

POSTERIOR LUMBAR FUSION

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Glossary

Anterior: in front of the body

Posterior: in back of the body

Disc: the soft cushion between two vertebrae

Vertebrae: the bones in one's spine which surround a disc

Fusion: growing together of the two bone surrounding an injured disc so that painful motion is stopped.

Single Level Fusion: fusion of the two vertebrae surrounding one disc

Two Level Fusion: fusion of the three vertebrae surrounding two discs

Three Level Fusion: fusion of the four vertebrae surrounding three discs

Pseudarthrosis: non-union or failure of bone graft fusion

Bone Graft: bone of any type, placed across an area of motion to encourage fusion

Ambulation: the act of walking

L5-S1: lowest disc in the low back or first disc up from the pelvis

L4/5: first disc above L5-S1 (second disc up from the pelvis)

L3/4: second disc above L5-S1 (third disc up from the pelvis)

(DIAGRAM)

(DIAGRAM)

BACK VIEW

SIDE VIEW

A POSTERIOR FUSION at the L4/5 Level

In this example, loose pieces of bone have been removed from the pelvis and placed across the L4/5 disc. In addition, a plate and screw system have been applied to reduce motion and encourage healing of the grafts.

General Information

A lumbar fusion is an operation to join together the two bones (vertebrae) surrounding a disc. **Posterior lumbar fusion** represents one option to achieve fusion of the lumbar spine. The posterior lumbar fusion involves an incision which ranges in length from three to six inches (depending on body size) and is placed vertically over your back. Briefly stated, **bone graft** is removed from your pelvis and prepared into long, thin strips. These strips are placed across each side of the vertebrae above and below the injured disc. Typically, metal **screws and plates** are attached to the vertebrae above and below to eliminate motion and encourage early healing, (see diagram). Over a six to nine-month period, this bone graft will fuse or “grow together” providing stability to the injured region of your spine. The success of the operation is primarily dependent on the healing of the bone graft, which requires activity restriction, so that excessive motion of the graft is avoided. Once a solid fusion has been achieved, then a permanent treatment of your spinal condition will have been accomplished, preventing future injury to this segment of your spine and no further activity restrictions are necessary. If the bone graft heals as planned, the screws and plate are of no consequence and are simply left in place.

Advantages:

The primary advantage to the posterior approach, is that spinal nerves can be inspected easily by the surgeon if the condition so dictates. Second, the application of the above-mentioned plates and screws allows the surgeon to achieve immediate stability in the operated area thereby reducing postoperative pain. It takes about **two to three hours** to perform a posterior lumbar fusion with plates and screws, depending on the amount of nerve work required and whether or not previous surgery has been performed.

Disadvantages:

The primary disadvantage of the posterior lumbar fusion is that its use is restricted to **single level fusions**, due to the low healing rate of long fusions, which span more than one disc space. It is typically used only at the L5/S1 disc space, given its high success rate at this level. In young

patients with good hard bone, or in older patients where the operation is performed to relieve leg pain, as compared to back pain, it sometimes is an option when two discs need to be fused (such as when both the L4/5 and L5/S1 discs require fusion).

If spinal nerves are exposed, there exists a small chance that scarring of the nerves will produce persistent leg pain after surgery.

The operation requires use of bone graft from your pelvis, as bone back bone alone is inadequate.

Blood loss can occur and for this reason, I advise you donate two units of your own blood prior to surgery. My office staff will discuss this recommendation with you.

Lastly, the pain associated with posterior surgery is greater than that experienced with anterior surgery.

Complications:

Although the complication rate of posterior lumbar fusion is quite low in my experience, complications do exist. The most likely complication is that of a non-union, or **pseudarthrosis**. This condition develops if the bone graft fails to heal and motion persists. In general, the success rate of a single-level fusion at the L5-S1 disc is approximately 90%, although the success rate for posterior lumbar fusion at L4-5 is 80%. Solid fusion when two discs are fused occurs in 70% of patients. If pseudarthrosis occurs, then an additional spinal fusion may be necessary in the future. Other, more aggressive procedures are available to raise the success rate in this situation.

