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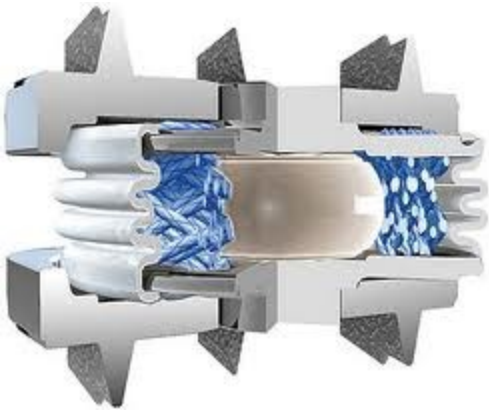
Cervical total disc replacement (TDR or cervical arthroplasty)

Cervical disc replacement is a motion preserving procedure mostly done for one or two-level problems in the cervical spine. The problem can be either a disc degeneration with neck pain only, a disc herniation, or a bone spur causing nerve pinching (radiculopathy) or a spinal cord compression (myelopathy) or a combination.

Disc replacements have been done for more than two decades. Currently, we use the third-generation implants. Our implant of choice is M-6 from Spinal Kinetics, which offers the closest biomechanics to nature of human disc. It is compressible in axial plane meaning that it works like a cushion which is different from the prior generations that did not offer axial motion. Additionally, it offers six degrees of freedom, and a close restoration of the center of rotation of the human disc.



Total disc replacement is considered a co-gold standard along with the anterior cervical discectomy and fusion. Obviously being a motion-preserving procedure, it offers a number of benefits over fusion:

1. First and foremost, it can decrease the chance of adjacent segment disease, which is seen in up to 3% of fusion patients per year.
2. It eliminates the need for a revision surgery for a nonunion (failure of fusion to take), which is seen in some patients who undergo a fusion.

At times, we perform a hybrid reconstruction - placing a total disc replacement at one level and performing a fusion at another level.

The usual problem associated with the fusion - a transient dysphagia or difficulty swallowing that can persist for up to few weeks following the operation is also seen with a disc replacement. However, with modern surgical techniques it is rare to see this become a long-term problem.

An adjacent segment disease is still a possibility even with a total disc replacement. However; the emerging body of the peer-reviewed literature suggests that with total disc replacement, the percentage of adjacent segment disease might be lower.

The M6 disc has a combination of titanium endplates and a synthetic core. The core has artificial annulus in the form of braided polyethylene cables mimicking the human annulus or the outer part of the disc.

Inside, there is a softer polyurethane core which simulates the compressible nucleus pulposus. It is possible that a wear debris is being generated from the motion of either the titanium endplates or the plastic core. However, the loads on the disc are relatively small and very few cases of endplate erosion due to the wear debris have been reported.