

Project 1 (Randomized Controlled Trial)

Post Operative Outcomes Comparing Drain vs. No Drain Placement Following Single and Multilevel Anterior Cervical Discectomy and Fusion Surgery

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Background:

Anterior Cervical Discectomy and Fusion (ACDF) is a widely performed procedure for degenerative cervical spine conditions, with more than 150,000 operations annually in the U.S. While generally safe, ACDF carries a 13–19% morbidity rate, including risks of dysphagia, hematoma, infection, and airway compromise. Subfascial drains are frequently used to reduce such complications, yet evidence supporting their use is limited and inconsistent. Current practice is largely based on surgeon preference rather than high-quality data.

Methods:

This randomized controlled trial enrolls adults aged 19–75 undergoing single or multilevel ACDF for degenerative cervical spine conditions at UNMC between August 2025 and August 2026. Participants are randomized to Drain or No-Drain groups via computer-generated allocation. The surgeons are unblinded; however, the outcome assessors and data analysts remain blinded. Collected data includes patient demographics, comorbidities, intraoperative metrics, and postoperative complications. Primary outcomes are instances of hematoma, infection, airway compromise, and secondary surgery which are recorded at 1–2 weeks, 3 months, 6 months, and 1 year. Secondary outcomes will include dysphagia (EAT-10), postoperative pain (0–10 scale), and length of hospital stay.

Results:

This study is currently in the early phases of patient recruitment and consenting, and no outcome data are yet available. Data to be collected analyzed by Fall 2026. We expect that drain placement will not significantly reduce complication rates and may increase dysphagia severity or prolong recovery.

Conclusion:

This trial addresses a critical evidence gap regarding drain use in ACDF, with potential to influence national surgical guidelines, improve patient outcomes, and reduce healthcare costs. It will be the first RCT to include multi-level ACDF cases in its analysis.

Project 2 (Retrospective Chart Review)

Radiographic and Clinical Outcomes of Static vs Dynamic Interbody Cages in TLIF with Posterior Spinal Fusion at Single and Multilevel Fusions from L3-S1

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Background: Transforaminal Lumbar Interbody Fusion (TLIF) with Posterior Spinal Fusion (PSF) is a common surgery used to treat degenerative conditions of the lumbar spine when other treatments have failed. One important factor in the success of TLIF is the type of interbody cage used. Static cages remain the same size after placement, while dynamic cages can be expanded inside of the disc space. Currently, there is limited evidence on how these cage types compare in both radiographic and clinical outcomes, especially in surgeries that involve one or two levels between L3 and S1.

Methods: Adult patients who underwent TLIF with PSF using static (Adaptix, Capstone, Titan) or dynamic (Catalyft) cages between 2015–2025 will be included. Patients who had spine surgery for trauma, tumor, infection, significant deformity, or other fusion approaches will be excluded. Collected data includes patient demographics, surgical details, and cage specifications. Radiographs will be reviewed to measure segmental and global lumbar lordosis, foraminal height, and cage subsidence before surgery, at 6 weeks, 6 months, and 1 year postoperatively. Revision surgeries and available patient-reported outcomes such as Oswestry Disability Index and Short Form 12 will also be evaluated.

Results: The IRB for this study is still under review, so no patient outcome data is available. We expect that dynamic cages will provide improved restoration of lordosis and foraminal height compared with static cages. Dynamic cages may also demonstrate lower rates of cage subsidence. However, it is possible that revision rates and patient reported outcomes will be similar between the two groups. These results will help clarify whether the radiographic advantages of dynamic cages translate into meaningful clinical differences.

Conclusion: This study will provide new comparative data on static and dynamic cages in TLIF. The findings may improve understanding of how cage selection affects alignment, stability, and patient outcomes, as well as help guide surgical decision making in lumbar fusion procedures.

Project 3 (Review Article)

Subfascial Drain Use in Cervical and Thoracolumbar Surgery: A Review of Indications, Outcomes, and Best Practices

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Background:

The use of subfascial drains in orthopaedic surgery has been widely studied, with most evidence suggesting they provide little benefit. In spine surgery, however, drain placement remains common but controversial. Many spine surgeons use drains to reduce the risk of postoperative hematoma, infection, or wound dehiscence, but outcomes are inconsistent, and decisions are often based on surgeon preference rather than by standardized clinical guidelines. The aim of this review is to evaluate current evidence for drain use in cervical and thoracolumbar spine surgery and to provide region specific recommendations.

Methods:

A targeted literature search was conducted through the McGoogan Health Sciences Library using MEDLINE, Embase, PROSPERO, and the Open Science Framework. Search strategies combined terms for spinal procedures, drain placement, and postoperative outcomes. Randomized controlled trials, observational studies, systematic reviews and meta-analyses were included.

Results:

Preliminary review of the literature shows mixed findings. In cervical surgery, especially anterior cervical discectomy and fusion, drains are often placed to lower concern for hematoma and airway compromise. However, multicenter cohorts and meta-analyses report no consistent reduction in hematoma, infection, or reoperation rates with drains. Several studies describe higher dysphagia rates, longer operative time, greater blood loss, or longer length of stay when drains were placed. Retrospective cohort studies show a low risk of retropharyngeal hematoma after anterior procedures, with incidence around 0.2-0.4%, which highlights the importance of airway monitoring rather than routine drainage. In posterior cervical surgery, drains were frequently used but did not reduce wound related reoperation.

In thoracolumbar surgery, including decompression, fusions, deformity correction, and trauma, drains have not been shown to lower infection, hematoma, or reoperation. Prolonged drain use was associated with increased transfusion needs, higher infection risk, and longer hospitalization.

Conclusion:

Current evidence does not support routine subfascial drain use in spine surgery. Selective placement in clearly high-risk cases, combined with early removal and careful postoperative monitoring, is reasonable. Further high-quality, region-specific studies are needed to guide practice.