All other complications are exceedingly rare and occur in less than 1% of our patients. These complications include **infection**, which is rare, but represents a possible complication with any surgical procedure and is usually treated with additional surgery and prolonged antibiotics. **Blood clots** can rarely develop in the legs or lungs (see hospitalization section) which would require blood-thinning medicine.

Nerve injury, resulting in weakness of the legs or even paralysis, can occur at the time of posterior spinal surgery, but is exceedingly rare. To date, no permanent nerve injury has occurred in my practice. However, it is a possibility that must be kept in mind when considering this surgical approach. Rarely, leakage of spinal fluid can occur, which may require another operation.

Bone Graft:

It is commonly recognized by surgeons that the best bone graft in posterior spinal surgery comes from the patient's own pelvis. This will produce a moderate ache in the region where the bone is taken (about two or three inches to one side of the base of your spine). Ache at the bone graft site typically resolves within one to two months. In a small number of patients, the graft site discomfort is permanent.

If there is insufficient bone in your pelvis (unlikely), then there is a small chance that additional bone from our bone bank will be necessary. The bone is collected from disease-free hosts and is completely sterilized with radiation, antibiotic soaking, and finally, freeze-dried. There exists the theoretical possibility of disease transmission, such as hepatitis or the AIDS virus, with the use of these bone bank products. However, tens of thousands of freeze-dried bone products have been used in patients all over the country and there has yet been a single episode of disease transmission when freeze-dried products were utilized. Therefore, it is my feeling that the issue of disease transmission is a very small consideration and the benefit of using bone bank bone certainly justifies the minimal risk, if it is required.

Many patients inquire about the possibility of graft rejection. Graft rejection is a process associated with transplantation of living structures, such as kidneys and hearts, which are reconnected to the blood supply of the patient, at the time of surgery. Freeze-dried bone graft products are not rejected as they are not living structures, so this issue is not of concern. After fusion occurs, the bone graft is slowly removed by your body and is replaced by your own bone, over a period of months to years. If you have an objection to the use of bone bank products for some reason, it is your responsibility to notify the office, so that another approach can be arranged.

Instrumentation

Considerable controversy exists at present, regarding the use of rods, plates, and screws to stabilize the spine during a spinal fusion. Years ago, spinal fusions were performed without screws, so that immediate stability was not present. With the newer instrumentation systems, immediate stability is achieved in the operating room, which allow for an improved fusion rate, although there is disagreement regarding how much the fusion rate is improved. In addition, there seems to be a marked reduction in the amount of pain patients experience during and after a fusion operation, when instrumentation is utilized. There is, of course, a complication rate associated with any technique and the primary complication associated with instrumentation placement is nerve injury. In proper hands, the rate of nerve injury is extremely low.

If a fusion is slow to heal or does not heal at all, then excessive stress is placed across the instrumentation and breakage can occur. This complication occurred primarily years ago, with older designs of instrumentation. The success of a fusion operation is based on the success of the fusion itself and not on the behavior of metal implants. For instance, a patient who has an intact fusion but broken instrumentation, is likely to feel vastly better than a patient with a fusion that did not heal, but with intact instrumentation. In my opinion, patients who experience instrumentation failure do so because the fusion did not heal.

I feel that advantages of instrumentation greatly outweigh the disadvantages. **If you have any questions or concerns regarding the use of pedicle screws, be sure to notify your surgeon, so that an appropriate, educated decision regarding your surgery can be made.** Be sure to review the Position Statement Regarding the Use of Pedicle Screw Instrumentation in Lumbar Fusion Operations on Page 16, before making your decision.

I am fully willing to perform your fusion without instrumentation if you so elect. If you decide to have a fusion without instrumentation, then, in my opinion, your success rate will be lowered by at least ten percent and you will experience far more pain in the healing period. Despite the

advantages of instrumentation, metal implants in the back remain controversial and the decision is yours to make.

We will place instrumentation at the time of your surgery, unless you advise us otherwise anytime prior to surgery.

