

## Intervertebral Disc Prosthesis

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It is interesting to note that when the hip or knee degenerates, it is rare to fuse these joints, yet when the spine degenerates, fusion often is performed. In one instance, the goal is to increase motion; in the other, the goal is to eliminate motion.

A major problem with fusion is that adjacent areas become prone to degeneration. If hip arthrodesis (artificial ankylosis) is performed, the well-known complications of ipsilateral knee pain and lower back pain can occur.<sup>1</sup> A major complication of spinal fusion, meanwhile, is increased movement of vertebral segments above and below the fused segments. The new increased workload to the spinal segments adjoining the fusion results in their accelerated degeneration and eventual pain, and a new cascade of degeneration occurs. Based on long-term studies, 29 percent of patients who have undergone fusions suffer with recurring pain due to disease in adjacent segments.

Kirkaldy-Willis<sup>2</sup> describes the last stage of spinal disc degeneration as the "stabilization phase," in which there is a stiffening due to osteophyte formation and facet arthrosis. This end stage, which occurs late in life, normally can result in a decrease or elimination of pain, as long as spinal stenosis, with symptoms of radicular pain, neurogenic claudicating, neurologic deficit and possible back pain, does not occur. "The goal of spinal fusion is to accelerate the patient's spine to the end-stage of the degenerative cascade with motion segment immobilization."<sup>1</sup> Hopefully, this stage is reached without the problem of stenosis. One of the reasons surgeons have been looking for alternative methods of surgery for degenerative disc disease is that a successful fusion as shown radiographically does not necessarily correlate with relief of the patient's pain. A retrospective study of fusion results reported adjacent segment degeneration of 16.5 percent in five years and 36.1 percent in 10 years.<sup>3</sup>

The latest surgical idea for relieving the effects of degenerative disc disease is arthroplasty (creation of an artificial joint)/prosthesis (fabricated substitute for a damaged or missing part of the body).<sup>4</sup> One important reason for a spinal prosthesis is to replace spinal fusion. Fritzell, et al.,<sup>5</sup> won the 2001 Volvo Award for a study that showed fusion of the lower lumbar spine could reduce pain and diminish disability more effectively when compared with nonsurgical treatment in patients with severe chronic low back pain. But there have always been problems with disc fusion. Fusion is used mostly for axial back pain, which is defined as back pain without radiation to the lower extremities, versus spinal decompression for radicular pain, which at times is combined with fusion.

The arthroplasty spinal devices are usually metal-on-plastic or metal-on-metal articulating surfaces. The purpose of these devices is to relieve pain by maintaining motion. As of now, these devices are built to allow flexion/extension, side-bending and axial rotation, but none of the modern arthroplasty devices allows for axial compression. While there have been positive results using spinal prosthesis, Errico<sup>1</sup> states that the story of lumbar disc arthroplasty is literally in its infancy, and at present there is a lack of long-term data and widespread implementation.

## References

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