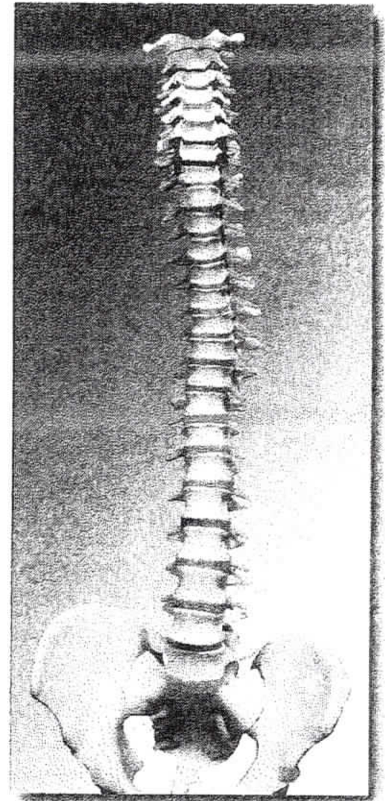
Anatomy of the Spine

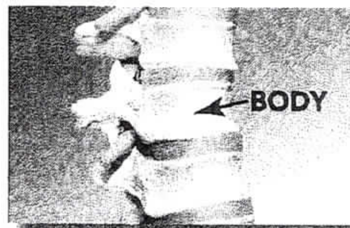
The foundation of our body, the spine allows us to stand, walk and sit in an upright manner while maintaining flexibility. It also serves as an anchor for multiple tendons and muscles that allow for movement of our upper and lower extremities.

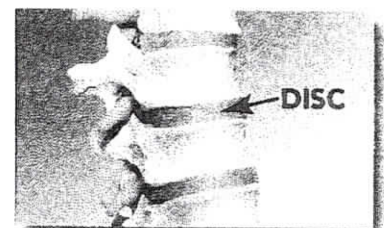


- The basic unit of the spine is the vertebra. The spinal column is comprised of 33 vertebrae – seven cervical, 12 thoracic, five lumbar, five sacral and four coccygeal. These vertebra are joined by multiple ligaments and their intervening discs. In addition to its structural function, the vertebrae provide protection to the spinal cord and its merging nerves. Each vertebra has a large circular opening called the spinal canal through which the spinal cord and its emerging nerves pass through.

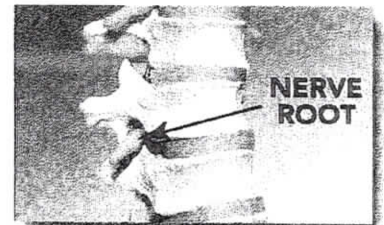
The vertebrae are stacked and joined together by intervening discs and ligaments. Additional stability is provided by the facet joints which limit your ability to flex, extend, rotate or twist.

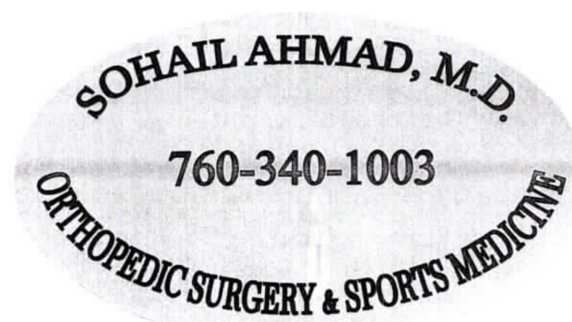
- The spine consists of bones called vertebral bodies which are separated by soft tissues (discs).



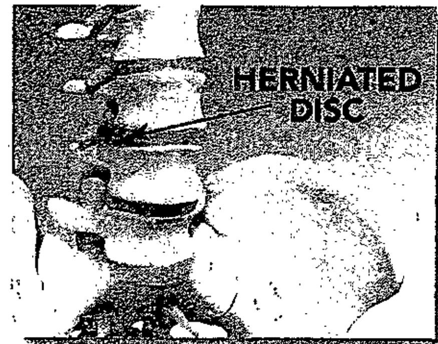


- At each level of the vertebral body, there are nerve roots that exit the spinal canal through a small hole called the foramen. The nerve root goes through the foramen from the spinal cord to the different parts of the body. The nerve roots and their branches send both motor and sensory signals to and from the brain to the respective muscle or organ.



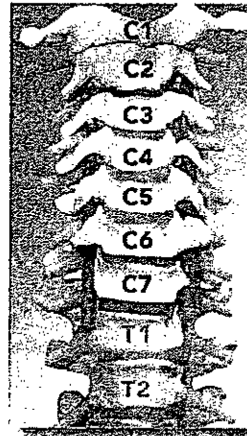


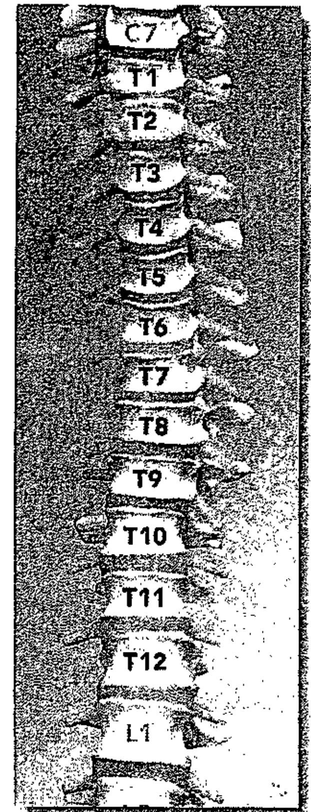
- If a disc has herniated, a small amount of disc material comes out of the disc space from between the two vertebral bodies depicted in this illustration. This disc material can press on the spinal cord or the exiting nerve root causing neurological symptoms, including pain, numbness, tingling or weakness.



The spine is divided into four areas: cervical, thoracic, lumbar and sacrum.

- The cervical portion of the spine consists of seven vertebrae (C1-C7) starting from the base of the skull to the clavicle. There are eight pairs of nerves arising from the cervical spine (C1-C8). These nerves exit their respective foramen to merge and branch with other nerves. These innervate various muscles and organs. The nerves that exit from the cord through the foramen go into the head, shoulders, and down into the forearms and hands.

