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# Hybrid Surgery in Cervical Myelopathy: Case Report and Literature Review

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## INTRODUCTION

Cervical myelopathy is a common condition in spondylotic spine disease resulting in significant limitations. Surgical methods to decompress spinal cord includes anterior, posterior approach, or a combination of both. Among anterior approaches, anterior cervical discectomy and fusion (ACDF) and cervical disc arthroplasty (CDA) both deliver promising results.

Hybrid surgery can potentially bring forth benefits from both ACDF and CDA.

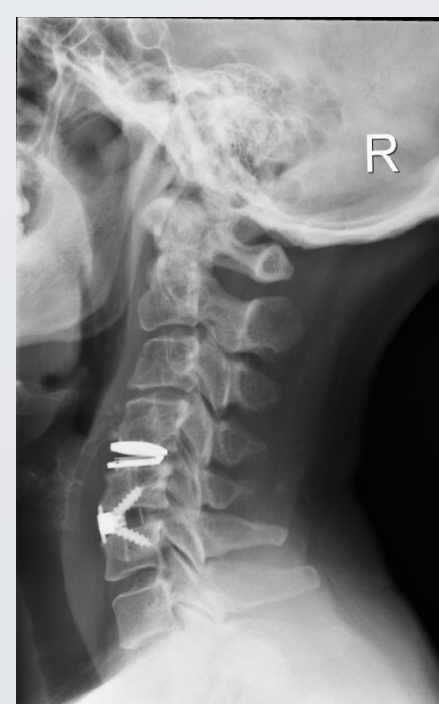
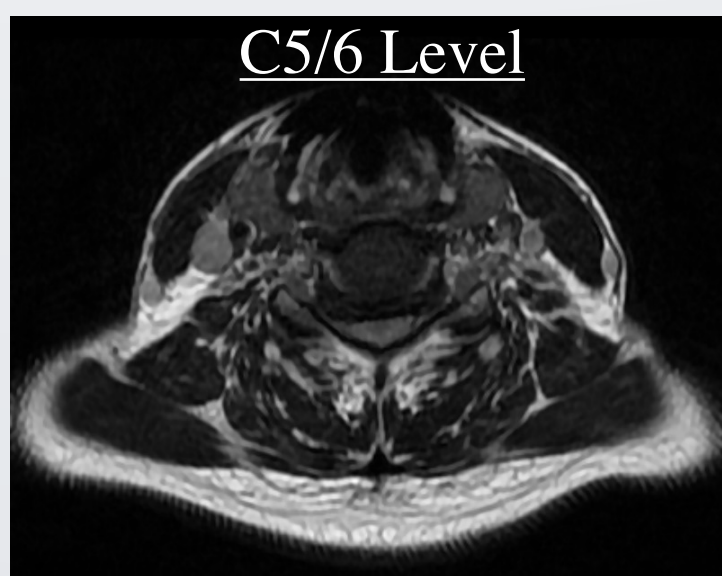
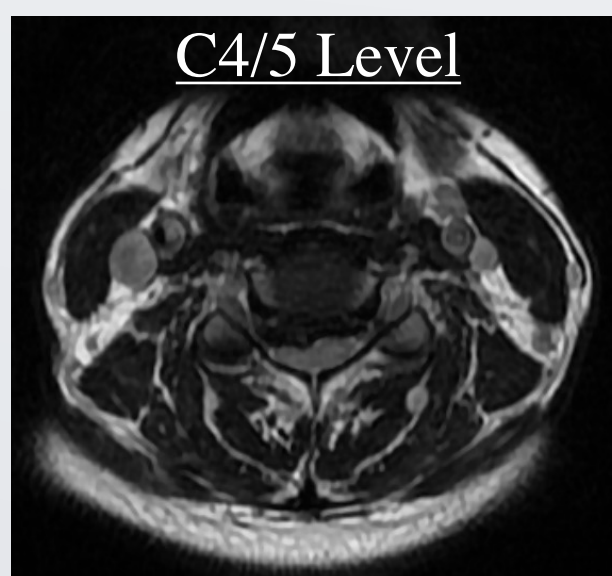
## CASE REPORT

46-year-old female with bilateral upper limb numbness, gait instability and incomplete bladder emptying.

- Physical examination: bilateral C7 to T1 power 4/5, brisk reflexes, myelopathic hand signs, numbness over C6 to C8 dermatomes, and spastic gait.
- Japanese orthopaedic association (JOA) score: 10.5.
- MRI scan of cervical spine: C4/5 and C5/6 prolapsed intervertebral discs with cord signal changes.

Hybrid surgery, ACDF and CDA, was performed. Prodisc C inserted over C4/5 and Zero-P VA cage inserted over C5/6.

- Post-operation with improved power, upper limb sensation, urinary control, symmetrical gait, mild decrease in neck active range of movement.
- Post-operative JOA score: 14.5.



MRI scans

Post-op X-rays

## DISCUSSION

Anterior cervical discectomy and fusion (ACDF)

- Standard procedure for cervical myelopathy
- Associates with accelerated adjacent segment degeneration (ASD) and revision procedure. Biomechanical studies show increased stress and motion and adjacent joints to compensate motion loss of fused levels<sub>1</sub>.
- Often performed in multilevel involvement.

