

Combined Anterior and Posterior Lumbar Fusion (Global or 360 Fusion)

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Glossary

Anterior: in front of the body

Posterior: in back of the body

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

Disc: the soft cushion between two vertebrae

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

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

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

Three Level Fusion: fusion of the three 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)

FRONT VIEW

SIDE VIEW

A Simultaneous Anterior and Posterior Fusion

In this example, the L4/5 disc has been removed and Replaced with a block of bone (from the front), and loose bone chips have been placed on the vertebrae from behind. In addition, a plate and screw system has been placed, as well.

General Information

A lumbar fusion is an operation to join together the two bones (vertebrae) surrounding a disc. **Simultaneous Anterior and Posterior Lumbar Fusion** is a combination of two separate operations on the spine performed on the same day. Many physicians consider this approach to be overly aggressive and it is, indeed, controversial.

The general purpose of considering this approach is to raise the success rate of a given spinal fusion. For example, if a patient's condition dictates a two-level fusion, then the traditional approach of a posterior fusion provides a success rate of only 70-80%. A conservative approach is to proceed with the posterior operation with the attitude that an additional operation can be performed later, if a fusion is not achieved. The problem with this approach is that any spinal fusion requires six to nine months of recovery and to repeat such a recovery is quite an imposition to the patient. Although much more aggressive, the combined approach of two operations on one day provides the average patient with a fusion rate of more than 95%. To a certain extent, the decision of having a simpler operation with a 70-80% success rate or a more complex operation with a 95% success rate is a philosophical one.

Typically, the **anterior operation** is performed first. The anterior lumbar fusion involves an abdominal, or belly, incision which ranges in length from one and a half inches to four inches (depending on body size) and is placed typically beneath and to the left of the navel. The abdominal contents are not disturbed in any way but only pulled to the side. Briefly stated, the disc is removed in entirety and replaced with a bone graft. This bone graft is, therefore, placed between the vertebrae, or backbones, above and below (see diagram, Page 2).

The patient is then turned over and the **posterior operation** is performed. 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 the back. Briefly stated, bone graft is removed from the 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.

Over a six- to nine-month period, this bone graft will fuse or "grow together" the vertebrae above and below 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 the spine and no further activity restrictions are necessary.

Advantages

The primary advantage of the combined anterior and posterior approach is that the success rate of the fusion is much higher than an isolated fusion on one side of the spine. Patients also obtain their fusion much more quickly, which is required for substantial pain relief. For instance, it is common to hear a combined fusion patient state that near complete relief has occurred by six months after surgery, while it is rare to hear this statement from a posterior fusion patient. Finally, the operation can be depended upon to achieve fusion over three levels of the low back where an isolated anterior or posterior procedure will rarely achieve a solid fusion (less than 50%).

Disadvantages

The primary disadvantage of the combined lumbar fusion, is that it represents a much larger operation, actually two operations in one. Therefore, the time under anesthesia is greater (three to five hours) as are the general risks and blood loss. There is obviously increased pain shortly after surgery, due to the fact two operations have been performed, although the reduction in postoperative pain during the healing period seems much quicker, likely due to the quick and reliable fusion that is achieved.

Complications

General

Although the complication of non-union or pseudarthrosis, (the bone graft fails to heal and motion persists) is quite rare with the combined approach as compared to simple anterior or posterior fusion, this complication can occur. In general, the success rate of one- and two-level global fusions exceeds 95%. Three-level fusions are rarely performed, and on occasion, one of the three grafts will be slow to heal. In any case, the three-level fusion rate, in my hands, appears to exceed 90%. Four-level fusions are exceedingly rare and typically performed only for completely incapacitated patient or those with tumors or infections. I have performed only a few four-level fusions and have seen only one which did not heal. Nevertheless, it should be stressed that the medical profession views three- and four-level fusions as very controversial (based on the success rate of older, more traditional procedures) and the long-term outcome of three or more fusions has not carefully been evaluated. Finally, if a rare pseudarthrosis occurs, you should realize that an additional spinal fusion may be necessary in the future.

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

Anterior Operation

Other complications are exceedingly rare and occur in less than 1% of our patients. Complications associated with the anterior aspect of the global fusion include a postoperative hernia, which can occasionally require hernia repair, injury to the blood vessels in the abdomen, which, in general, can be repaired without significant implications to the patient at the time of surgery. Infection is exceedingly rare in anterior lumbar surgery.

A very sensitive complication that can occur with the anterior portion of the global operation needs to be addressed in male patients – that of retrograde ejaculation. The incidence of this complication is exceedingly low and is felt to occur in approximately 1 in 400 cases. Briefly, there exist nerves in the abdomen which control the process of ejaculation in the male. These nerves are pulled to one side during an anterior lumbar fusion. If injury to these nerves occurs, inability to ejaculate in a normal fashion results and can result in sterility. The patient does not experience any difficulty with regards to erection and the act of sexual intercourse, whatsoever. Given the rare nature of this complication, I do not typically feel that this issue should alter a patient's thought process regarding anterior lumbar fusion. This can be a very sensitive subject for young males, and the patient may very well elect to avoid surgical intervention, altogether. Another option is sperm donation to the local sperm bank. Please contact the office nurse regarding this matter if so desired.