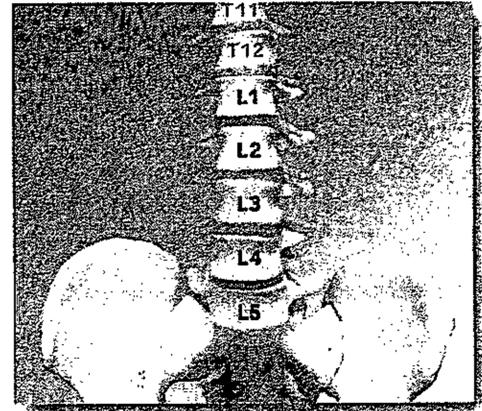




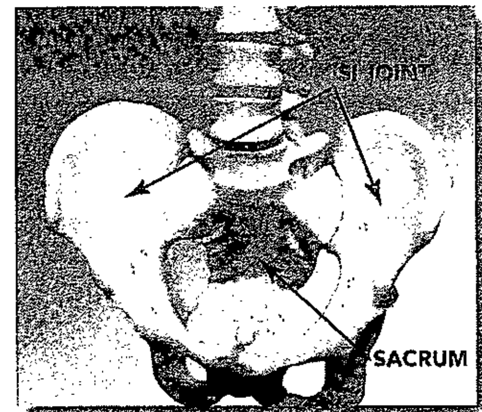
- The thoracic portion of the spine consists of 12 vertebrae (T1-T12) starting at the level of the clavicle down to the last rib. These ribs not only protect the important organs of the chest, but also provide additional support and stability to this region. There are 12 pairs of nerves arising from the thoracic region which supply the muscles in the thoracic region and also many of the organs in the chest and abdomen.

Anatomy of the Spine (Continued)

- The lumbar portion of the spine consists of five vertebrae (L1-L5) and extends from the bottom of the last rib to just below the waistline. The vertebrae are separated by fibrocartilaginous discs that provide cushioning and mobility. Additional mobility and stability are provided by the facet joints and various ligaments. The five pairs of nerves and their numerous branches arising from the lumbar region pass through the pelvis and into the legs and feet. These nerves provide both motor and sensory information to and from the legs to the brain.



- The sacrum and the pelvis are at the bottom of the spinal column. The bottom portion of the sacrum is known as the tailbone or coccyx. The pelvis is a ring-shaped bone that connects the sacrum and spine to the hips. The joint between the sacrum and pelvis is known as the SI (sacroiliac) joint. There are several ligaments that help connect and provide stability between the sacrum and pelvis. The five pairs of nerves arising from the sacrum innervate areas such as the pelvic floor muscles, bladder, bladder sphincter, as well as the anus.



What is Spine Surgery?

Surgery on the spinal column can be performed for a variety of reasons, including to relieve pain and to preserve or restore spinal function and stability. The most common spinal procedures including taking pressure off the nerves and/or spinal cord, creating decompression and realigning or stabilizing a spine that is malaligned or moving abnormally to create fusion.

- **Decompression**
  Decompression procedures of the spinal column take pressure off of the nerves and/or spinal cord. These procedures have different names depending on the part of the spinal column that is removed.

- **Laminectomy / Laminotomy**
  These are procedures that remove a portion of the back part of the vertebral body (the lamina) in order to relieve pressure within the central spinal canal. A laminectomy is removal of the majority of the lamina, while a laminotomy is removal of a smaller portion of the lamina.

- **Discectomy**
  A discectomy is the removal of a portion of the disc (the soft cushion between the vertebral bodies) that is putting abnormal pressure on a nerve, causing pain or loss of function. This is often, but not always, done through a laminotomy.

- **Foraminotomy**
  A foraminotomy is a procedure to open the side tunnels through which the nerves exit the central spinal canal and spinal column. This is often, but not always, done through a laminectomy or laminotomy.

- **Corpectomy**
  A corpectomy is removal of a substantial portion of the vertebral body which is often done to relieve pressure on the spinal cord (usually done on the cervical, thoracic or upper lumbar spine).

- **Stabilization**
  Stabilization procedures of the spinal column decrease the amount of motion between two vertebrae. Any malalignment of the two vertebrae can be "fixed" at the expense of lost motion. By far the most common type of procedure is an instrumented fusion where the two vertebrae are fused together to form one block of bone. Fusions take time to heal and thus instrumentation/hardware (e.g., screws and rods) are often used to hold the two vertebrae together while they fuse. In certain circumstances your surgeon may recommend a disc replacement. This procedure maintains motion versus a fusion which is designed to eliminate motion.

- **Replacement Surgery**
  In this procedure, a segment of the spine, such as a disc, is replaced. In certain circumstances this may be an option offered to you by your surgeon.

Understanding Risks of Surgery

Spine surgeries are highly successful and generally safe procedures. Despite their success, complications can arise. The following are just some of the possible complications associated with spine surgery. It is important that the patient understands these risks. Any questions relating to these risks should be discussed with the surgeon in advance of the surgery.

- **Infection**
  Patients will be given antibiotics just before and after the operation. The surgery will be performed under sterile conditions with sterile equipment. Despite this, infections can still arise. Infections can arise: 1) from within the patient, as in the case of a remote infection, such as a urinary tract infection that spreads to the surgical site, and 2) from outside the patient, that is, from contamination of the wound itself (soiled or contaminated objects coming into contact with the wound). An infected wound can become red, hot and painful. Infected wounds also commonly have drainage; however, just because a wound is draining does not mean it is infected. It is important to let your surgeon know if you have concerns about your wound because they may want to start you on antibiotics or, in certain situations, may recommend an operation to clean/wash the wound. Infection can sometimes lead to sepsis (blood infection) which can become a very serious, possibly life threatening, complication.

- **Bleeding**
  During any operation, some bleeding is expected. Your surgeon will make every effort to minimize the amount of bleeding during your operation. Occasionally there may be enough bleeding to require a blood transfusion though this is uncommon. Injuries to a nearby artery or vein can cause accelerated bleeding, either during or after the surgery. This is a rare but very serious complication.

- **Hematoma**
  A hematoma is a localized collection of blood than can cause complications from the pressure it exerts. For example, bleeding after neck surgery done through the front of the neck can form a hematoma that can compromise the airway and the ability of the patient to breath. Bleeding within a muscle can form a hematoma that pressurizes the muscle and causes pain. Bleeding within the spinal canal can form a hematoma that compresses the nerves and can cause pain and loss of nerve function (e.g., loss of control of the legs, bowel and bladder). The surgeon may place drains during your surgery to minimize the chances of a significant hematoma forming.

