

Chapter 1 : A Short Practice of Spinal Surgery (NoDust) by Henry V. Crock | eBay

A Short Practice of Spinal Surgery, 2nd Revised Edition. Henry V. Crock. Vienna, Springer Verlag, Pages: Price: \$ The surgical management of degenerative spinal disease is a complex, highly controversial subject. The disorders that result from disc herniation or degeneration often.

This article has been cited by other articles in PMC. Abstract Lumbar spinal stenosis LSS is mostly caused by osteoarthritis spondylosis. Clinically, the symptoms of patients with LSS can be categorized into two groups; regional low back pain, stiffness, and so on or radicular spinal stenosis mainly presenting as neurogenic claudication. Both of these symptoms usually improve with appropriate conservative treatment, but in refractory cases, surgical intervention is occasionally indicated. In the patients who primarily complain of radiculopathy with an underlying biomechanically stable spine, a decompression surgery alone using a less invasive technique may be sufficient. Preoperatively, with the presence of indicators such as failed back surgery syndrome revision surgery , degenerative instability, considerable essential deformity, symptomatic spondylolysis, refractory degenerative disc disease, and adjacent segment disease, lumbar fusion is probably recommended. Intraoperatively, in cases with extensive decompression associated with a wide disc space or insufficient bone stock, fusion is preferred. Instrumentation improves the fusion rate, but it is not necessarily associated with improved recovery rate and better functional outcome. Spinal stenosis, Lumbar vertebrae, Instrumentation, Spinal fusion Introduction Degenerative joint disease is a degradative process of the joints that primarily involves the articular cartilage [1]. This disease is the leading cause of chronic disability all over the world and usually presents with joint pain, tenderness, stiffness, locking, and effusion [2]. In advanced cases, muscle atrophy, joint instability, or deformity may develop [2 , 3]. The arthritic changes in the spinal column spondylosis with involvement of the facet joints and intervertebral discs, in addition to these common signs and symptoms, may also cause neurologic impingement [4 , 5]. Degenerative process of the spine is usually divided into three phases; inflammatory, instability, and re-stabilization [6]. Although these arthritic changes are more common in the area with greater mobility and pressure like lower cervical or lower lumbar spine, different stages of arthrosis can be observed simultaneously in one region of the spine [7]. Lumbar spondylosis is not synonymous with lumbar spinal stenosis LSS , but it comprises the vast majority of these cases [8]. Clinically, the symptoms of patients with lumbar spondylosis can be categorized into two groups; regional low back pain, stiffness, and so on or radicular spinal stenosis mainly presenting as neurogenic claudication [5 , 8]. Both of these symptoms usually improve with appropriate conservative treatment [8]. In refractory cases, surgical intervention is occasionally indicated [8 , 9]. In these review, we present an updated concept for the necessity of fusion in patients with LSS undergoing surgical treatment. Lumbar Disc Herniation versus Spinal Stenosis Although traditionally every case of neurologic impingement with involvement of the spinal cord or nerve roots is categorized as spinal stenosis, the patients who present with only intervertebral disc herniation are usually different from those with LSS [10 , 11]. In these special cases, the only pathologic finding is herniation of the soft disc without any other abnormality in the adjacent facet joints, ligamentum flavum, or bone. These patients are usually younger and the course of the disease is more acute. Positive straight leg raising test, muscle weakness, and other objective findings are usually more common in these patients. These findings are contradictory to those in patients with LSS who have multiple complaints inability to walk, inability to stand, or interfere with activities of daily living , but usually no positive objective finding can be detected [10]. Which Patients Should Undergo Decompression? The only well known absolute indication for surgical neurogenic decompression in patients with lumbar radiculopathies is cauda equina syndrome CES [12]. Although CES includes a famous triad of bilateral Achilles areflexia, saddle anesthesia, and sphincter disturbances, these findings are observed in only half of the patients [13]. Therefore, the clinicians should not wait too long to observe all the three features of the syndrome. In other patients with signs and symptoms of LSS, a three-month trial of aggressive conservative treatment is usually recommended, but after this time period, surgery has been found to be associated with significant improvement in all primary outcomes [14]. In ordinary LSS, radicular complaints other than CES are usually

relative surgical indications, even though most of the authors recommend early neural decompression when the radicular pain is present even at rest [15 , 16]. The primary goal of neurologic decompression is to improve the radicular pain. The surgeon should know that the patients who primarily present with a complaint of low back pain may not show much improvement after decompression only procedures even though a relatively severe stenosis might be detected in the imaging studies [8 , 15]. The primary goal of spinal fusion is to improve the regional back pain [17]. Spinal fusion is usually achieved by applying autogenous or allogeneous bone graft over the decorticated bone surfaces. Instrumentation may be used to improve the fusion rate and to correct the underlying deformity [18]. Instrumentation may increase the fusion rate especially in multilevel fusion , but it is not necessarily associated with improvement in the recovery rate [19]. Solid radiographic fusion does not guarantee a successful outcome [20]. Favourable outcome is generally achieved by appropriate patient selection. Appropriate indications for lumbar fusion are usually categorized into two major groups; preoperative and intraoperative indicators. Paying attention to the patient is necessary for making a logistic decision of performing spinal fusion. Before considering these two groups, the clinicians should not forget that in every spinal procedure for achieving spinal fusion, the fusion stage is the most important stage in the whole procedure. Failed back surgery syndrome In the patients with a history of previous lumbar surgery who present with instability, deformity flat back , or recurrence, if revision surgery is found to be necessary, fusion is probably indicated, because revision often requires more resection of the stabilizing structures Fig. In those cases in which less invasive techniques were used previously or the previous surgery induced fusion, decompression alone may be sufficient, but instrumentation should be routinely used in the operating room during all revision lumbar surgeries.

