Scoliosis Surgery: Information for Patients & Families

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**Introduction**

This booklet will help you and your family to get ready for scoliosis surgery and your hospital stay. Having scoliosis surgery is a big deal and it’s normal to have many questions and concerns. We are here to help.

**General Information about Surgery for Scoliosis**

Why surgery?

The main reasons for this operation are to stop your scoliosis from getting worse and to improve the appearance of your back. The surgery will likely improve what you look like, but it is important to have realistic expectations. Your back will look better, but not perfect. If you have breathing problems, some kinds of scoliosis surgeries can help your lungs expand, making breathing easier.

How much better?

Surgery can usually correct at least half of the scoliosis. For example, if the scoliosis curve is 60° before the operation, the remaining curve size may be about 30° or less after the surgery. The amount of correction you get is different for each person. Correction depends on several factors such as: flexibility of the curve, location of the curve, severity of the curve, type of scoliosis, other health conditions, and your age.

These before and after x-rays show a very good correction.
Surgical treatment options

It is important to understand what type of surgery is planned for you. You, your family and your surgeon should discuss the options available to you and the likely results for your particular case, as each person is different.

Posterior spinal instrumentation and fusion

This is the most common type of surgery for scoliosis. The patient lies on his or her stomach and the incision is made down the patient’s back to expose the spine. The surgeon will choose the instrumentation best suited to the particular patient. This may include a combination of pedicle screws, hooks and rods. Pedicle screws are placed in the vertebrae from the back of the spine. The screws or hooks grab into the bone of the vertebra, getting a solid hold on the vertebra. Once the screws and/or hooks are in place they attach to metal rods that connect all the instrumentation together. A stiff metal frame is formed when everything is bolted together and tightened. The spine is held in this corrected shape while healing occurs. Bone graft is then placed around the instrumentation on the back of the vertebrae. The instrumentation is made out of rigid titanium or cobalt chrome.

Fusion or Bone Graft

In this procedure, the surface of the vertebra is roughened and small pieces of bone are placed between the vertebrae. This stimulates bone growth between the vertebrae that “fuses” the spine in place when healed. Fusion of the spine usually takes about one year. Bone graft can come from: bones from the patient (vertebra, rib), donated bone (allograft) and synthetic bone substitutes.

Anterior Surgery

This type of surgery is done through the patient’s side, approaching the spine from the front (the anterior), rather than the back. The anterior approach allows the surgeons to remove discs, release ligaments and/or place corrective spinal instrumentation. Sometimes, the anterior
approach surgery is done first, then the posterior fusion is done a week or more later. This allows for better correction of the spine in more severe cases.

Traction

In scoliosis surgery, “traction” means pulling on the body to help straighten the spine. This can be done before, during or after an operation for scoliosis.

Procedures for Growing Children

VEPTR Procedure
(Vertical Expandable Prosthetic Titanium Rib)

This device attaches to the ribs or spine in an up and down position. It can be made longer as the child grows allowing the lungs to grow and the spine to become straighter. This procedure is indicated for some children with early-onset spinal deformity and who are at risk of developing breathing difficulties. The VEPTR is adjusted every six months so the rib cage can continue to expand. This usually requires many minor surgeries until the child is nearly full grown.

Growing Rods & MAGEC Rods

Growing rods are a potential surgical option for young children with scoliosis. Metal instrumentation including hooks/screws and rods are attached to the spine through one or two incisions in the back. As the child grows, the rods are expanded to keep the spine growing. Traditional growing rods are expanded through a minor surgery every 6 months. MAGEC rods are expanded in the clinic setting using a magnetic machine placed on the child’s back.
Success and potential problems

The success rate of scoliosis surgery is very high and the rate of complications is very low; however, problems can occur with any surgery. It is important to understand the potential risks, even if the chance of any of them occurring is low. The following is a list of potential problems that can occur with scoliosis surgery:

- **Neurological injury** - damage to the spinal cord or nerves that can cause loss of feeling or movements including loss of movement of the legs. This can be temporary or permanent and is extremely rare.
- **Infection** - this can occur early or late in the post-operative period
- **Instrumentation-related loosening or breaking of the instrumentation**
- **Visual loss** - from pressure on the eye nerves during surgery - exceedingly rare
- **Excessive bleeding** - blood transfusion may be necessary
- **Breathing problems**

Please discuss all potential risks with your surgeon.