Cervical disc arthroplasty (CDA)

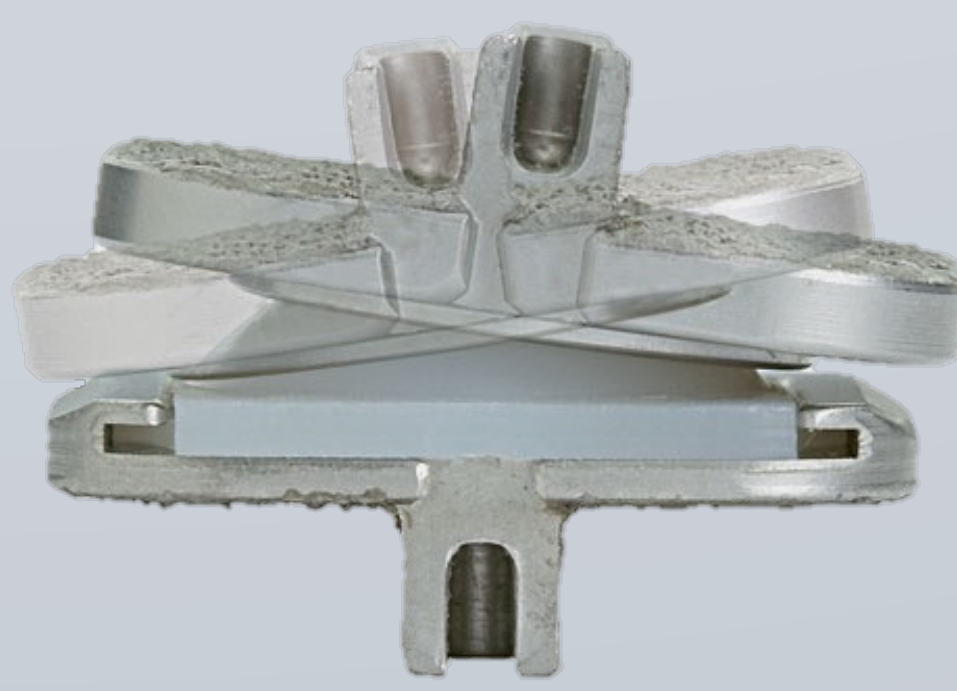
- Preserves normal intervertebral motion, has a lower incidence of ASD, higher overall, neurological and neck disability index success, neck disability index (NDI) success<sub>2</sub>.
- Contraindicated in retrovertebral compression, spondyloarthropathy, underlying instability, metabolic bone disease, infection and malignancy<sub>3</sub>.
- Greater quality of life at a lower cost compared to ASDF<sub>4, 5, 6</sub>.

Hybrid surgery (ACDF with CDA)

- Developed to maintain motion and promote bony fusion.
- Similar perioperative complication risks and length of stay<sub>7</sub>.
- Better recovery of NDI score, more preservation of cervical range of movement, non-inferior clinical outcome and functional recovery compared with ACDF<sub>8,9</sub>.
- No publication for the cost effectiveness of hybrid surgery.



Zero-P VA cage (ACDF)



Prodisc C (CDA)

## CONCLUSION

Hybrid surgery, ACDF and CDA, brings a new solution to cervical myelopathy patients with multi-levels involvement. It has better range of motion and improved bony fusion with no increased complication risks.

## REFERENCE

1. Zhang Y, Lv N, He F, et al. Comparison of cervical disc arthroplasty and anterior cervical discectomy and fusion for the treatment of cervical disc degenerative diseases on the basis of more than 60 months of follow-up: a systematic review and meta-analysis. *BMC Neurol.* 2020;20(1):143.
2. Zheng B, Hao D, Guo H, He B. ACDF vs TDR for patients with cervical spondylosis - an 8 year follow up study. *BMC Surg.* 2017 Nov 28;17(1):113.
3. Radcliff K, Zigler J, Zigler J. Costs of cervical disc replacement versus anterior cervical discectomy and fusion for treatment of single-level cervical disc disease: an analysis of the Blue Health Intelligence database for acute and long-term costs and complications. *Spine (Phila Pa 1976).* 2015;40(8):521-529.
4. Ament JD, Yang Z, Nunley P, Stone MB, Lee D, Kim KD. Cost Utility Analysis of the Cervical Artificial Disc vs Fusion for the Treatment of 2-Level Symptomatic Degenerative Disc Disease: 5-Year Follow-up. *Neurosurgery.* 2016 Jul;79(1):135-45.
5. Boddapati V, Lee NJ, Mathew J, et al. Hybrid Anterior Cervical Discectomy and Fusion and Cervical Disc Arthroplasty: An Analysis of Short-Term Complications, Reoperations, and Readmissions. *Global Spine J.* 2021;11(8):1183-1189.
6. Zhang J, Meng F, Ding Y, et al. Comprehensive Analysis of Hybrid Surgery and Anterior Cervical Discectomy and Fusion in Cervical Diseases: A Meta-Analysis. *Medicine (Baltimore).* 2020;99(5):e19055.
7. Leven D, Meaie J, Radcliff K, Qureshi S. Cervical disc replacement surgery: indications, technique, and technical pearls. *Curr Rev Musculoskelet Med.* 2017 Jun;10(2):160-169.
8. Scott-Young M, McEntee L, Rathbone E, Hing W, Nielsen D. Clinical Outcomes of Cervical Hybrid Reconstructions: A Prospective Study. *Int J Spine Surg.* 2020 Aug;14(s2):S57-S66.