Important Preoperative Considerations

Fitness

Rehabilitation will be easier for patients who maximize spinal fitness prior to surgery. Of course, severe pain prior to surgery, limits the ability to engage in exercise. However, the vast majority of patients are able to engage in a swimming program before surgery, which is ideal from every perspective. Swimming is critical part of the rehabilitation process (see **After Discharge from the Hospital**) and it is much easier to swim after surgery if you begin swimming before surgery. Locate the closest indoor swimming facility near your home or work, and create a schedule to regularly swim three to four times a week.

Smoking

Smoking is very bad from several perspectives. First, the complication of Pseudarthrosis (failure of the bone grafts to heal—see **Complications, General**) is markedly increased in smokers. If you smoke, the **most** important thing you can do for yourself, preoperatively, is to quit as many months before surgery, as possible. Second, complications involving the lungs are markedly increased during hospitalization in smokers. Lastly, your heart and lungs will work better after surgery if you quit smoking, which will allow improved rehabilitation.

Medicines

All anti-inflammatory drugs (Advil, Nuprin, Aleve, Motrin, Feldene, Naprosyn, Relafen, Day-Pro, etc.) and aspirin-containing drugs must be stopped two weeks prior to surgery. Patients on blood-thinning medications require careful treatment, and care will be coordinated with your internist. All pain medications should be discontinued one month prior to surgery, as your surgical experience will be vastly better if your system is “purged” from narcotics.

Hospitalization

In general, hospitalization for a posterior lumbar fusion is approximately **three days** in length. The operation itself is well tolerated by most patients, but causes moderate pain in the back due to the magnitude of the operation. Restriction of dietary intake will be necessary for a short period. You will likely receive only liquids the night of surgery and your diet will be slowly progressed thereafter. During the period of **dietary restriction**, intravenous fluids will be necessary. Typically, the intravenous fluids can be discontinued on the morning of the second postoperative day.

For the first two to three days after surgery, **pain** will be controlled with **PCA or Patient Control Anesthesia**, will be utilized. In this situation, a computerized pump allows you to regulate the amount of pain medicine you receive via your IV lines. In addition, we utilize Toradol, an injectable agent that requires a “shot” in the hip every six hours for the first two days. The combination of these medicines seems to provide excellent relief of the pain experienced by posterior lumbar fusion patients. After the above measures are stopped you will be placed on pain pills by mouth to control postoperative discomfort.

Bandages and surgical drains will stay in place until the second postoperative morning at which point they will be removed and a light dressing will be applied. Thereafter your dressing will be changed each morning until you go home.

Typically, a **urinary catheter** is used after surgery to avoid the difficulties associated with getting out of bed and going to the bathroom in the immediate postoperative period. After you are walking without assistance, the catheter is removed. This catheter is placed at the time of your surgery after anesthesia has been initiated, and therefore there is no discomfort associated with placement of the catheter. Removal of the catheter is typically a painless, quick affair and typically occurs on the second or third postoperative morning when the epidural catheter is discontinued.

Frequent coughing and deep breathing are important to clear the respiratory passages after surgery and these activities should be performed every hour while awake.

Activity in the hospital is an important issue to discuss. The bone grafts are inserted in a manner at the time of surgery so that stability is achieved, although excessive motion of the spine is undesirable, as it will delay healing of the grafts. The nursing staff will instruct you how to get out of bed, which simply involves rolling over onto your side and then assuming the sitting position. Thereafter, you can stand and walk without concern. When moving from the standing to sitting position, you should make an effort to bend at the knees and keep the spine relatively straight during this activity. Bending forward at the waist to pick up an item on the floor and/or twisting are to be avoided if at all possible. It is permissible to stoop by bending the knees to get to floor level, if you are able to perform this activity.

It is critical to understand that the most important thing that you can do for yourself while in the hospital is to mobilize quickly. Patients who lie in bed and fail to be aggressive with mobilization seem to have more pain, a higher rate of complications and spend longer in the hospital. Although the nursing staff will roll you side to side frequently during the first 24 hours after surgery, feel free to roll yourself to obtain a more comfortable position. A trapeze (triangle

of metal) will be placed over your bed so that you may pull your body upwards and change position more easily. The nursing staff will assist you in getting out of bed for the first few days and discuss proper technique. Your sitting and walking schedule will begin the night of surgery with one to two episodes and increase day by day thereafter. It is important to understand that your back will be very stable and you will not injure yourself during the mobilization process, no matter how aggressive. Again, aggressive mobilization will be rewarded handsomely with reduced pain and quicker discharge from the hospital.