- **Acute or Persistent Pain**
  A common reason for having spine surgery is to reduce the level of pain caused by arthritis or stenosis (narrowing of the nerve tunnels). Acute pain after surgery is common as one heals. Your surgeon will make every effort to keep you comfortable after surgery. Persistent pain past the typical recovery period is rare. It can be due to a variety of reasons discussed in this section or other less common reasons.

- **Altered Wound Healing**
  The wound may become thickened and painful (keloid scar). Massaging the scar with cream (vitamin E or Mederma®) after the wound has healed may help the appearance. NEVER start wound massage and cream application without getting the approval of the surgeon as the wound can breakdown and become infected if this is done too early.

- **Nerve Damage / Paralysis**
  Altered sensation along the incision is fairly common. This is usually temporary and may take several months to resolve, but may also be permanent. Rarely, damage to nerves within the incision or within the spine can result in altered sensations, altered muscle function (weakness, loss of coordination), or both.

- **Spinal Fluid Leakage**
  The nerves within the spinal canal lie within a fluid-filled sac called the thecal sac. Rarely, the sac can leak fluid after surgery. Untreated, this can cause problems including headaches, swelling of the wound or drainage from the wound which can prevent the wound from healing. If the surgeon has to repair a leak during surgery, the patient may have to stay laying flat in bed for a short period of time to decrease pressure on the repair.

- **Adjacent Level Disease**
  Surgery on one part of the spine does not prevent other parts of the spine from wearing down. In some instances, surgery itself can be associated with increased wear and tear in another part of the spine, often affecting the levels adjacent to where surgery was performed. This can result in symptomatic arthritis or stenosis. For this reason, it is important that the patient learns to move properly in order to decrease the wear and tear changes within the spine as much as possible.

- **Need for Fusion after Decompression**
  Decompression procedures are excellent for taking pressure off of nerves and relieving symptoms. Unfortunately, because these procedures involve removal of a portion of the spine, they do weaken the spine slightly. This weakening of the spine can sometimes result in symptoms like abnormal movement within the spine. Some cases may require a stabilization procedure, such as a fusion.

- **Constipation / Urinary Retention**
  Pain medications, anesthesia and inactivity slow the intestines and the bladder and can cause constipation and urinary retention, respectively. Constipation can be treated with medications and increased activity. Urinary retention typically resolves with the constipation, but sometimes requires placement of a foley catheter into the bladder to drain the urine. If you have had difficulty with bladder emptying or retention, please notify your surgeon.

- **Blood Clots / Pulmonary Embolism / Stroke**
  Any patient undergoing surgery is at risk for blood clots. Clots typically happen in the vein but may also occur in the artery. They can inhibit blood flow to organs (in the case of an arterial clot) or flow back to the heart (in the case of a venous clot). Clots can also break off and travel to another organ such as the brain or a lung. In either of these cases, these complications can be devastating and at times fatal.

- **Organ Failure**
  Undergoing surgery is a major risk. There must be a balance of patient optimization, proper anesthesia, fluid balance, and careful resuscitation. Despite best efforts, bodily organs can be affected. This may include heart attack, heart failure, stroke, kidney or liver failure. These are very uncommon but potentially devastating complications.

- **Falls**
  Patients are often at a higher risk for falling right after surgery due to multiple factors. Falls can result in fractures, bleeding within the brain, and can affect surgical outcomes. Fall prevention is an important part of postoperative recovery.

Please inform your surgeon of all the medications you are presently taking – including vitamins and all nutritional supplements. Talk to your doctor about any medicines you take to thin your blood.

> Failure to discontinue the above medications may result in re-scheduling your surgery.
>
> *You must have clearance from your prescribing physician to stop any anticoagulant medication.

If you have a cardiac stent, do not stop taking your medications to prevent clots without first talking to the doctor who put in the stent.

Certain medications need to be stopped prior to surgery, such as

- Anticoagulants
  (e.g., aspirin, warfarin (Coumadin®), clopidogrel (Plavix®), Brilinta®, Ticlid, Eliquis®, Xarelto®, Lovenox®, Arixtra®)
- Anti-inflammatory medicines
  (e.g., ibuprofen, naproxen, Advil®, Aleve®, Motrin®, Relafen®, Mobic®)
- Vitamins and nutritional supplements
  (e.g., multivitamins, calcium, vitamin D, St. John's Wort, fish oil, herbal supplements, garlic, ginger, ginko biloba saw palmetto)

If you have any questions, please call your surgeon's office.

Quit Smoking Before Surgery

Evidence has shown that tobacco and nicotine use is known to impair the body's ability to heal bones and wounds and that smokers are at a higher risk for infection and other complications. Patients who quit smoking before and during spine care treatment have less pain than those who smoke and also have better outcomes.

Why Should You Quit Smoking Before Spine Surgery?

Smoking changes blood-flow patterns, delays healing, and slows recovery. This is true for any major surgery. The Anemia Institute for Research and Education reports smoking can reduce your blood cell count. Of course, smoking can also increase lung complications, which is always a concern for patients undergoing general anesthesia.

In an article for the *Medical Journal of Australia*, Matthew Peters, MD, wrote that, "Wound infection rates are higher in smokers than in non-smokers who have had surgery." Earlier studies have also shown smoking is linked to longer surgeries, lengthened hospital stays, and a higher demand for hospital services.

According to Dr. Peters, "Continuing smokers must accept that some risks are simply unacceptable given the intent of surgery." And the key is quitting – simply cutting back on smoking is not adequate. To achieve a benefit, patients need to stop several weeks before surgery. Smoking effects bone healing crucial to the success of any spine surgery, especially stabilization or fusion.

The specific reason for higher infection rates in smokers is not clear. However, there is a glimmer of good news. Dr. Peters indicated nicotine replacement devices, such as nicotine gum and patches are not linked to increased infection rates. Your doctor can refer you to smoking cessation programs offered locally.

Just think of how your life may change when you've quit smoking and have had your diseased spine surgically repaired to improve pain and mobility. You'll have a better chance for a faster recovery, and you could be on your way to a new, much healthier life.

Alcohol Use and Surgery

Evidence has also shown that complications following surgery are exponentially related to pre-surgery alcohol use/misuse. Alcohol use increases the risk of infection, poor healing and falling. If possible, minimize your drinking well in advance of surgery.

