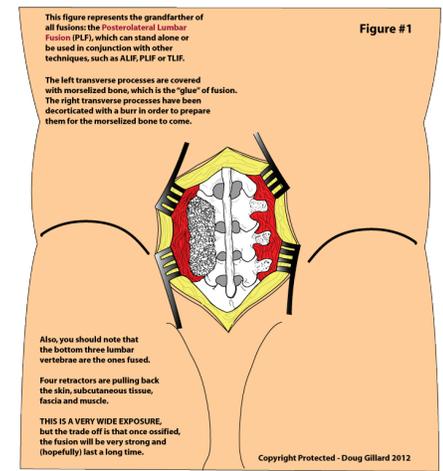


## FUSION 101

**Warning:** Fusion of the lumbar spine, or any level of the spine for that matter, is an end-of-the road treatment intervention for back pain. It is imperative the patient try every other form of care first before going down this road—it is really a big deal and should not be taken lightly! Why do I say this? The discs of the lumbar spine are like a house of cards: if you topple one, then the others may fall. That is, a fusion at L4/5 will put undue biomechanical stress on L3/4 and L5/S1, which may result in their failure and the need for fusion in the not so distant future.

### Some Basic Questions and Answers:

**Why am I having a fusion?** There are two basic reasons as to why a patient will undergo fusion: #1) you have a damaged disc (internal disc disruption, annular tears and/or degenerative disc disease), facet joint(s), or pars interarticularis, and the natural movement between the two vertebrae is irritative to these conditions and causing your pain. #2) Something is "pinching" the delicate neural structures of the spine; i.e., the cauda equina, traversing nerve roots, exiting nerve roots or spinal nerve; and that something is usually bone that has grown thicker than normal (this is called degenerative joint disease, spondylosis or arthritis) into the bony canals of the spine; i.e., the central canal, the lateral recess, or the intervertebral foramen (IVF). So fusion surgery is an attempt to remedy these problems by decompressing the bony canals of the spine (this usually means laminectomy and facetectomy) and then eliminating all movement between adjacent vertebrae (this is the actual fusion).



**What conditions are treated with fusion?** The undisputed indications for fusion are as follows: symptomatic spondylolisthesis, degenerative scoliosis (both for correction of the abnormal curves, as well as for the decompression of the IVF secondary to foraminal collapse), traumatic deformities of the spine and nerve root-compressing stenosis. Other more controversial indications for fusion include pathologically degenerated facet(s), far lateral disc herniation, massive disc herniation, recurrent disc herniation and degenerative disc disease (DDD). Surprisingly the latter condition accounts for nearly 50% of all fusions performed in the United States [page 342, Herkowitz [2]].

**Who is the ideal candidate for fusion?** In order to be the ideal candidate for fusion, there are three hurdles to clear:

**Hurdle #1: less invasive treatment first:** Basic common sense dictates that the patient should try all other, less invasive, procedures before trying fusion. And the other less invasive procedures are as follows: (1) all forms of conservative care including physical therapy and exercise, chiropractic, massage, and acupuncture; (2) injective procedures including facet injections with steroid/rhizotomies, sacroiliac joint injections with steroid, and epidural steroid injections with steroid; and (3) different types of medication including opioids, Neurontin/Lyrica, anti-inflammatories and acetaminophen.

**Hurdle #2: Prove It:** There are ancillary diagnostic techniques that must be completed in

order to ensure the patient is a proper candidate for fusion. These techniques all involve the use of an anesthetic which is injected in and around the suspected pain generator. For example, if the facet joint is suspected to be the chronic pain generator, then injecting the facet with an anesthetic (lidocaine for example) should give the patient two or three hours of pain relief. If so, then there is proof that the facet joint is the pain generator and denervation and fusion of that joint should eliminate the pain (of course you would try rhizotomy before fusion). Let's say the doctor suspects stenosis within the L4/5 lateral recess and IVF is the pain generator. Then, under fluoroscopy, an anesthetic is injected in to these regions. Again, if the patient affords pain relief for two or three hours, then it is logical to conclude that these nervous structures are the pain generator and by decompressing the area the pain will diminish. For suspected disc related problems (i.e. symptomatic DDD, IDD, and/or symptomatic annular tear(s)), the "prove it" story is a little different. We use a technique called provocation discography to confirm that the disc is in fact the pain generator. It involves injecting contrast into the nucleus of the disc under fairly high pressure (50 PSI) and observing the effect. Ideally the patient should scream in pain and that pain should be his or her usual pain (that is called concordant pain). If that is the case, then there is evidence that the patient is suffering from discogenic pain and by eliminating most of the disc with interbody fusion, the pain will cease.

*Hurdle #3: You Better Be Really Hurting:* many surgeons are going to disagree with this criteria, but this is what I believe: Just because your back pain prevents you from participating in some of the more arduous recreational activities (golf, skiing/snowboarding, snowmobiling, softball, bowling, etc.), Doesn't mean you are a candidate for fusion. YOU MUST BE REALLY SUFFERING to be a candidate. More specifically, you should be in pain all the time; you should not be sleeping well because of pain; you should not be able to go out socially because of pain – get the picture. In order to quantify the degree of patient pain and dysfunction, there are two tests that dominate the medical literature: the simple visual analog scale for pain (VAS) and the Oswestry disability index (ODI). Typically, patients undergoing fusion will have pre-surgery ODI scores well above 50 and VAS scores above 5.

If you pass these 3 hurdles, surgery might be necessary for your case. Make sure you don't rush your decision. Be sure to exhaust all your treatment avenues before considering spinal fusion. The chances for "success" all depends on how you define "success" and which of the thousands of published investigations on fusion you want to believe.