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The concept of fusion is similar to that of welding in industry. Spinal fusion surgery, however, does not weld the vertebrae immediately during surgery. Rather, bone grafts are placed around the spine during surgery. When is Fusion Recommended? There are many potential reasons for a surgeon to consider fusing the vertebrae. One of the less controversial reasons to do spinal fusion is a vertebral fracture. Although not all spinal fractures need surgery, some fractures - particularly those associated with spinal cord or nerve injury - generally require fusion as part of the surgical treatment. Sometimes a hairline fracture allows one vertebra to slip forward on another. This condition is called spondylolisthesis see page on Spondylolysis and Spondylolisthesis and can be treated by fusion surgery. Another condition that is treated by fusion surgery is actual or potential instability. Instability refers to abnormal or excessive motion between two or more vertebrae. It is commonly believed that instability can either be a source of back or neck pain or cause potential irritation or damage to adjacent nerves. Although there is some disagreement on the precise definition of instability, many surgeons agree that definite instability of one or more segments of the spine is an indication for fusion. Cervical disc herniations that require surgery usually need not only removal of the herniated disc discectomy, but also fusion. With this procedure, the disc is removed through an incision in the front of the neck anteriorly and a small piece of bone is inserted in place of the disc. Although disc removal for a disc herniation is commonly combined with fusion in the neck, this is not generally true in lumbar disc herniations. Spinal fusion is sometimes considered in the treatment of a painful spinal condition without clear instability. The theory is that pain can originate from painful spinal motion and fusing the vertebrae together to eliminate the motion will get rid of the pain. Because it can be so hard to locate the source of pain, treatment of back or neck pain alone by spinal fusion is somewhat controversial. Fusion under these conditions is usually viewed as a last resort and should be considered only after other conservative nonsurgical measures have failed. How is Fusion Performed? There are many surgical approaches and methods available to fuse the spine, and they all involve placement of a bone graft between the vertebrae. The spine may be approached and the graft placed either from the back posterior approach, from the front anterior approach or by a combination of both. In the neck, the anterior approach is more common; lumbar and thoracic fusion is more commonly performed posteriorly. The ultimate goal of fusion is to obtain a solid union between two or more vertebrae. Fusion may or may not involve use of supplemental hardware instrumentation such as plates, screws and cages. Instrumentation is sometimes used to correct a deformity, but usually is used as an internal splint to hold the vertebrae together to while the bone grafts heal. Whether or not hardware is used, it is important that bone or bone substitutes be used to get the vertebrae to fuse together. The bone may be taken either from another bone in the patient autograft or from a bone bank allograft. Fusion using bone taken from the patient has a long history of use and results in predictable healing. The iliac crest is a common donor site for autograft. Smoking, medications you are taking for other conditions, and your overall health can affect the rate of healing and fusion, too. Currently, there is promising research being done involving the use of synthetic bone as a substitute for either autograft or allograft. It is likely that synthetic bone substitutes will eventually replace the routine use of autograft or allograft bone. The indications for minimally invasive surgery MIS are identical to those for traditional large incision surgery; however, it is important to realize that a smaller incision does not necessarily mean less risk involved in the surgery. The immediate discomfort following spinal fusion is generally greater than with other types of spinal surgeries. Fortunately, there are excellent methods of postoperative pain control available, including oral pain medications and intravenous injections. Another option is a patient-controlled postoperative pain control pump. With this technique, the patient presses a button that delivers a predetermined amount of narcotic pain medication through an intravenous line. This device is frequently used for the first few days following surgery. Recovery following fusion surgery is generally longer than for other types of spinal surgery. Patients generally stay in the hospital for three or four

days, but a longer stay after more extensive surgery is not uncommon. A short stay in a rehabilitation unit after release from the hospital is often recommended for patients who had extensive surgery, or for elderly or debilitated patients. It also takes longer to return to a normal active lifestyle after spinal fusion than many other types of surgery. This is because you must wait until your surgeon sees evidence of bone healing. The fusion process varies in each patient as the body heals and incorporates the bone graft to solidly fuse the vertebrae together. The healing process after fusion surgery is very similar to that after a bone fracture. In general, the earliest evidence of bone healing is not apparent on X-ray until at least six weeks following surgery. Substantial bone healing does not usually take place until three or four months after surgery. At that time activities may be increased, although continued evidence of bone healing and remodeling may continue for up to a year after surgery. The length of time required you must be off of work will depend upon both the type of surgery and the kind of job you have. It can vary anywhere from approximately four to six weeks for a single level fusion in a young, healthy patient with a sedentary job to as much as four to six months for more extensive surgery in an older patient with a more physically demanding occupation. In addition to some restrictions in activity, a brace is sometimes used for the early postoperative period. There are many types of braces available. Some are very restrictive and are designed to severely limit motion, while others are intended mainly for comfort and to provide some support. Following spinal fusion surgery, a postoperative rehabilitation program may be recommended by your surgeon. The rehabilitation program may include back strengthening exercises and possibly a cardiovascular aerobic conditioning program. In some cases, a comprehensive program will be custom-designed to safely get the patient back to work. The decision to proceed with a postoperative rehabilitation program depends upon many factors. These include factors related to the surgery such as the type and extent of the surgery as well as factors related to the patient age, health and anticipated activity level. Active rehabilitation may begin as early as four weeks postoperatively for a young patient with a single level fusion.

Chapter 3 : Lumbar Spinal Stenosis: Who Should Be Fused? An Updated Review

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