If you would like more information about smoking cessation and a variety of other health-related programs and services, please call the Healthy Living Resource Center located at the Eisenhower George and Julia Argyros Health Center in La Quinta at 760-610-7205. The goal of the Center is to promote healthy lifestyles through education, information, screenings and wellness programs.

Night Before Surgery

- Review the instructions given to you by the surgical interview nurse.
- Eat a light dinner; nothing to eat or drink past midnight.
- No alcohol or smoking prior to surgery as it interferes with anesthesia, pain medication and the healing process.
- Take a shower using chlorhexidine wash. (If not provided, you may purchase it at any local drug store.)

Chlorhexidine Wash Instructions

No one wants an infection. By washing your skin carefully before surgery, you can lower your chances of infection.

Using chlorhexidine liquid soap (Safeguard or Dial is ok if chlorhexadine unavailable)

- Wash your body and hair with your regular soap and shampoo and rinse off. Do not shave the area where you will be having surgery.
- Turn off the water or step out of the shower and put the chlorhexidine soap all over your body **from the neck down.** Wash gently for five minutes, adding more soap as you wash parts of your body. (Avoid washing your genitals with the chlorhexidine soap.) This soap will not lather like your regular soap. Pay extra attention to the place where you will be having surgery.
- Turn the shower back on and rinse all of the chlorhexidine soap off of your body. Do not use any additional soaps.
- Dry yourself with a clean towel.

After using chlorhexidine liquid soap

- Be sure to put on clean clothes after you use the liquid soap.
- Do not put on lotion, deodorants, creams, powders or perfumes.

Benefits and risks of chlorhexidine liquid soap

- You will have fewer germs on your skin, lowering your risk of infection at your surgery site.

What problems could happen?

- Rash, itching, burning

Day of Surgery

Follow instructions provided regarding your medications and eating on the day of surgery.

- If you were instructed to take medications by the surgical interview nurse, do so with a very small sip of water.
- Take another shower this morning, prior to coming to the hospital, using the chlorhexidine soap. Avoid using this soap on your face and genitals.
- Do not mark the surgical area.
- Do not shave the surgical area.
- Bring this book with you to the hospital.
- Arrive on time at the main entrance to the hospital. You will be escorted to the pre-surgery area.
- A name band will be placed on your wrist after verifying your name and date of birth. Throughout your hospital stay, you will be frequently asked to say your first and last name as well as your date of birth. This helps to ensure your safety.

In Pre-surgery Area

- You will be cared for by a registered nurse.
- You will change into a surgical gown and be given a pair of socks, a soft blue hat and a warm blanket.
- An intravenous (IV) line with fluids will be started by your nurse.
- All consents, paperwork and lab results will be reviewed with you by your nurse.
- You will be asked several routine screening questions – these are safety checks.
- Your nurse will administer any medications ordered by your surgeon.
- You will meet the following members of the peri-operative team:

  Your anesthesiologist will review your medical and surgical history, your medications and allergies to determine the best type of anesthesia for you; you will then sign a consent. Notify your anesthesiologist of any prior issues with anesthesia.

  Your circulating nurse, who is a member of the surgical team, will ask you to verify your name, date of birth, and ask routine screening questions regarding your health and medication allergies prior to escorting you to the operating room. Their role is to manage the nursing care inside the operating room, document the progress of the surgery, and maintain a safe, comfortable environment for the patient.

- Your family will be able to visit with you in this area.
- Your stay in the pre-surgery area will be about 90 minutes to two hours.

In the Operating Room

- A registered nurse will take you into the operating room on a gurney and remain with you during the entire surgery.
- The room is bright, cold and noisy.
- You will see the anesthesiologist, a surgical technician who assists the surgeon, an anesthesia technician who assists the anesthesiologist. Some surgeons work with a physician assistant as well.
- You will be placed on a monitor that continuously records your vital signs.
- A registered nurse will monitor your care in the operating room, will ask you several routine screening questions, and will monitor safety checks.
- You will be kept comfortable during the procedure.
- The length of time for your surgery will depend on complexity.

When the procedure is completed, the surgeon will speak with your designated contact person, if they are available. If your contact leaves the area, please ask them to leave a phone number where they can be reached.

In the Recovery Room

- You will be cared for by a registered nurse.
- You will be connected to a cardiac monitor in order that your vital signs – blood pressure, heart rate, oxygen level, temperature and pain level – can be checked frequently.
- The spine incision will be covered with a dressing.
- You will have a warm blanket, oxygen, IV fluids, SCD (sequential compression device) to prevent blood clots, and may have a foley catheter in your bladder. If you have a catheter, it will be removed as soon as possible. This helps prevent a urinary tract infection from developing. A bladder ultrasound may be used to make sure you are emptying your bladder after the catheter is removed. You may also have a wound drain that will be removed in a few days.
- Your stay in the recovery room will be approximately two hours.
- You will receive any medications ordered by the surgeon and/or anesthesiologist.
- If you wish, one person will be allowed to visit briefly.
- If your procedure is an outpatient surgery, you will be discharged home once you have met discharge criteria.

Visitors

Patients may designate and receive visitors of their choosing. Eisenhower Health does not have established visiting hours; however, the hospital may limit the number of visitors for any one patient during a specific period of time. The patient will be informed regarding the reason for any restriction or limitation of visitors.

To protect our patients' health, friends and relatives who are ill should not come to the hospital to visit.

Set realistic expectations for your pain management as the first few days are the most painful. If you are currently seeing a pain specialist, make sure to notify them you are having surgery to coordinate a pain management plan. You will need to follow up with this specialist for pain management after your surgery.

Managing Pain without Medicine

Below is a list of suggestions to help manage your post-surgical pain. They are to be used in conjunction with the pain medication recommended by your surgeon.

- Move every hour to 90 minutes.
- Change your position frequently.
- Use cold therapy to help reduce pain and swelling as instructed by your doctor.
- Practice meditation.
- Allow distractions.
- Practice relaxation.
- Watch the CARES channel.

Pain Management at Home

At the time of your discharge, your surgeon will decide which medication you will require at home.

It is important to continue with the following:

- Keep your pain manageable.
- Take your medication as stated on the label.
- Frequently change your position every 1 to 1½ hours.
- Get up and move around as instructed.

If your pain is preventing you from normal daily activities after doing all of the above, call the surgeon's office.

