

Cervical spine disc replacement

We previously discussed anterior cervical decompression and fusion (ACDF) for cervical spinal conditions refractory to nonoperative care. A new technology is cervical total disc replacement (cTDR) which may be combined with a decompression. There are currently two FDA-approved devices, both of which are a ball-and-socket mechanism. Although these devices retain mobility, it is not the normal motion of a spinal disc which allows mobility by deformation of the disc. The current devices are indicated for one-level cervical disc conditions and a recent study identified that 43% of ACDF patients are a potential candidate for disc replacement surgery.

The rationale for doing cTDR rather than ACDF is not so much that the patient will have improved overall range of motion of the cervical spine, but rather that there may be less stress on the adjacent cervical spinal discs and potentially less deterioration of those discs. In an eight to ten-year follow-up outcome study at Midwest Spine Institute, the rate of adjacent segment degenerative disc disease that required additional surgery was 1-2% per year. Women were 2.5 times more likely to experience this condition compared to men. Another advantage to cTDR versus ACDF, which has already been realized in our practice as well as in prospective randomized controlled studies is that recovery and return to work are substantially shorter for cTDR patients. Complications such as implant instability or migration is rare when used with the current indications.

Outcome studies to date show similar results for ACDF and cTDR. A growing relative indication for disc replacement is for patients who have already had a prior ACDF and now have adjacent segment problems. These patients have already demonstrated propensity for adjacent segment problems and thus, these are the ones most likely to benefit from a disc replacement versus yet another fusion producing yet additional adjacent segment problems. These patients who have “cascading adjacent segment degeneration” are thought to be the patients who are best suited for total disc replacement; however, identifying these patients is not always simple. Current studies performed outside the United States have found problems with the currently available cTDR devices when applied to multiple levels such as autofusion or kyphosis.

In summary, cTDR offers early advantages in terms of reduced recovery time. It may offer late advantages in terms of preventing adjacent problems and reducing the rate of additional operations. Future development will address multi-level conditions.