Lastly, there are nerves within the pelvis which are pulled to the left during the operation. Some of these nerves control the temperature in the left leg. An occasional patient describes increased temperature of the left leg (some incorrectly report decreased temperature of the right leg). This is usually temporary and resolves completely within six to twelve months. On occasion, however, this effect is permanent. In this case, patients seem to quickly adapt to this abnormality and it does not represent any long-term problem for most patients.

Posterior Operation

Complications associated with the posterior aspect of the global fusion include infection, which is rare (less than 1% in my practice), but represents a possible complication with any surgical procedure and usually requires additional surgery and prolonged antibiotics. Blood clots may 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 any surgical approach. Leakage of spinal fluid may occur but rarely happens. If so, re-operation may be required.

Bone Graft

Anterior Operation

Over the last several years, we have utilized bone from bone banks for the anterior part of the global fusion. This bone has been collected from disease-free hosts and is completely sterilized with radiation, antibiotic soaking, etc, and finally, freeze-dried. It is possible to use bone graft from a patient's hip, but this produces considerable discomfort and the success of the anterior lumbar fusion is not changed. 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. Therefore, it is my feeling that the issue of disease transmission is a very small consideration and the benefit of using bone from a bone bank certainly justifies the minimal risk.

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, because they are not living structures, so this issue is not of concern. After fusion occurs, the bone graft is slowly removed by the patient's body and is replaced by his or her own bone, over a period of months to years. If you have an objection to the use of bone bank products, it is your responsibility to notify the office, so that another approach can be arranged.

Posterior Operation

It is commonly recognized by surgeons that the best bone graft in posterior spinal surgery come from the patient's pelvis. Therefore, a small amount of bone will be taken from your pelvis at the time of the posterior operation. The bone is usually taken from the left side of your pelvis through the same incision. This will produce a moderate temporary ache in the region where the bone is removed (about two or three inches to one side of the base of the spine). The duration of this discomfort varies from two weeks to three months.

If there is insufficient bone in the pelvis (unlikely), then there is a small chance that additional bone from our bone bank will be necessary (see comments in **Bone Grafts**, Anterior, above).

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 17, 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 global lumbar fusion is approximately three to four days in length. The operation is well tolerated by most patients, but causes moderate pain in the back due to the magnitude of the operation. Patients typically feel a moderate degree of abdominal pain, but this is far less than typical abdominal operations, such as cesarean sections and gallbladder removals. Restriction of diet will be necessary until normal abdominal function returns, which typically requires two to three days. During the period of dietary restriction, intravenous fluids will be necessary. Typically, the intravenous fluids can be discontinued on the morning of the third 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 you 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 global 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, the surgical bandages will be removed and a light dressing will be applied. Thereafter, the dressing will be changed each morning until you go home.

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. This catheter is placed at the time of your surgery after you are asleep; 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 postoperative morning.

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, because 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.

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. You will experience increased pain during position change (lying or sitting to standing) but once you are standing, you will find that you are remarkably comfortable and able to walk with minimal difficulty. **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. This brace serves as a reminder to keep your back straight and to avoid bending and twisting. The brace typically is not used for the first four or five days after surgery, because of tenderness at your incisions. During this period, you should go ahead and mobilize without the brace. As the incisions become less tender, the brace should be applied when out of bed and while ambulating. There is no need to wear the brace while in bed.

Discharge requirements need to be discussed. I expect all patients to be on oral pain medicines only for 12 hours prior to discharge. No injections (shots) will be allowed during the last 12 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 also to be expected.

If your wound is still draining at the time of hospital 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 sterile 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 and at night. For global fusion patients, I generally recommend the use of the brace when leaving the house or when engaging in physical activities while at home. The brace can be worn under or over your clothing. On occasion a type of heat rash will develop under your brace. A good approach here is a cotton tee 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 global 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. AT the beginning of the second month, a swimming program is recommended, as well. I recommend that you attempt to swim three to five times a week. Any stroke is perfectly acceptable and, again, you 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**. Return to any 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. 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 two to three weeks following surgery as long as the bending/twisting rule can be observed. 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 possible, then return to work will not be possible until a solid fusion has been obtained.

EXPECTATIONS

Recovery from global 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. 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 you will be given the option to consider additional studies 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. For heavy laborers, specific complex rehabilitation will be

necessary and work return is variable. On occasion, return to physically demanding work is not possible.

MEDICATIONS

The use of narcotic medication is a huge problem for us in that most patients come to our office having been overly medicated. Narcotic tolerance and dependency develop extremely easily. In general, 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 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.**

Informed Consent

I have carefully reviewed this entire document, have been given ample time to ask questions and understand the proposed operation of:

Anterior/Posterior Lumbar Fusion: _____

I have requested that Dr. Alan Heilman, M.D., proceed with the above operation, being fully aware of risks, advantages, disadvantages, and implications.

Patient: _____

Date: _____

Witness: _____

Date: _____

Dear Patient,

Please initial **each page of this entire document** and make sure that 20 pages are present.