REPUTATION MANAGEMENT: SPINAL FUSION SURGERY
Meaningful and Positive Progress in Spinal Fusion Results: A Journey towards Excellence

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As a practicing spine surgeon, I can attest to the fact that the majority of the patients I see struggle to find positive information about successful spinal fusion surgeries. I can’t remember how many times patients will say something like, “You know what they say? Never let them operate on your back.” When I reply, “Who is ‘they’?” the patients usually mention a friend, neighbor, someone in line at the coffee shop, or sometimes even their primary doctor. Clearly, spine surgery has a reputation problem, and those of us who practice the art have not done a great job of conveying how things have changed for the better. Until now…

Many patients are driven away from surgery by fear. Many are discouraged by a lack of tangible success stories. Over my 20 years in spine surgery I have asked thousands of patients what drives your fears, and how can we assess the objective data to help you make intelligent decisions? The goal of this article is to address why many patients harbor negative impressions of spine surgery (compared to knee or hip surgeries, for example) and look at some of the facts that reflect modern spine surgery results.

What Drives Patients’ Fears?

Patients are more comfortable considering surgeries on their shoulders or knees as they tend to know more patients who have had these, compared to spine surgeries. Being a bit more afraid of a complication with spine surgery is also common. This is understandable as the spinal cord and nerves are delicate structures and are an integral part of spine surgery. Many patients express a fear of paralysis or nerve damage from surgery, even though these risks are less than 1%.
The press also plays a role in generating fear. More often than not, the lay press will gravitate towards stories that deal with controversy, highlighting issues of complications or potential abuse. This is not unique to spine surgery, but plays a role in painting a negative picture of our discipline and our results. Shocking, provocative headlines sell magazines and fuel the public (mis)perception that surgery harms most and helps few. For example:

- Why You Should Never Get Fusion Surgery For Plain Back Pain; Forbes 2011
- A Knife in the Back; Is surgery the best approach to chronic back pain?; The New Yorker 2002

Sensationalism and selective highlighting of only the negative data creates a skewed information platform for the patients, biasing their opinions even if they don’t have a spine problem.

The medical journals can also be a source of bias against spine surgery. When researchers assess the number of spine fusions in the U.S., they note that the rates of surgeries are increasing more rapidly than what might be expected for the population. Some authors cast blame on the surgeons, implying that they are over-reaching, operating for incidental back pain, and possibly taking advantage of patients who don’t know better. 

When researchers see similar trends of dramatic rises in the rates of total hip and knee replacement surgeries, the authors more commonly focus on the increasing aging population as well as worsening rates of obesity as the primary explanations. Spine fusion surgery has long suffered in the orthopedic literature as an outcast compared to the more routine joint replacement procedures. As physicians rely on the medical literature and patients rely on physicians as a primary source of advice, it is understandable how a negative bias propagates and persists.

**Surgeon Training Advances**

Another meaningful source of concern from patients is the wide variability in terms of the clinical results obtained between different surgeons, all treating similar problems. Again, this is not unique to spine surgery. Much of this can be traced to the individual surgeon’s skill set, not only in the operating room but also in the clinic where the actual decision to perform surgery is made. Years ago, there was no formal spine training after the basic orthopedic or neurosurgery residency years. Many surgeons’ techniques, training, and skills never improved and patients suffered. Over the past 15-20 years formal spine surgery fellowship training programs are the norm, often mandatory, for surgeons to obtain privileges in spine surgery at many hospitals.

So how does a doctor actually become a spine surgeon? Spine surgeons attend four years of medical school and then gain acceptance to either an orthopedic surgery or neurosurgery residency-training program. These residencies are usually five to six years in duration, depending on the program. After residency, a one to two year fellowship in spine surgery is next. During his or her fellowship, the surgeon-in-training is focused 100% on spine care. Experienced surgeons supervise clinical and surgical training. Most programs require research publications. These fellowship-training programs are now the norm, which is extremely important for creating a fundamental consistency in the spine field. This helps patients obtain better results than in the past.

Spinal fusion surgeries are more complex than most routine hip and knee surgeries. Unfortunately, some surgeons still use outdated techniques, learned in residency, and do not stay current with modern spine surgery advancements. These issues can lead to surgeons recommending very different surgery options to patients from one practice to another. That, in turn, confuses patients seeking second opinions before committing to a surgical procedure. The rapid advancements in spine surgery over the past 10-15 years require a substantial ongoing training commitment from the surgeons so that the benefits can be transferred to the patients.
seeking better outcomes. Spine surgeons now must dedicate 120 hours / 3 years on continuing medical education in order to maintain certification, which is good for them and good for their patients.

**What is a Spinal Fusion?**

Spinal fusion surgery is an operation that reduces pain attributable to pathological (painful) motion at an unstable or severely degenerated disc segment. The pain is due to a loss of the good, functioning cartilage of the spine (disc and facet joints), which then leads to painful inflammation/irritation of the bones during sitting, bending, twisting, and lifting. A fusion eliminates the painful motion and stabilizes the spine, which, in properly selected patients, leads to a reduction in pain.

Spinal fusion surgery is essentially an orthopedic intervention, where the surgeon must get two bones to grow together. While we often do a decompression of the nerves as well, it is the bone work that is most critical to the success of a fusion.

**Historical Perspective on Fusions**

Much of the negative data on surgery outcomes came from the early days of spinal surgery. Before the availability of modern instrumentation (titanium implants) patients had to often endure months of painful bracing to hold their spines still during healing. While external bracing is occasionally still needed, its use has almost completely been eliminated by the benefits of internal fixation.

