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# Outcomes to Spinal Fusion and Artificial Disc Replacement Surgeries in the Cervical spine: A Systematic Review


## Abstract

BACKGROUND: Surgical intervention is often utilized to address pain and functional loss associated with age-related changes and degenerative disc disease in the spine. Two of the most common surgical procedures utilized to address these issues in the cervical spine are anterior cervical discectomy and fusion (ACDF) and cervical disc arthroplasty (CDA). Cervical disc arthroplasty is the most recently introduced of the two procedures and few comparisons of outcomes to the two procedures are available. A variety of factors influence decisions regarding surgical procedure choice, including patient outcomes. PURPOSE: The aim of this study is to compare reported outcomes to ACDF and CDA with an emphasis on post-surgical functional improvements and the frequency of follow up surgeries. METHODS: A systematic review of the literature focused on outcomes to ACDF and CDA was performed through the CINAHL and PubMed databases. Inclusion and exclusion criteria included type of surgical intervention (ACDF or CDA); anatomical location (cervical spine); reported changes in function measured via the neck disability index (NDI); single level intervention; and additional surgeries for continued complaints related to the cervical spine following the initial procedure. In vitro studies, traumatic injuries, and prior surgeries were excluded from consideration. Initially 94 studies were reviewed. Four studies met all the stated inclusion criteria. Outcomes data from those studies was categorized using a post-operative timeline. RESULTS: Statistically significant differences in NDI scores favoring CDA were reported up to the 6-month follow-up period. After the 6-month point, NDI scores between the two surgeries became more alike over time, eventually evening out completely at the 3-year follow-up period. There was no significant differences reported between the two interventions beyond 36 months regarding NDI scores. Conflicting, non-statistically significant results were found regarding re-operation rates. DISCUSSION: Additional long-term studies reporting on additional surgeries following ACDF and CDA as well as other outcome measures and patient-pre-operative health will be meaningful to the decision-making process for both surgeons and patients when considering surgical options for age related degenerative changes in the cervical spine. Based on the evidence reviewed in this study, there is no clear advantage to one of these procedures over the other for improving NDI scores or minimizing re-operation rates long term.



*Keywords:* Cervical disc arthroplasty, CDA, anterior cervical discectomy and fusion, ACDF, NDI, re-operation rates, radiculopathy, degenerative disk disease, DDD