A **back brace** will be provided to you during your hospital stay. Basically, the brace helps you remember to keep your back straight and to avoid bending and twisting. The brace typically is not well tolerated for the three to four days after surgery because of tenderness at the incision. During this period you should go ahead and mobilize without the brace. As the incision becomes less tender, (usually about three days postoperatively), the brace should be applied when out of bed and while ambulating. There is no need to wear the brace while in bed.

Lastly, **discharge requirements** need to be discussed. I expect all patients to be on **oral medicines only** for 24 hours prior to discharge. No injections (shots) will be allowed during the last 24 hours of hospitalization. Finally, you should be totally independent in restroom activities as well as ambulating in the halls to a distance of approximately 50 yards without difficulty.

Hospitalization Summary—throughout hospitalization remember to cough and deep breathe every hour while awake and work hard to mobilize quickly with your walking program. The schedule below is followed as closely as possible

Day 1—AM Surgery, rest until 4-6 PM, then begin ambulation program, frequent cough and deep breathing, ice chips only, PCA for pain.

Day 2—Continue aggressive walking program, continue lung exercises, continued PCA for pain, begin juices and Jell-O when belly function returns.

Day 3—Early AM: remove all drains, IV, PCA, urinary catheter and change bandages. Advance diet and begin oral pain medicines. You may go home when you are independent, able to walk 200 feet and are tolerating oral pain pills.

After Discharge from the Hospital

WOUND CARE:

When you arrive home you may remove the **surgical dressings** if your wound is dry. Small **pieces of surgical tape** will be noted across the wound, which should be left in place. Typically these tapes come off in the process of showering, etc. in the first two weeks. If any residual tape is in place two weeks following surgery, then feel free to remove them. Expect a minimal degree of tenderness and swelling around the incision site. A minimal to moderate degree of redness at the incision site and extending to each side of the incision a few millimeters is to be expected.

If your wound is still draining at the time of discharge, it is important that you provide local wound care. Twice a day the bandage should be changed and the wound itself should be cleaned with a Q-tip dipped in hydrogen peroxide.

If you notice increased tenderness, swelling, redness, or drainage from the wound, notify the office immediately.

Once the wound is totally healed, about two weeks following surgery, a vitamin E creme obtained from your local pharmacy will hasten maturation of your scar. **Exposure of the wound to water** should be limited to a relatively brief shower for the first two weeks following surgery. Once the wound is totally healed following this two-week period, then whirlpools and hot tubs are fully acceptable.

BRACE WEAR:

As stated above in the hospitalization section, the purpose of the brace is to help you to remember to keep you back straight and to avoid bending and twisting. There is no need to wear this brace during shower or while in bed. In general, for posterior lumbar fusion patients I recommend the use of the brace throughout the day and especially when outside the house walking, driving, and engaging in physical activities. The brace can be worn under or over your clothing. On occasion a **rash** will develop under your brace, which is basically a heat rash. A good approach here is a cotton T-shirt underneath the brace to control moisture. Cornstarch applied on the skin underneath the T-shirt seems to be of benefit as well. A hair dryer placed on the cool cycle can serve to dry skin quickly. Do not use oils, cremes, or lotions, as this will only aggravate the moisture problem. If marked rash or irritation develop, notify the office immediately.

The **use of your brace will be continued** until signs of a solid fusion are seen on the X-rays taken at the time of your postoperative office visits. This can range anywhere from four to nine months and is basically dependent on the ability of your body to form bone. The decision to discontinue brace wear will be made in the office and will be based on the appearance of your spinal X-rays.

