Clinical Outcomes following 3- and 4-level anterior cervical discectomy and fusion (ACDF)
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Introduction
The anterior cervical discectomy and fusion (ACDF) is one of the most commonly performed surgical procedures for cervical spine diseases. Overall one and two level ACDFs are well tolerated compared to three or 4-level ACDFs. However, the outcome data for 3- and specifically 4-level ACDF procedures are lacking in the literature, with concerns raised over their relative safety in comparison to 1- and 2-level procedures. This study aims to provide a comparison of perioperative complications and clinical outcome data between 3- and 4-level ACDF procedures.

Methods
A retrospective review of all adult neurosurgical patients undergoing elective ACDF for degenerative disc disease at a single institution between 2013 and 2018 was performed. The inclusion criteria for the study were patients who underwent first-time 3- or 4-level ACDF. The exclusion criteria were patients lacking 90-day minimum follow-up and those undergoing ACDF following non-elective circumstances. Outcome measures included perioperative complication rates, need for revision surgery, Nurick scores, Odom's criteria, and specific symptom resolution.

Results
Forty-four patients who underwent 3-level ACDF and 21 patients who underwent 4-level ACDF were identified. The 4-level ACDF group was found to have significantly higher mean estimated blood loss (47±33 mL) compared to the 3-level group (33±20 mL; p=0.042). The 4-level group was found to have a significantly higher mean procedural duration (141±21 mins) compared to the 3-level group (118±21 mins; p=<0.001). No differences were identified between the 4- and 3-level groups with regard to perioperative complications. Within the 4-level group, the rates of dysphagia (35.0%), laryngeal nerve palsy (15.0%) and infection (5.0%) were all found to be comparable to the 3-level group rates of dysphagia (45.5%; p=0.433), laryngeal nerve palsy (2.3%; p=0.051) and infection (2.3%; p=0.561). Post-Operative symptomology in terms of Nurick scores was found to be comparable between the 4-level (0.7±1.2) and the 3-level group (0.6±1.3; p=0.787). Rates of revision surgery for the 4-level group (16.7%) were not found to be significantly different compared to the 3-level group (16.7%; p=0.112). Outcome classification according to Odom’s criteria was comparable between the 4-level and 3-level groups (p=0.061).

Learning Objectives
By the conclusion of this session, participants should be able to: 1) Be able to recognize and discuss the 4-level ACDF as a safe option for patients with degenerative disc disease, 2) Consider the use of an anterior approach for long segment fusion.

Conclusion
Compared to those who underwent 3-level ACDF, patients who underwent 4-level ACDF had only significantly higher mean estimated blood loss and mean procedural duration. No significant differences were found between groups in post-operative symptomology, revision surgery, Nurick scores, or Odom’s criteria. These findings suggest 4-level ACDF procedures do not lead to increased morbidity or worsened outcomes when compared to 3-level procedures.

References