# Spine surgery

- The intrathecal morphine analgesia for full endoscopic lumbar discectomy: a prospective dosefinding study
- Letter to the editor: 'Vancomycin Antibiotic Prophylaxis Compared to Cefazolin Increases Risk of Surgical Site Infection Following Spine Surgery' by Brandon J. Herrington et al
- Anterior transarticular crossing screw fixation for reducible atlantoaxial dislocation with basilar invagination: a radiological feasibility study
- In memoriam dr. Margareta Nordin (1945-2025): A leader in spine research, rehabilitation and a global health advocate
- Jean Dubousset, MD : From the Scoliosis Research Society History Committee
- Robot-assisted versus navigated spinal fusion surgery: a comparative multicenter study on transpedicular screw placement accuracy and patient outcomes
- Survey of rehabilitation practice for patients undergoing lumbar surgery in the United Kingdom
- Formononetin enhances cisplatin chemotherapy sensitivity in osteosarcoma by inducing ferroptosis and reconstructing the immune microenvironment

Spine surgery is taught and practiced within two different surgical disciplines: neurological surgery and orthopedic surgery <sup>1)</sup>.

Spinal surgery has become lower risk and more efficacious for complex spinal deformities, and thus more appealing to patients, particularly those for whom conservative treatment is inappropriate or ineffective. Recent innovations and advances in spinal surgery have revolutionized the management of spinal deformity in elderly patients.

The clinical entity lumbar spinal stenosis is the most common reason for spinal surgery in patients 65 years of age and older in the United States.

Recently, intraoperative stereotactic navigation has become more available in spine surgery. Stereotactic navigation with cone-beam fluoroscopy and CT and the use of the O-arm (Medtronic) 3D imaging with stereotactic computer navigation have been well described for the safe and accurate placement of pedicle screws.

## History

Spine surgery history.

# Training

Spine surgery training.

# Epidemiology

Spine surgery has been growing rapidly as a neurosurgical operation, with an increase of 220% over

#### 15 years.

## Types

Cervical spine surgery

Complex spine surgery

Emergency spine surgery

- Endoscopic spine surgery
- Lumbar spine surgery
- Minimally Invasive Spine Surgery
- Pediatric spine surgery
- Robot-assisted spine surgery

Spine fusion

- Thoracic spine surgery
- Oncological spine surgery
- Vertebral augmentation

## Indications

The line between appropriate and #inappropriate\_spine\_interventions has to be clear; to clarify proper indications, priorities of treatment, and ethical considerations.

Appropriate #Indications are well known to everyone, including:

Progressive #neurological\_deficits, to prevent permanent neurological damage and to halt or potentially reverse deterioration.

Symptomatizing spinal #mechanical\_instability, of any type, also presents clear indications.

#Intractable\_Pain with concordant pathology.

Failure of appropriate #conservative\_measures for enough time (3 months).

#Deformity with progressive deterioration.

Inappropriate / Controversial Interventions and Premature Surgery

Surgery is generally inappropriate when:

Uncorrelated Imaging Findings and Symptoms: · #Incidental\_findings: MRI abnormalities without corresponding symptoms. · Non-specific #LBP: In the absence of deficits, instability, or specific pathology. · Normal aging #degenerative\_changes on imaging that are asymptomatic.

2. Untreated #psychiatric\_comorbidities: Active depression, anxiety disorders, or personality disorders predict poor outcomes.

3. #Secondary\_gain\_factors: Litigation, disability claims, or other secondary gain motivations.

4. Substance #abuse: predict poor surgical outcomes and complications.

5. #Unrealistic\_expectations: When patient goals cannot reasonably be achieved with the proposed intervention.

6. Inappropriate #Risk\_Benefit Assessment: Appropriate spine surgery decisions require rigorous riskbenefit analysis including: · Patient-specific factors: Age, comorbidities, bone quality, prior surgeries, and healing capacity. · Surgical complexity: More extensive procedures carry higher complication rates. · Expected outcome probability: Realistic assessment of success rates based on the specific pathology and patient factors.