Surgery - Getting Prepared
You and your family need to know:

- Why you are having surgery for scoliosis - what are your goals?
- What type of surgery you are having
- What are the risks involved
- What amount of correction is expected
- What other options do you have
- What would be expected if you decide not to have the surgery

These are all things that need to be discussed with the orthopedic surgeon. You may find it helpful to write down your questions you have before you meet with your surgeon, so that you can make sure you get all your questions answered.

Regular Medications
If you take regular medications, this should be discussed with your surgeon well in advance of your surgery, as certain medications may need to be stopped prior to surgery. Be sure to inform your surgeon if you take medications that thin your blood such as anti-inflammatories (Advil). Some herbal remedies have also been shown to increase the risk of bleeding in surgery. These include: garlic, ginkgo and ginseng. These should be stopped at least 2 weeks prior to surgery.

Pre-Operative Evaluations
Before surgery you will have x-rays taken of your back. You and your family should discuss these x-rays with your surgeon so you know the type and severity of curve you have. You may also need other tests done such as an MRI or CT scan. After your surgery is completed, you will have more x-rays to compare changes due to surgery.
Pre-Operative Nutrition
It is important to have optimal nutrition for scoliosis surgery. Having a healthy diet for several months before and after surgery will help your healing and prevent complications. Calcium and Vitamin D are needed to help the bones heal. Protein and iron are also very important for wound healing. Speak with your family doctor, pediatrician, or see a nutritionist for advice.

Other Sources of Information
Patients and parents may find it helpful to speak with other patients and parents who have gone through scoliosis surgery. If you would like to be linked with another parent or patient, please ask the clinic coordinator or Nurse Practitioner.

The Internet is a vast source of information; some is reliable but some is not. Some web sites that we recommend are:

- The Scoliosis Research Society-
  http://www.srs.org/patients-and-families
- Scoliosis Alberta- local information and videos
  http://www.scoliosisalberta.ca
- iScoliosis website for teens
  http://www.iscoliosis.com
- The National Scoliosis Foundation
  http://www.scoliosis.org
- The Hospital for Sick Children-
  search scoliosis
  http://www.aboutkidshealth.ca

Your Scoliosis Health Care Team

While you are going through surgery and hospitalization, many health care professionals will work as a team to provide you with the best care possible.

- Orthopedic Surgeon- the doctor who performs the surgery and is the team leader, supervises medical learners such as resident physicians
- Anesthesiologists- the doctors in the operating room who help you to sleep and monitor you throughout the surgery
- Neuromonitoring specialists- their job is to monitor your spinal cord, nerves and muscles during the surgery to avoid potential problems
- Pediatric doctors- may see you for various health conditions to help your recovery
- Nurse Practitioner (NP)- a nurse with advanced education who specializes in pediatric scoliosis
- Nurses- will care for you throughout your hospital stay
- Physiotherapists- will assist you to do exercises to regain your movements
- Occupational Therapists- will help make sure you can do regular activities such as dressing and bathing, and arrange for equipment at home if needed
- Acute Pain Service- a team that will help with pain management after surgery
- Child life therapist- a person who can help you cope with procedures and make your stay more enjoyable
• Other healthcare professionals such as dietitians, respiratory therapists, and social workers are available if needed

Pre-Admission Clinic Visit

You will come to the pre-admission clinic at the University of Alberta Hospital (Stollery Children’s Hospital) within a month of surgery. This appointment can take several hours, so bring a snack and some activities to keep you busy. At the pre-admission clinic, you will meet several people who will help prepare you for surgery:

• Be sure to bring a current list of all medications and supplements you are taking.
• The clinic nurses will go through your health history and record your height, weight and vital signs.
• The nurses and Child Life Specialist will explain how to prepare for surgery and about what to expect before and after surgery.
• Pre-surgery tests like x-rays and blood work will be completed as needed.
• An anesthesiologist will meet with you. Be sure to let them know about any past illnesses or surgeries you have had and any allergies you have.
• A physiotherapist will teach you how to begin rolling in bed, how to get up and down after surgery and how to do breathing exercises.

