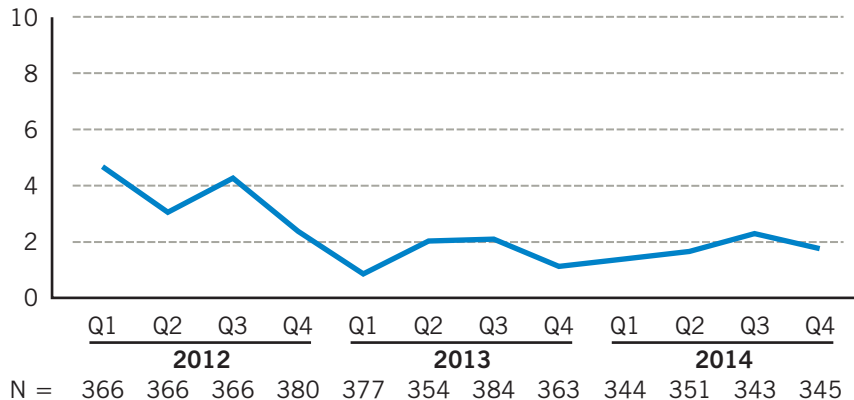
2. Deyo RA, Mirza SK, Martin BI, Kreuter W, Goodman DC, Jarvik JG. Trends, major medical complications, and charges associated with surgery for lumbar spinal stenosis in older adults. *JAMA.* 2010 Apr 7;303(13):1259-1265.

Surgical Site Infections

Surgical Site Infection Rates for Spinal Surgery (N = 2861)

2012 – 2014

Infections per 100 Clean Cases



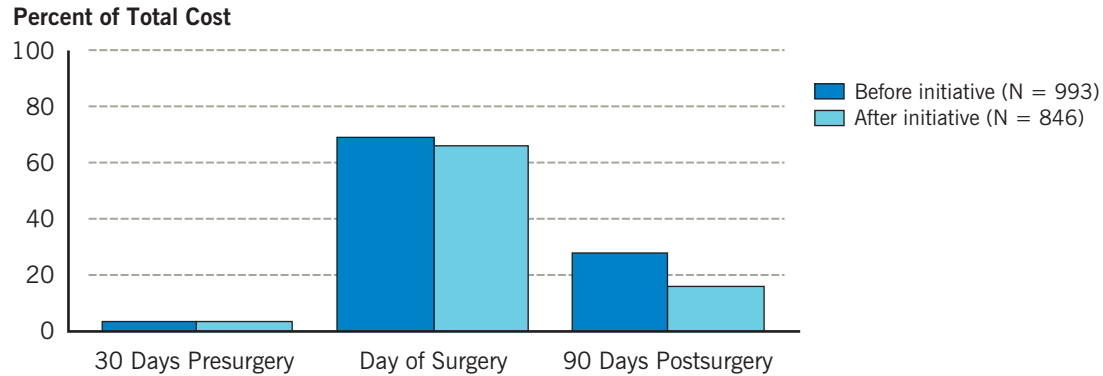
New protocols introduced in 2012 to reduce surgical site infections include nasal staphylococcus surveillance and decolonization protocols, an updated perioperative scrub protocol, new rules restricting operating room traffic and updating operating room table preparation, and new wound closure recommendations. The most recent overall postoperative infection rates in the Spine Center of 1.5% for 2013 and 1.9% for 2014 compare favorably with available published data ranging from 1.4% to 11%.^{1, 2} N = spinal surgeries with available infection surveillance data.

1. Smith JS, Shaffrey CI, Sansur CA, Berven SH, Fu KM, Broadstone PA, Choma TJ, Goytan MJ, Noordeen HH, Knapp DR Jr, Hart RA, Donaldson WF 3rd, Polly DW Jr, Perra JH, Boachie-Adjei O; Scoliosis Research Society Morbidity and Mortality Committee. Rates of infection after spine surgery based on 108,419 procedures: a report from the Scoliosis Research Society Morbidity and Mortality Committee. *Spine*. 2011 Apr 1;36(7):556-563.

2. Schimmel JJ, Horsting PP, de Kleuver M, Wonders G, van Limbeek J. Risk factors for deep surgical site infections after spinal fusion. *Eur Spine J*. 2010 Oct;19(10):1711-1719.

Cost Reduction With Implementation of Surgical Site Infection Prevention Initiative (N = 1839)

Surgical Dates: April 2012 – December 2013



Average direct internal cost per patient (as a percentage of total direct internal cost before the initiative) was compared for similar cohorts of patients before (April–December 2012) and after (April–December 2013) implementation of the surgical site infection reduction initiative. Overall, comparing nearly 1000 matched patients in each cohort, there was a 14% reduction in average total cost per patient postinitiative. Use of nasal swabs and preoperative antiseptic wash solutions added minimally to the preoperative cost, defined as health system related cost 30 days prior to surgery. Average intraoperative costs decreased minimally by 3%. The main cost savings occurred in the 90 days after surgery, presumably related to a reduction in emergency department visits and readmissions related to surgical site infections.