Bending, lifting or twisting should be avoided

Do not bend, lift or twist after having spine surgery. Bend your knees and hips when picking something up. Do not lift more than 10 pounds (a gallon of milk), until cleared by your surgeon to do so. Turn your whole body instead of twisting (log roll). Adhering to these restrictions will promote healing after surgery.

On a Bowel Regimen

At home, you need to ensure your bowels stay regular as pain medications cause constipation. Drink plenty of fluids and eat foods high in fiber. If needed, you may take over-the-counter softeners or laxatives to keep to keep yourself regular.

Need for Pain Control

Pain medication, walking, ice, repositioning, etc. should be used at home to keep you comfortable. Take your pain medications as instructed by your surgeon. If you are having pain that is not tolerable with these measures, please contact your surgeon's office.

Exit Plan

Identify your plan for help when you go home. Who will stay with you after surgery? Ensure you have a walker prior to arriving to the hospital for your surgery.

Stay Active

Please continue to be active at home. Walking several times daily is important to your recovery. Movement helps prevent blood clots and promotes healing after surgery.

Helpful Hints After Spine Surgery

Tips to project the back or neck while the tissues heal.

Careful Positioning

- Be aware of your posture, especially while sitting or standing.
- Tighten your abdominal muscles to support the back.
- Break up tasks, such as washing dishes, to avoid prolonged standing.
- Choose a chair with arms and a firm seat that will support good posture.
- Sit with a pillow behind you for additional support, as needed.
- Sleep with a pillow under your knees or between your legs, as needed.

Frequent Movement

- Walk frequently to relax your muscles.
- Change positions frequently; do not sit for more than one hour.
- Plan rest breaks, such as lying flat, throughout the day.
- And again, walk frequently.

Remember Your Precautions

Avoid Bending

- Use your reacher to pick up something far away or near the floor.
- Bend at your knees and hips (instead of your back) when you stand up, flush the toilet, brush your teeth, wash your hair in the shower, etc.

Avoid Lifting

- Keep your load under 10 pounds and carry that load in front of you, such as groceries or trash.
- Do not push, pull or reach overhead.

Avoid Twisting

- Remember your log roll when getting in or out of bed.
- Use both hands to open the refrigerator or a heavy door.

Prevent Falls

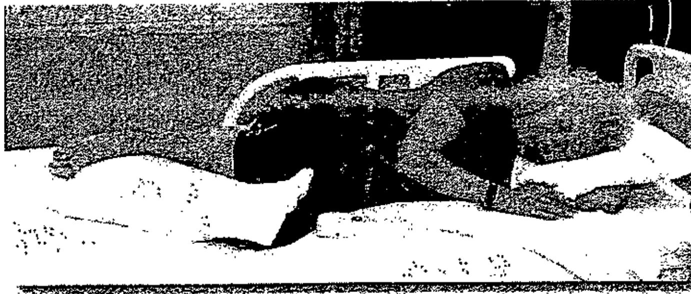
- Sit down to dress and undress. Use your reacher for pants, find supportive slip-on shoes.
- Avoid flip-flops or slides.
- Take your time using stairs. Feel each step with your toe when going up, or your heel when going down.

Avoid Infection

- Do not allow your pets to sleep in bed with you until your incision is fully healed.
- Do not sit in water, including bathtubs, hot tubs, swimming pools, bodies of water, etc. until your incision is healed.

Sleeping on Side

- Place pillow under knees.
- Use cervical support under neck and a roll around waist as needed.

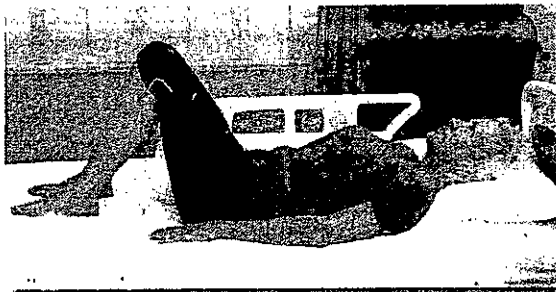


Sleeping on Back

- Place pillow under knees.
- A pillow with cervical support and a roll around waist are also helpful.

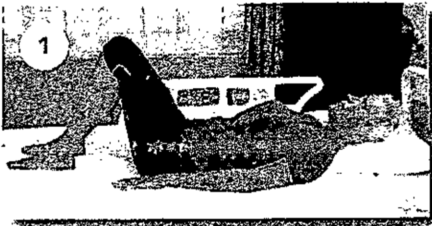
Log Roll

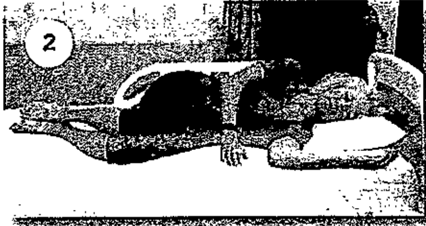
- Lying on back, bend left knee and place left arm across chest.
- Roll in one movement to the right.
- Reverse for rolling to the left.
- Always move as one unit.

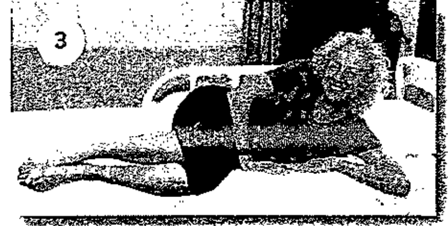


In/Out of Bed

- Lying on back, bend left knee and place left arm across chest.
- Roll in one movement to the right.
- Reverse for rolling to the left.
- Always move as one unit.
- Lower self to lie down on one side by raising legs and lowering head at the same time.
- Use arms to assist moving without twisting.
- Bend both knees to roll onto back if desired.
- To sit up, start with lying on side and use the same movements in reverse.
- Keep trunk aligned with legs.







When at home, if you are having...

Nausea

- Take your medications with food, unless otherwise instructed.
- Eat small, frequent meals.
- Call the surgeon's office if it is not relieved.

Constipation

Constipation is a side effect of narcotic pain medications, anesthesia, surgery, and decrease in activity.

- Take a stool softener as ordered.
- Increase the fiber in your diet (e.g., fiber cereal, fiber bars, plenty of fruits and vegetables).
- Drink plenty of water unless restricted by your primary physician or cardiologist.
- If you have not had a bowel movement for two days, please take an over-the-counter laxative (MiraLAX®, magnesium citrate, suppository, etc.). If you still don't have a bowel movement after taking these medications, please contact your surgeon's office.