Getting ready the day before surgery

• You will be provided with special soap in the Pre-Admission Clinic. The night before your surgery, scrub your back and wash your hair with the special soap. The morning of your surgery, wash your back again with the special soap.
• Do not eat or drink anything after midnight the night before your surgery.
• If you have long hair, it’s a good idea to part your hair down the middle and secure it at the sides in pony-tails or braids.
• All jewelry and nail polish must be removed before surgery.

Surgery Day

What to Bring

• Your own pillow, slippers, housecoat and favorite stuffed toy or blanket
• Toiletry items: toothbrush & paste, hairbrush, shampoo, lotion, etc.
• One comfortable outfit to wear home (loose sweatpants, tee-shirt, sweatshirt)
• Activities such as reading material, hand-held games, music player with earphones.
Admitting
On the day of your surgery you will register at either the Pre-Admission Clinic (before 6:15am) or the Admitting Department (after 6:15am). Your parent or guardian will fill out some forms and then you will go the pre-operative area where you will get changed into a hospital gown and get prepared for surgery. The nurse there will put some cream on your hand and cover it with a sticker.

Surgery

The operating room will have lots of equipment and many people all getting ready to look after you during your surgery. You will be sleeping during the operation and wake up when it’s all finished. You will wake up in a different room called the Recovery Room. In the Recovery Room, you will be closely monitored and may be given medication as you wake up from your surgery. You will be asked several times to wiggle your fingers and toes.

Scoliosis surgery usually takes several hours. Parents should stay in the hospital or be available by cell phone throughout the surgery. Parents can wait in the Family Room (4H2.02), or any of the many waiting rooms on the units. A member of the surgical team or your surgeon will contact your parents when the surgery is complete.

Your hospital stay

The hospital address is:
Stollery Children's Hospital
8440 - 112 Street
Edmonton, Alberta
T6G 2B7
Ph: (780) 407-8822

The Stollery Children’s Hospital and the University of Alberta Hospital are in the same building – the Walter C. Mackenzie Centre.

For general information about the Stollery, please refer to the booklet *Stollery: Guide to Services for Patient and Families* or the AHS website: [www.albertahealthservices.ca](http://www.albertahealthservices.ca)

The first few days

After scoliosis surgery, most patients go to unit 4D and stay for the first 24-48 hours in a special observation room called the ICE room. ICE stands for Intermediate Care Environment, but don’t worry, it’s not cold in the ICE room! In the ICE room, you will be closely monitored and checked. The nurses will help you to turn in bed every 2 hours. This is very important to avoid complications like skin sores, blood clots, and breathing problems. One parent or guardian can stay with you overnight in a little bed beside your bed.
When you wake up, you will have stickers and wires on you attached to machines that monitor you closely. You may have tubes such as a catheter to drain your bladder, a drain to remove excess fluid from your back, and an IV to give you fluid and medication. You will likely have small plastic tubes in your nostrils to give you extra oxygen. The nurses will help you to turn from your back to your sides every two hours.

On the first day after your surgery, you will be assisted to sit on the side of your bed. You will move your feet and do deep breathing exercises frequently. These will help your body recover faster.

We will help you get standing and walking as soon as you are ready. At first, this will be difficult, but don’t worry, we will help you and it will get easier every day. You will be able to start eating and drinking small amounts after surgery. You will have a big bandage covering the incision on your back that will be changed by the nurses.

