

Advances in spine surgery

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In the last decade, there have been dramatic developments in both the techniques as well as the tools employed in spine surgery resulting in better outcomes in patients undergoing spine surgery. The myth prevailing in society about spine surgery being unsafe has largely been exploded with access to better training and advancement in technology. Some of these are as under:

MINIMALLY INVASIVE APPROACHES TO THE SPINE

The introduction of the tubular retractor system allowed spine surgeons to treat symptomatic herniated discs with minimally invasive techniques using microscope or an endoscope. These have allowed procedures like discectomy to be done through key hole access. Tubular retractor system too has undergone various modifications over the past few years and has allowed the spine surgeon to expand the role of minimally invasive approaches to include lumbar fusion techniques for treatment of spondylolisthesis, degenerative disc disease, short segment spinal deformity, as well as traumatic fractures. Since there is less tissue trauma post operative rehabilitation is easier. Patients can be mobilised earlier as there is less post operative pain. Excellent outcomes combined with fewer complications, shorter hospital stays, and less blood loss have been reported with this technique.

MOTION PRESERVATION

The past few years have witnessed a change in philosophy regarding cervical and lumbar fusion surgery. Fusion surgery tends to cause more stress on adjoining segments resulting in faster degeneration. It is felt that patients undergoing fusion surgery have a higher risk of becoming symptomatic

due to their adjacent segment degeneration and a significant number will require a subsequent surgery. There are two options currently available for patients that are interested in having non-fusion, motion preservation procedures for the spine. The first is artificial disc replacement technology, the second is dynamic stabilisation.

Dynamic stabilisation is a technology that manages intolerable and intractable low back pain yet retaining motion within the desired limits. The source of back pain is most commonly associated with degenerative disc disease but can be also associated with lumbar facet disease. These devices are most useful for younger patients by maintaining flexibility in their backs. It is not a good device for patients who are older, have osteoporotic bones, or who have fused on their own with aging and do not have flexible backs.

A trend toward motion preservation in the form of disc replacement procedures has become more popular. Such fusion less surgeries have demonstrated encouraging and better results as compared to fusion procedure. Although disc arthroplasty may be a reasonable option for patients with cervical or lumbar disc disease, many patients may not fit the criteria for arthroplasty. Hence a careful patient selection is important.

NEUROMONITORING AND NEURO-NAVIGATION

Neuromonitoring allows the spinal cord functions to be monitored during spine surgery. Thus any insult to the spinal cord can be immediately noticed during surgery and remedial measures can be taken. This has gone a long way in making spine surgery safe.

Spine navigation allows precise surgical technique and accurate instrumentation with minimal spinal bony damage and blood loss.



SPINAL BIOLOGICS

Development of biologically active agents was done with the idea to augment and possibly restore the function of the spine. One of the first biologics to be approved was rhBMP-2. This powerful osteoinductive agent stimulates the production of bone and is utilised to augment fusion surgeries of the spine. Further development of the commercially available product has revolutionised the spine surgeon's ability to obtain a fusion mass in patients that may have problems achieving an adequate fusion.

IMPLANTABLE DEVICES: SPINAL CORD STIMULATOR AND BACLOFEN PUMP

People whose back, neck or neuropathic pain has not been relieved by back surgery or other treatments may have another option to consider: spinal cord stimulation. A spinal cord stimulator (SCS) device is surgically placed under the skin and sends a mild electric current to the spinal cord, modifying or blocking nerve activity in a non-medical way to minimize the sensation of pain reaching the brain.

The baclofen pump system has been used in the treatment of spastic disorders refractory to conventional treatments and consists of a pump and a



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catheter that brings the medication from the pump into the spinal fluid. The pump is surgically implanted under the skin of the abdomen.

The pump contains a battery, which usually lasts between 5 and 7 years, a reservoir for the medication, and a microprocessor. The catheter is a thin flexible tube implanted under the skin. One end of the catheter is connected to the pump, and the other end is inserted into the spine at various levels and directly delivers the drug to the spinal cord.