Swelling and Bruising

- Swelling and bruising after surgery is normal. It will resolve over the first few weeks.

Difficulty Swallowing

Having difficulty swallowing, also called dysphagia, is among the most common and concerning aspects of an Anterior Cervical Decompression and Fusion (ACDF) recovery. Not only is swallowing critical to how the body naturally gets needed nutrients, it also plays an important role in making eating a pleasurable experience. Dysphagia can also be dangerous as it increases the risk of choking. Most ACDF patients fully recover their ability to swallow within a few days after surgery. Sometimes, however, dysphagia lingers for weeks, months or even longer. After ACDF surgery, most patients have a sore throat. To monitor for a potential swallowing problem while in the hospital, patients are started on clear liquids and then progress to soft foods. Here are some tips to help manage dysphagia that lingers after returning home from the hospital:

- Stock up on soft foods. Yogurt, applesauce, creamy soups and other soft foods are good choices during the recovery period when swallowing is still difficult.
- Puree hard foods. Using a food processor or blender to breakdown solid foods such as meat, chicken and veggies is a good way to keep the calorie count up and maintain protein levels. Remember to add enough liquid so the pureed food slides down easily.
- Smoothies. Using a food processor or blender to make a smoothie can be an easy way to get the proper food and nutrients in a fast and efficient manner.
- Use a bendy straw if it helps. Unlike a straight straw, a bendable straw's angle can be altered to conveniently meet the user's mouth to minimize head and neck movements.

If the ability to swallow seems to be getting weaker or if swallowing water is hard or impossible, a doctor should be consulted. Waiting too long to see a doctor could increase the risk of choking.

When to Call the Surgeon

It is relatively common to experience some surgical site pain, as well as some residual arm or leg pain, numbness, or tingling immediately following the surgery, but these symptoms generally improve on a weekly basis.

You should contact the office if:

- You have a temperature greater than 101 degrees.
- You have excessive bloody or odd colored drainage from the incision.
- You have increasing redness around the incision.
- Your pain is not relieved with the appropriate pain medication.
- You have new onset numbness, tingling, or loss of bowel or bladder function.
- You are unable to urinate.
- You have ongoing belly pain or if you have not had a bowel movement for three days.
- You have any side effects from medications prescribed by the surgeon.

For any life-threatening emergencies or symptoms, call 911 to be transported to the nearest emergency room.

Understanding Risks of Surgery

Joint replacement surgery is a highly successful and generally safe procedure. Despite its success, complications can arise. The following are just some of the possible complications associated with joint replacement surgery. It is important that the patient understands these risks. Any questions relating to these risks must be discussed with the surgeon in advance of the surgery.

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ORTHOPEDIC SURGERY & SPORTS MEDICINE

- **Infection**
  Patients will be given antibiotics just before and after the operation. The surgery will be performed in sterile conditions with sterile equipment. Despite this, infections can still arise. Infections can arise from the host, or patients themselves, as in the case of a remote infection that spreads to the joint replaced, from the local environment such as the operating room, patient's room, nursing home or patient's home. The wound site may become red, hot and painful. There may also be a discharge of fluid. This is usually treated with antibiotics, but an operation to wash out the joint may be necessary. In some cases, the implants may be removed and replaced at a later date. The infection can sometimes lead to sepsis (blood infection) during which intravenous antibiotics are required. Infection is a very serious and possibly life threatening complication.

- **Bleeding**
  During any operation, some bleeding is expected. Your surgeon will make every effort to minimize the amount of bleeding during your operation. In some cases, patients may have injury to a nearby artery or vein causing accelerated bleeding, either during or after the surgery. This is also a rare but very serious complication.

- **Acute or Persistent Pain**
  The purpose of having a hip or knee replacement is to reduce the level of pain caused by the arthritis. Acute pain after surgery is common as one heals. Persistent pain past the typical recovery period is rare. It can be due to a variety of reasons discussed in this section or other less common reasons. In some cases the surgeon is unable to discover a definitive reason for the pain or discomfort.

- **Altered Leg Length**
  For those undergoing hip replacements and more rarely knee replacements, the leg that has been operated on may feel shorter or longer than the other. This rarely requires a further operation to correct the difference. More commonly, a shoe lift is worn to address the discrepancy. In rare circumstances, surgery may be necessary to correct the problem.

- **Joint Dislocation**
  Hip replacement patients may experience a dislocation. This is a condition in which the ball or femoral head pops out of its socket. It can be traumatic and painful. Typically, a patient is transferred to the emergency department where the doctor, "reduces" the hip back into place. Most often, the joint can be put back into place without the need for further surgery. Sometimes this is not possible, and an operation is required. This can happen at any time during the lifespan of the hip replacement. In cases of recurrent dislocations, surgery may be necessary to correct the problem.

- **Knee Stiffness**
  This may occur after the operation, especially if the knee is stiff before the surgery. Working on flexion and extension of your new joint may minimize stiffness and reduce pain. Manipulation of the joint (under general anesthetic) may be necessary. Using pain medication so that you can participate properly with physical therapy will minimize stiffness. Poor compliance to the post-operative therapy regimen and pre-surgical stiffness are common reasons for post-surgical stiffness. Persistent stiffness past the general period of recovery is a very common reason for continued knee pain.

Medications to Stop Prior to Surgery

Please inform your surgeon of all the medications you are presently taking — including vitamins and all nutritional supplements. Talk to your doctor about any medicines you take to thin your blood.

Failure to discontinue the medications listed below may result in rescheduling your surgery.

***You must have clearance from your prescribing physician to stop any anticoagulant medication.**

If you have a cardiac stent, do **not** stop taking your medications to prevent clots without first talking to the doctor who put in the stent.

Certain medications need to be stopped **prior** to surgery such as aspirin, Coumadin®, Plavix®, Pradaxa®, Lovenox®, Ticlid®, Xarelto®, Eliquis®, etc.

- Coumadin®
- Plavix®
- Aspirin
- Anti-inflammatory medicines (e.g., ibuprofen, naproxen, Advil®, Aleve®, Motrin®, Relafen®, Mobic®)
- Vitamins and nutritional supplements: (e.g., multivitamins, calcium, vitamin D, St. John's Wort, fish oil, herbal supplements)

If you have any questions, please call the office.

The specific reason for higher infection rates in smokers is not clear, However, there is a glimmer of good news. Dr. Peters indicates nicotine replacement devices such as nicotine gum and patches are not linked to increased infection rates. Your doctor can refer you to smoking cessation programs offered locally.