ACTIVITIES/REHABILITATION:

Adequate rehabilitation is crucial for a successful result. Many patients with spinal injuries have suffered from spinal pain for months or years and considerable atrophy, or shrinkage, of the spinal muscles has developed. This is especially a problem if previous surgery has been performed, such as a laminectomy. Rehabilitation of the spine to accomplish spinal fitness is absolutely mandatory for an excellent surgical result. This goal is difficult to achieve because activities are limited until fusion has been obtained, which typically takes about six months following surgery. Nevertheless, a progressive regimented rehabilitation program is mandatory.

Stationary bicycling and swimming are very important in the rehabilitation process. Many patients are resistant to these activities and offer me a multitude of excuses why they have not engaged in these activities as instructed. This attitude, of course, only compromises the surgical result. Any patient can borrow or buy a stationary bike. Swimming is more difficult, but almost all patients will find a swimming facility if they try hard enough and are willing to drive. I suggest you attempt to arrange membership at an indoor swimming facility **prior to your surgery**. We are glad to provide a prescription to you for either of the above. The majority of insurance carriers seem willing to honor these prescriptions.

The **first stage of rehabilitation is an aggressive walking program**. While in the hospital ambulation to a distance of 50 or so yards is typically achieved. Immediately, at the time of discharge, this ambulation program should be continued, walking more and more each day. In general, I recommend three to five episodes of exercise a day. I anticipate that the average posterior lumbar fusion patient be ambulating a minimum of one mile within two weeks following surgery. This same ambulation program should be continued throughout the first six months following surgery. There is no upper limit to the distance and many patients are able to ambulate two to three miles without difficulty within the first month following surgery. The other activity that is strongly suggested during the first month after surgery is that of walking in the shallow end of a pool. Caution should be exercised when entering or exiting the pool so that bending and twisting is avoided. Do not enter the water until your wound is totally healed and without drainage (typically by 14 days after surgery). Remove the paper strips on your wound prior to pool entry.

By the beginning of the **second month**, I recommend you begin a **stationary bicycling** program. Again, a slow progressive increase in bicycled distance per day is the best advice. More aggressive walking in the pool is permissible. The walking program outside should be continued.

By the beginning of the **third month**, a **swimming program** is recommended. I recommend that you attempt to swim three to five times a week. Any stroke is perfectly acceptable and, again, you should start slow with a few laps and slowly increase the distance on a daily basis.

The **fourth, fifth, and sixth months** are spent performing aggressive rehabilitation via long distance walking, swimming, and bicycling. In general, my feeling is the more the better. However, it is very important to remember to **avoid bending and twisting** during this period. It is possible to **overdo this rehabilitation** and produce a moderate increase in back pain at which point the exercise program should be limited to half the previous level until recovery from the aggravation has occurred. Thereafter, slowly progress your activities once again. Increased pain during rehabilitation is to be expected and is best treated with ice packs applied to the spine every 3 hours or so.

By **six months post surgery**, activity level is based on the appearance of your X-rays. During this period aggressive rehabilitation with continued walking, swimming, and bicycling is recommended. If you are advised by me at your six-month visit that your fusion is not solid, then continued restriction of bending and twisting will be necessary until your fusion is healed.

However, by six months, the majority of patients have achieved a solid fusion and their braces have been discontinued. If you are so advised, then stretching exercises with forward and backward bending as well as side bending can be initiated in a progressive fashion. Once you can bend forward and backward comfortably as well as swim half a mile or so in the swimming pool, I recommend slow return to routine activities, such as **recreational athletics**. All return to recreational athletics should be slow and progressive. For instance, golfers should spend a month or so at the driving range progressing slowly with common sense. Once a half-hour of driving range activities is well tolerated, then nine holes of golf is a reasonable step. We would be glad to discuss specific activities with you.

With regards to **driving**, I recommend you avoid driving for the first two weeks following surgery. It is permissible to ride in a car short distances to go to church or a restaurant, etc. Thereafter, as long as you are making good progress with regards to ambulation and reduction of postoperative pain, then driving short distances to go to the grocery store, etc. are permissible. By four to six weeks postoperatively the majority of patients can drive without restriction in and around town. If this is well tolerated, feel free to drive any distance you would like. Expect slow increased tolerance to driving during the first three to six months following surgery. Many patients find that a pillow placed in the small of the back or a lumbar support from a surgical supply company eases discomfort while driving.