Surgery is #premature when: Inadequate Trial of Conservative Management: First-line for non-urgent conditions: Most non-emergent spine conditions warrant 6-12 weeks of conservative care before surgical consideration. 2. Incomplete conservative approach: Failure to comprehensively employ physical therapy, appropriate medications, targeted injections, and lifestyle modifications. 3. Inadequate diagnostic workup: Proceeding to surgery without ruling out non-spinal sources of pain or neurological symptoms.

Appropriate means balancing technological capabilities against patient needs and experience-based practice. The conscientious spine surgeon must remain committed to continuous critical self-assessment, and placing patient welfare above all other considerations.

The power of spine surgery carries the responsibility to use it judiciously. The future lies not in performing more surgeries but in performing the right surgeries for the right patients at the right time.

## Outcome

see Spine surgery outcome.

## Complications

see Spine surgery complication

## Length of stay

#### Spine surgery length of stay

#### Evidence

For the majority of spinal interventions, well-designed prospective, randomized, pragmatic costeffectiveness studies that address the specific decision-in-need are lacking. Decision analytic modeling allows for the estimation of cost-effectiveness based on data available to date. Given the rising demands for proven value in spine care, the use of decision analytic modeling is rapidly increasing by clinicians and policy makers.

A proper, integrated, clinical, and economic critical appraisal is necessary in the evaluation of the strength of evidence provided by a modeling evaluation. As is the case with clinical research, all options for collecting health economic or value data are not without their limitations and flaws. There is substantial heterogeneity across the 20 spine intervention health economic modeling studies summarized with respect to study design, models used, reporting, and general quality. There is sparse evidence for populating spine intervention models. Results mostly showed that interventions were cost-effective based on \$100,000/quality-adjusted life-year threshold. Spine care providers, as partners with their health economic colleagues, have unique clinical expertise and perspectives that are critical to interpret the strengths and weaknesses of health economic models.

Health economic models must be critically appraised for both clinical validity and economic quality before altering health care policy, payment strategies, or patient care decisions.Level of Evidence: 4 <sup>2)</sup>.

A co-ordinated multidisciplinary pathway with a stratified approach to LBP assessment and care provided a greater proportion of surgery candidates than the conventional referral process. The implementation of such processes may allow surgeons to restrict their practices to patients who are more likely to benefit from their services, thereby reducing wait times and potentially reducing costs.Level of Evidence:  $3^{3}$ .

In the USA, obesity rates have significantly increased since 2000. Mirroring this trend, a large proportion of patients undergoing spinal surgery are obese <sup>4)</sup>.

see spinal fusion surgery

#### Simulation

The use of simulation in spinal neurosurgery education is not as ubiquitous in comparison to other neurosurgical subspecialties, but many promising methods of simulation are available for augmenting resident education <sup>5)</sup>.

#### Community

The spinal surgery community has recently witnessed serious controversies and discussion concerning possible bias in scientific reports on the effects of a commercially available bone morphogenetic protein. This has compromised the standing of this community, and it was the direct reason for performing a study titled <sup>6) 7) 8) 9)</sup>.

Spine surgery cost.

# **Spine Surgery Books**

see Spine Surgery Books.

#### Implementation of an enhanced recovery programme in spine surgery

Minimal literature exists describing the process for development of a Joint Commission comprehensive spine surgery program within a community hospital health system. Components of a comprehensive program include structured communication across care settings, preoperative education, quality outcomes tracking, and patient follow-up. Organizations obtaining disease-specific certification must have clear knowledge of the planning, time, and overall commitment, essential to developing a successful program. Health systems benefit from disease-specific certification because of their commitment to a higher standard of service. Certification standards establish a framework for organizational structure and management and provide institutions a competitive edge in the marketplace <sup>10</sup>. <sup>11</sup>.

# Intraoperative neurophysiological monitoring in spine surgery

see Intraoperative neurophysiological monitoring in spine surgery.

## Spine surgery informed consent

Spine surgery informed consent

# Spine surgery in Italy

#### Spine surgery in Italy

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