Just think of how your life may change when you've quit smoking and have had your diseased joint replaced with an implant designed to reduce pain and immobility. You'll have a better chance for a faster recovery, and you could be on your way to a new, much healthier life.

[1] Fact Sheet: Preparing for Joint Replacement Surgery, American Academy of Orthopaedic Surgeons

[2] *Medical Journal of Australia*. 2004; 180 (7): 317-318

[3] *Clinical Orthopedics*. 1999 Oct; 367: 172-180

Alcohol

The AAOS also reports that complications following joint arthroplasty are exponentially related to pre-surgery alcohol use/misuse. Alcohol use increases the risk of infection and poor healing. If possible, minimize your drinking well in advance of your surgery.

If you would like more information on a variety of health-related programs and services, please call the Healthy Living Resource Center located at the Eisenhower Argyros Health Center in La Quinta (760-610-7205). The goal of the Center is to promote healthy lifestyles through education, information, screenings and wellness programs.

Your Surgery

Night Before Surgery

- Review the instructions given to you by the surgical interview nurse.
- Eat a light dinner; nothing to eat or drink past midnight.
- No alcohol or smoking prior to surgery as it interferes with anesthesia, pain medication and the healing process.
- Take a shower using chlorhexidine wash (If not provided, use Safeguard or Dial Soap

Chlorhexidine Wash Instructions:

No one wants an infection. By washing your skin carefully before surgery, you can lower your chances of infection.

For chlorhexidine liquid soap:

- Wash your body and hair with your regular soap and shampoo and rinse off. Do not shave the area where you will be having surgery.
- Turn off the water or step out of the shower and put the chlorhexidine soap all over your body **from the neck down**. Wash gently for five minutes, adding more soap as you wash parts of your body. (Avoid washing your genitals with the chlorhexidine soap.) This soap will not lather like your regular soap. Pay extra attention to the place where you will be having surgery.
- Turn the shower back on and rinse all of the chlorhexidine soap off of your body. Do not use any additional soaps.
- Dry yourself with a clean towel.

After You Use Chlorhexidine Liquid Soap:

- Be sure to put on clean clothes after you use the liquid soap.
- Do not put on lotion, deodorants, creams, powders, or perfumes.

What will the results be?

- You will have fewer germs on your skin, lowering your risk of infection at your surgery site.

What problems could happen?

- Rash, itching, burning

Helpful tips

- Do not shave the area where you will be having surgery.

In Pre-surgery Area

- You will be cared for by a registered nurse.
- You will change into a surgical gown and be given a pair of socks, a soft blue hat and a warm blanket.
- An intravenous (IV) line with fluids will be started by your nurse.
- All consents, paperwork and lab results will be reviewed with you by your nurse.
- You will be asked several routine screening questions — these are safety checks.
- Your nurse will administer any medications ordered by your surgeon.
- You will meet the following members of the surgical team:

  Your **anesthesiologist** will review your medical and surgical history, your medications and allergies to determine the best type of anesthesia for you; you will then sign a consent.

  Your **Pain Management Team** (an anesthesiologist and registered nurse) will discuss with you the most appropriate way to manage your post-surgical pain.

- Your family will be able to visit with you in this area.
- Your stay in the pre-surgery area may be 90 minutes to two hours.

Dr Ahmad will answer your questions & give you the prescriptions if needed.

B-O-N-E-S

Blood Thinner

You will take a blood thinner after surgery, both while being in the hospital and when you go home. It is very important to take this medication as prescribed.

usually Ecotrin or Aspirin

On a Bowel Regimen

Pain medications can cause constipation. You will need to ensure you are staying regular, both in the hospital and when you go home. You may need to take over the counter bowel medications to maintain regularity.

use metamucil or mineral oil

Need for Pain Control

You will need to establish your pain goal after surgery. Identify what you have done/taken in the past that has worked well for your pain management and let staff know. We will use pain medications, ice, ambulation and repositioning to keep you comfortable. If you are hurting, please let the nursing staff know so they can take measures to make you more comfortable.

you will not eliminate post-op pain with medications. The goal is to make the pain tolerable during the recovery

Exit Plan

Identify your plan for help when you go home. Who will stay with you after surgery? Ensure you have a walker prior to arriving at the hospital for your surgery.

Stay Active

After your surgery, please continue to be active at home. Walking several times daily is important to your recovery. Movement helps prevent blood clots, reduces pain and promotes healing and motion of your new joint.

Managing Pain without Medicine

Below is a list of suggestions to help manage your post-surgical pain. They are to be used in conjunction with the pain medication recommended by your surgeon.

- Move every one hour to 90 minutes. For 2-3 minutes
- Change your position frequently.
- Use cold therapy to help reduce pain and swelling.
- Elevate your leg above your heart to reduce swelling.
- Practice meditation.
- Loosen Bandages if they feel tight
- Allow distractions.
- Practice relaxation.

Pain Management at Home

Your surgeon will decide at the time of your discharge the medication you will require at home.

It is important to continue with the following:

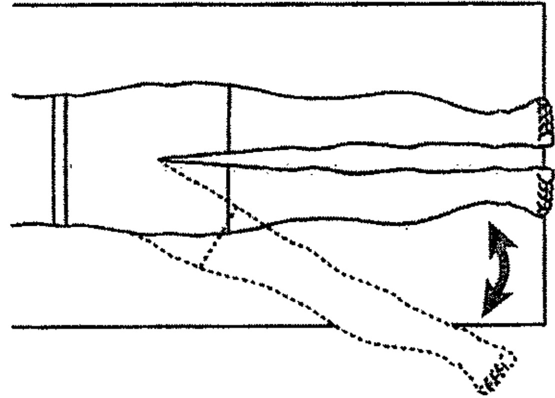
- Keep your pain manageable.
- Take your medication as stated on the label.
- Use ICE.
- Change your position every one hour to 90 minutes.
- Elevate your leg above your heart.
- Use your walker until your physical therapist advances you to a cane.

If your pain is preventing you from normal daily activities after doing all of the above, call the surgeon's office.

Leg Sweeps

- Lie on back on firm surface, legs together.
- Move leg out to side, keeping knee straight.
- Return to starting position.
- Repeat with the other leg.

