

Title: Long-term changes in sagittal alignment and their clinical and radiological implications after anterior 1-2 level corpectomy cage subsidence for degenerative cervical disease

Background: Despite the advances in anterior cervical corpectomy and fusion (ACCF) as a reconstructive surgical technique, the rate of complications related to artificial implants remains high.

Research question: The purpose of this study was to investigate the long-term clinical course of ACCF with tantalum trabecular metal (TTM)-lordotic implants. Focus is placed on the relevance and influence of implant subsidence on sagittal alignment and the related clinical implications.

Design: Multicentre, retrospective, observational study of prospectively collected outcomes

Methods: 56 consecutive patients with degenerative cervical disc disease (myelopathy and/or radiculopathy). All patients underwent 1-or 2-level ACCF with TTM-lordotic implants. The mean duration of follow-up was 4.85years.

Results: The fusion rate at the end of follow-up was 98.11% (52/53). Implant subsidence occurred in 44 (83.01%) cases, including slight subsistence (<3 mm) in 37 (69.81%) and severe subsidence (>3 mm) in 7 cases (13.2%). The greatest degree of subsidence developed in the first 3-months postoperatively ($P=0.003$). No patients presented a significant increase in implant subsidence beyond the second year of follow-up. The most common site of severe subsidence was the anterior region of the cranial endplate (4/7). At the end of follow-up, C1-C7 lordosis, and segmental-Cobb angle of the fused segment increased on average by 5.06 ± 8.26 and 1.98 ± 6.02 degrees, respectively, though this difference failed to reach statistical significance ($P>0.05$). Visual analog scale and Neck Disability Index scores improved at the end of follow-up ($P<0.05$).

Discussion: ACCF with anterior cervical reconstruction using TTM-lordotic implants and anterior cervical plating for treatment of cervical degenerative disease have high fusion rates and good clinical outcome. The osteoconductive properties of TTM provide immediate stabilization and eliminate the need for bone grafts to ensure solid bone fusion. Before fusion occurs, asymptomatic implant settlement into the vertebral body is inevitable. However, lack of parallelism and reduced contact surface between the implant and the vertebral endplate is a major risk factor for severe further subsidence which may negatively affect the clinical outcomes.