In order to fuse a spine segment together, a bone graft is needed to pack the area around the spine. This bone grows together to the spine bones (fuses). In the past (and occasionally still today) the surgeons had to remove (harvest) bone from the patient’s pelvis and then place it in the spine. This bone-grafting procedure has been shown to have a higher complication rate and often left patients with a structural defect. The bone grafting procedure, while essential to the success of early spine fusions, still remains a very high concern for many patients considering surgery.

The fusion rates (percentage of cases where the bones successfully grow together) in the past were quite poor. Historical data showed fusion rates for many lower back and neck surgeries were as low as 60%. If the bones fail to fuse (non-union/pseudarthrosis) then the patient must undergo a revision fusion that has a much higher rate of complications.

**Technological Advances**

As the field of orthopedic surgery has witnessed incredible technological advancements over the past 30+ years in trauma (broken bones) as well as hip/knee replacements, we have also seen remarkable improvements in spine technology as a result. Our instrumentation arrived a bit later than the others, hence our being a bit behind the curve.

The advent of pedicle screw fixation for spine fusions was the most important advancement to stabilize the spine and dramatically improve fusion rates. These internal fixation tools directly hold the spine segments and allow most of our patients to recover without wearing braces (Figure 1). These tools improved fusion rates achieved with internal fixation range from 85-90% compared to fusion rates in the 60% range before.

Synthetic bone graft substitutes or extenders have also made a positive impact on the outcomes of spine surgery while reducing the need to harvest bone from the patient’s pelvis. The most powerful
bone graft substitute is BMP (bone morphogenetic protein), which has demonstrated fusion rates in various papers from 95%-100%. There are some concerns that this product may have deleterious side effects in some patients while other papers found no such concerns. Less biologically potent products including beta tri-calcium phosphates, allograft bone grafts, and stem cells are also commonly used for spinal fusions.

Nano-technology has recently become available in spine. Biologically active spine fusion implants can help form a successful fusion. Scientific advancements in our understanding of how the implant can generate a favorable reaction in the patient’s own bone have led the way to this remarkable advancement in spine surgery. To date, only one implant has FDA clearance for this nano-scale technology (Titan Spine, LLC; Mequon WI).

Minimally invasive techniques have become more common in spine surgery over the past ten years. Similar to other surgical disciplines, many spine fusions can be performed using small incisions with tubes or minimally invasive systems to reduce trauma and muscle damage. Several studies have shown faster early recovery times with minimally invasive techniques. Given the complexity of certain spine surgeries however, many operations must still be performed with open techniques.

Myths and Myth-Busters

An important yet difficult issue for patients is trying to separate fact from fiction as it pertains to spine surgery. Possible versus probable is a concept that doctors are comfortable with but can be vexing for patients. While there are many things that "could" lead to complications in spine surgeries, very few are "likely." Let’s take a look at some of the common myths surrounding spine surgery.

Myth: Many patients are paralyzed after spine surgery.

While paralysis is a possible complication after spine surgery, it is extremely rare. Various studies place the risk of paralysis at less than 1%. An injury to a nerve (not paralysis) is slightly more common, but the risk, like any other surgery, is still small (1-2% depending on the complexity and type of surgery).

Myth: Most patients are worse after the surgery than before. I never met a patient who did well after spine surgery.

Clinical outcomes data (i.e. how well did the patient do) from spine surgeries are relatively common and easy to find. Again, one must look at the type and complexity of the surgeries to draw conclusions. The majority of patients that underwent spinal fusions for low back degeneration report statistically significant rates which lead to better clinical improvements for patients after surgery. There is, however, a small group of patients who do not improve as much, and a few feel worse but these are not the likely outcomes in most scientific studies. Most studies demonstrate patient satisfaction with fusion surgery averaging 71%.

Myth: Once you do one spine fusion you will inevitably need another one at the next disc.

This issue of "adjacent segment degeneration" is a problem somewhat unique to spine because we have multiple disc segments connected to the next. Spine fusions stabilize a painful disc by stopping the motion, but this will put more pressure on the adjacent disc. The important issues are how do the discs look now and over how much time do you think the next disc will maintain good function? The longer time frames, the more likely one will see an adjacent segment deteriorate. This is logical. Scientific studies place the rates of symptomatic degeneration (next to a fusion) at 0.6% to 3.9% per year. Approximately 13%-20% of patients will need an adjacent disc fusion at ten years after their first fusion.
What Can Patients Do To Improve Outcomes From Spine Surgery?

• Consult with fellowship trained spine surgeons.
• Ask questions about the surgeon’s outcomes and ask if you can speak with a patient who has had the surgery you are considering.
• Be an active healthy participant in the success of your surgery: Lose weight if obese/ stop smoking/ ask to see a psychologist if you are depressed or overwhelmed/ don’t abuse alcohol or pain medications/ engage your spouse or significant other in the pre-op process.
• Learn about your diagnosis so that you will ask good questions. A few great resources are: www.SpineRF.org and www.spine-health.com.
• Be mentally prepared to address any complications that may arise. While these are rare they can occur and require fortitude to endure.
• Once you commit to the surgery, be optimistic that you will recover well and improve. A positive mental attitude, along with good preparation, is essential to success.

Conclusion

Spinal fusion surgery is performed when the patient and the surgeon, using a shared-decision making process, determine that it is the best option to improve the patient’s pain. Prior to the advent of modern spinal surgery techniques, the outcomes were often unpredictable. Over the past 20 years, there has been substantial improvements in surgeon training and implant technology, which had led to better results for patients. Most clinical studies find that in carefully selected patients, spinal fusion surgery can reduce pain and improve quality of life in the majority of patients, with a very low rate of complications.

*For a full list of references please visit SpineRF.org