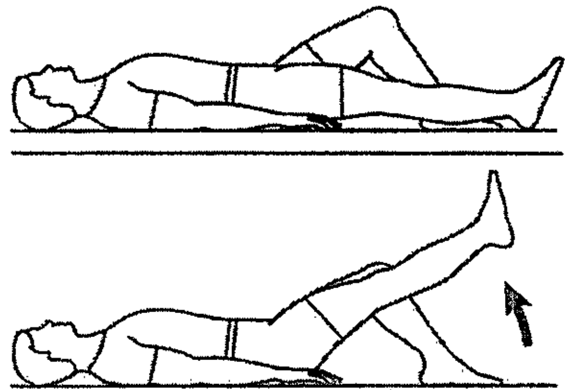
Perform 1 set of 10 repetitions, three times a day.



Straight Leg Raise

- Lie on back with uninvolved knee bent as shown.
- Raise straight leg to thigh level of bent leg.
- Return to starting position.
- Repeat with other leg.

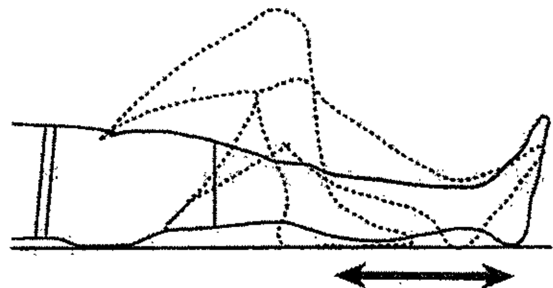
Perform 1 set of 10 repetitions, three times a day.



Heel Slides

- Lie on back with legs straight.
- Slide heel up to buttocks.
- Return to starting position.
- Repeat with other leg.

Perform 1 set of 10 repetitions, three times a day.



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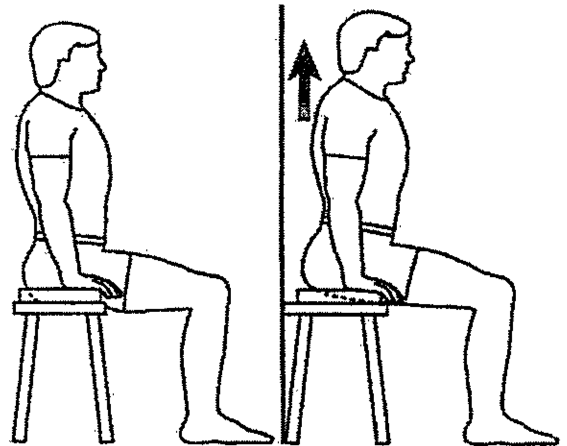
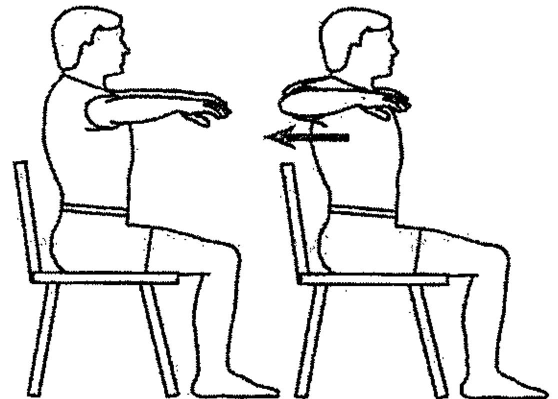
Seated Pushups



- Seated pushups
- Sit on a firm surface, with arms at side.
- Push downward with both hands on the arms of the chair, lifting your buttocks off of the chair.
- Slowly, return to start position.

Perform 1 set of 10 repetitions, twice a day.

Shoulder Blade Squeezes

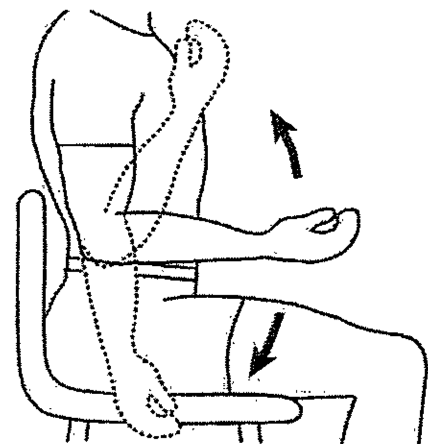


- Sit in chair or upright in bed.
- Raise arms to shoulder height, out to sides, elbows bent.
- Squeeze shoulder blades together, and relax.

Special Instructions:
Keep elbows bent.

Perform 1 set of 10 repetitions, twice a day.

Bicep Curls



- Sit in chair or upright in bed.
- Begin with arm at side, elbow straight, palm up.
- Bend elbow upward.
- Return to starting position.

Special Instructions:
May use weights with these bicep curls.

Perform 1 set of 10 repetitions, twice a day.
Hold exercise for 5 seconds.

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When to Call the Surgeon

- You have a temperature greater than 101 degrees.
- You have excessive bloody or odd colored drainage from the incision.
- You have increasing redness around the incision.
- You have increasing thigh, calf and/or ankle swelling not relieved with frequent elevation.
- Your pain is not relieved with the appropriate pain medication.
- You have any side effects from medications prescribed by the surgeon.

For any life-threatening emergencies or symptoms, call 911 to be transported to the nearest emergency room.

Frequently Asked Questions

Why is my knee warm?

- This is a normal response to the surgery and implant.
- We recommend cold therapy.

Why is there swelling?

- Swelling is a normal response to the surgery.
- Excessive swelling can be painful and slow the healing process. We recommend frequent elevation above your heart and cold therapy.

Can I get the incision wet?

- You will be instructed at the time of your discharge if/when you can get the incision wet. Usually, remove the bandage at the 7-10 day mark after surgery.

Can I kneel on my new knee?

- NO It may not feel very comfortable.

Do I have to protect the position of my new hip?

- Your physical therapist and nurse will instruct you after surgery on any restrictions placed upon you.

When can I drive?

- You are not using any narcotics during the day.
- Your use of a cane or walker is minimal.
- Generally at three weeks or as instructed by your surgeon.

When can I golf?

- Your surgeon will determine at your follow-up visit.
- Generally at 12 weeks or as directed by your surgeon.

When can I play tennis?

- Your surgeon will determine at your follow-up visit.
- Generally at four to six weeks you may start to hit the ball.
- At about 12 weeks you should feel comfortable moving around the court.

When can I resume sexual activity?

- Your surgeon will determine at your follow-up visit.