Reversal of Anterior Cervical Discectomy and Fusion with a Cervical Artificial Disc Replacement - Regain Motion after Nine Years Fusion

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Objective: This case report describes a patient who initially underwent anterior cervical discectomy and fusion (ACDF) for 9 years and revised with artificial disc replacement (ADR).

Case report: This previously healthy 39-year-old woman presented initially with spontaneous onset of a bilateral hand numbness and leg weakness early in 2001. She was treated at another hospital, and got ACDF operation. Most of her neurological deficits was relieved after operation, but which was repeated 2 months before the second operation and failed of conservative treatment. Her preoperative JOA score was 13, and NDI score was 30. CT myelography shows recurrent of cervical disc herniation at the cephalad adjacent segment which compressed the spinal cord. There was still some osteophyte at the C56 level which also cause the compression to the spinal cord, and solid fusion was present at this level, the facet joints at C56 level was slight degenerated, but remain unfused.

If revision with ACDF was conducted the patient would lose one more motion segment and got more chance to have adjacent segment disease again. After rigorous preoperative design, we decided to reversal of ACDF with ADR. With a high speed drill, decompression through the grafted region was effected. The segment was mobilized and there was no intraoperative evidence of a solid posterior element fusion. Then the two prosthesis were placed with a standard method in C45 and C56 levels. The range of motion at the revision level at the 2 months follow-up was 15.1˚, her neck symptom and neurologic function were significantly recovered (JOA 16.5, NDI 12).
Discussion: The advantages of ADR include preservation of normal motion in the cervical spine, and reduction of adjacent segment degeneration. There was one case report described reversal of ACDF with ADR, 6 months after first operation. But our report was the first long term case. Motion in the cervical spine occurs at both the intervertebral disc and the facet joints. Loss of motion either anteriorly or posteriorly can lead to subsequent ankylosis at the other motion center. If motion can be reestablished at one motion center and the other center has not ankylosed, functional cervical motion may occur. The results of thoracolumbar fractures prove that non-fused spinal segments included in pedicular instrumentation maintained mobility in a high percentage once the hardware is removed, which provides a theoretical basis for this kind of revision.  

Conclusions: In our case, the range of motion at the revision level at the 2 months follow-up was well preserved, in select cases ADR represents a reasonable alternative to a repeated attempt at fusion.