Sexual activity involves considerable pelvic activity, which certainly can represent a form of bending of the lumbar spine. The best approach here is for you to assume the missionary or dependent position and “let your partner do most of the work”. This approach is best continued until a solid fusion has been obtained.

Many patients have the need to use **stairs** at home or work. There is no restriction here and you may utilize stairs immediately upon discharge.

Housecleaning involves many different activities, obviously. Remember the rule, no bending or twisting and apply it as indicated. Attempts to keep your spine straight will be rewarded with a higher success rate.

A brief word with regards to **lifting** is in order. Most surgeons tend to provide their patients with a “lifting restriction”. I see little logic in this restriction. The reasoning here is that the amount of weight that one lifts is not near as important as how the weight is lifted. For instance, lifting five pounds from floor level while bending the spine is much more damaging to the spine than lifting twenty pounds with an erect back and bent knees. Failure to lift appropriately has likely been responsible for a good part of your spinal injury to begin with and appropriate lifting patterns for the remainder of your life are critical. Therefore, I place no lifting restriction, per se, on my post-fusion patients.

With regards to **work**, this is a very broad topic that requires a different approach for each patient. Remember the rule, no bending or twisting. Patients who have sedentary jobs often return to work within three to four weeks following surgery as long as the bending/twisting rule can be observed. Executives who need to return to work very quickly and who are willing to tolerate moderate pain at work often return to work much more quickly. Driving can be a difficulty for patients who commute because driving distances over 20 miles for the first two months after surgery can produce a moderate degree of backache, so that the distance from home to work needs to be considered. If your job involves bending and twisting, and restrictions are not a possibility, then return to work will not be possible until a solid fusion has been obtained. For heavy laborers, specific complex rehabilitation will be necessary and work return is variable. On occasion, return to **physically demanding work** is not possible.

EXPECTATIONS:

Recovery from posterior lumbar fusion is quite variable. Patients sometimes achieve a dramatic, remarkable reduction in their pain with minimal associated operative pain. On the other hand, some patients do not achieve substantial relief in their pain until a solid fusion has been achieved. In any case, a moderate degree of back pain with intermittent leg pain is to be expected in most patients. Increased pain with prolonged sitting and driving is expected as well during the healing process. As per the other activities described above, slowly increase your exposure to these activities and expect decreased discomfort with time.

Some difficulty **sleeping** is commonly described for the first month or so after surgery. I recommend to my patients to persist in the identification of a comfortable sleeping position and tolerance of their sleeping difficulty without resorting to sleeping medicine. While in the supine position a few pillows underneath the knees to keep the knees bent seem to provide benefit. While lying on your side, a pillow between the knees seems to be the best approach.

As the months proceed, slow progressive improvement in back pain is expected. Despite the slow progressive improvement, some patients experience a mild to moderate increase in their back pain at the four to six-month postoperative interval related to the technical issues of graft healing. Once a solid fusion has been obtained and adequate rehabilitation has been accomplished, we expect a dramatic reduction in your preoperative pain. Many patients describe complete relief of pain. There are also a substantial number of patients, approximately 50%, that will persist with ache in their lumbar spine with various activities and early in the morning. It should be stressed that this discomfort is minimal in nature and represents a vast improvement over the preoperative pain level, according to most patients. This residual pain should diminish slowly over the first two or three years following surgery. Despite an excellent technical result, a small percentage of patients will have persistent pain and are unhappy with their surgical result. This occurs in 5-10% of the patients who undergo posterior fusion. If this does occur, then additional studies will be performed in hopes that a separate pain source can be identified.

LONG-TERM RESTRICTIONS:

There are no long-term restrictions with regards to recreational athletics. In general, I recommend that you develop the habit of bending at the knees and not the spine to preserve spinal function above your spinal fusion, so that an additional spinal injury does not occur at a separate level in the years ahead. I would emphasize that this is good common sense for any

person of any age with or without a history of spine surgery and does not represent a significant limitation.

MEDICATIONS:

The use of narcotic medication is a huge problem for us in that most patients come to our office having been overly medicated elsewhere. Narcotic tolerance and dependency develop extremely easily. We expect you to discontinue pain pills four weeks before surgery. Large quantities of pain medication will be given to you while in the hospital to ease operative discomfort. You will be discharged with a course of anti-inflammatory medicine as well as a moderate quantity of pain pills. Mild to moderate pain should be tolerated, and the pain pills should be utilized only when you are unable to cope with your discomfort. Due to the problems of narcotic addiction, **no narcotic pain pills will be utilized beyond one month postoperatively.** If you have difficulty with this approach, you will be referred to a psychiatrist, Dr. Lesem, for management of this problem.

OFFICE VISITS:

Upon leaving the hospital, you should call my office and arrange the first postoperative visit, which should be three weeks following surgery. You will be seen in the office and radiographs will be obtained to assess the condition of your fusion. You should arrange further office visits at two months, four months, six months, twelve months, and twenty-four months following surgery. The importance of your twenty-four month visit cannot be over stressed. The long-term appearance of your fusion and prognosis will be discussed, and we strongly urge you to make and keep your two-year follow-up visit.

Position Statement Regarding the Use of Pedicle Screw Instrumentation in Lumbar Fusion Operations

Fondren Orthopedic Group, Section of Spine Surgery

History: Pedicle screw fixation of the spine is a surgical procedure where screws are inserted into the spine at various points and linked together with rods or plates. This allows the surgeon to provide immediate stability to the spine at the time of a fusion operation to reduce postoperative pain and increase the success of the fusion. The technique also allows the surgeon to move displaced spine segments back into normal position. Pedicle screw fixation was first used in Houston, Texas in 1969 and was followed by increasing use in Europe thereafter. Widespread acceptance of the technique by the surgical community in the United States occurred during the latter half to the 1980's. Recent reports in the medical literature (1987-1993) confirm extensive experience with pedicle fixation in both the United States and Europe.

Studies: Controversy exists at present regarding how much the rate of fusion is increased when pedicle screws are used. Fusion rates without pedicle screw application vary widely in the medical literature (50-90%) and are affected by the number of spinal segments fused as well as the type of fusion operation performed by the surgeon. The literature suggests a 10 to 20% increase in the fusion rate over the standard posterior spinal fusion when pedicle screws are utilized.

Despite the benefits of pedicle screw fixation described, complications are associated with their use and do occur. These complications range from 0.4% to 10% in the literature and include problems associated with any surgical procedure as well as problems directly associated with pedicle screw placement such as nerve injury.

Our Experience: The combined pedicle screw experience of the spine surgeons at Fondren Orthopedic Group since 1988 was approximately 850 cases as of October 1993. The infection rate during this period was 0.7%. Three patients in this group developed one or more broken pedicle screws. Early in our experience two patients developed pain associated with screw placement and required screw removal. The unanimous opinion of the surgeons at our institution is that the advantages of pedicle screw fixation far outweigh the disadvantages associated with their use.

Controversy with the FDA: One of the roles of the FDA is to control the marketing and distribution of various medical devices so as to maximize their safety. Despite the widespread use of pedicle screw systems in the United States and Europe the FDA has only approved pedicle screws for insertion into the sacrum (bottom part of the lumbar spine). They have not yet approved insertion into the region of the low back above the sacrum. Both areas are involved in a lumbar fusion so if you elect to proceed with pedicle screw insertion then insertion of a device that is not FDA approved will occur. It is important to understand that the FDA has no control over what surgical implants are chosen by a surgeon, only the marketing and distribution of such devices. Large multi-center studies are ongoing with the FDA at this time to establish their safety. Marked increase in the use of pedicle screw systems continues because most spinal surgeons feel that the screws represent the best available treatment for patients.

Position statements by the FDA as well as various professional spine societies are available in our office for your review. **If you have any questions or concerns regarding the use of pedicle screws, be sure to notify your surgeon so that an appropriate, educated decision regarding your surgery can be made.**