Day 3 to Discharge

During the rest of your hospital stay, you will progress to walking longer distances and going up and down stairs. As you recover, you will be able to eat more and do more, but it takes time. We will ensure you are able to do all the things you need to do for yourself such as getting in and out of bed, on and off the toilet, and in and out of the shower, before you go home.

The Child Life staff can provide fun activities to keep you occupied while you’re in the hospital. When you are feeling up to it, you can go to the playroom or Teen Room and use the toys, games and computers. Wi-Fi Internet is available on unit 4D, ask any staff if you need help connecting.

Usually the length of hospital stay for scoliosis surgery is only 4 to 7 days. If your stay is longer, the Stollery has two classrooms with teachers to help you keep up with schoolwork.

All your drains and tubes will be removed before you go home. We will know you’re ready to go home when you can eat and drink, walk, and take your pain medication by mouth.

How parents can help

- Reassure and comfort your child- just being there is comforting for them, holding their hand or doing whatever your child finds soothing.
- Help to make sure your child uses the incentive spirometer 10 times every hour while they are awake to expand their lungs.
- Get drinks and snacks from the patient kitchen once your nurse says it’s okay.
- After being shown by the nurses, you can help your child roll over in bed and find a position of comfort with pillows placed behind their back and between their knees.
• Help provide basic hygiene needs such as washing your child’s face, combing their hair and brushing their teeth.
• Once your child is walking, you can help them to have a shower. Ask your nurse for assistance.
• Be an advocate for your child and help ensure your child is provided rest and quiet time when needed.
• Encourage your child for their progress and stay positive. This surgery is physically, mentally and emotionally draining. Small improvements are important to recognize.
• Take care of yourself. Recognize that you need food, rest and breaks sometimes too in order to be a good support for your child.

Post-Operative Issues after Scoliosis Surgery

Numbness & Tingling

After scoliosis surgery, you may feel some numbness or tingling (pins and needles) on your back, sides or down your legs. Your nurses will test your sensation (feeling) and movements all over your body after surgery. Be sure to tell your doctor or nurse if any place on your body feels funny or different. This usually resolves with time but sometimes medications are needed to help.

Pain

There is no doubt that scoliosis surgery can be painful. Pain can come from the re-aligning of the shape of your body and from the surgical incision. You will be given medication for pain before, during and after your operation. Tell your nurse if you are having pain. The Acute Pain Service (APS) is a specialized team of doctors and nurses who will work with you and your nurses to help manage your pain. We will give you different types of pain medication that will work together to try and make you comfortable. At first, you will likely have a button to push that’s connected to a machine that gives you pain medication through your IV when you need it. This is called a PCA or Patient-Controlled Analgesia. A PCA pump is programmed to provide you with a safe dose of pain medication; you cannot give yourself an overdose by pushing the button too much. You can discuss whether you will use the PCA with your doctors and nurses before the surgery.

FACES Pain Scale

The nurses will ask you to rate the amount of pain you feel using a number scale from 0-10 or face pictures. A score of “0” means no pain and “10” would be the worst pain ever. It also helps
to tell your nurses how the pain feels (e.g. dull or sharp, aching or stabbing). This helps us know if we need to adjust your medicine.

Other things that can help with pain after scoliosis surgery include repositioning your body, walking, warm blankets on your back and keeping your mind focused on other things like listening to music or watching TV. Although initially you will feel stiff and sore when you move, the more you move, the easier it will get.

**Nausea, Dizziness & Itchiness**

Tell your nurse if you feel sick to your stomach, dizzy or itchy as these are are all common after spine surgery. Your nurse can give you medicine to help these feelings get better. These problems can be from anesthetics given in surgery, medications given after surgery, or the surgery itself. Although it is difficult at first, the more you walk around, or are up in a chair, the faster you will start feeling better!

**Going to the Bathroom**

When you are asleep in surgery, a nurse will put a urinary catheter in your bladder. When you wake up, you will feel the tube taped to your leg. This will empty your bladder so you will not have to get up and walk to the bathroom right away. When you can walk to the bathroom, your catheter will be taken out. Sometimes when the catheter is first taken out, it can be difficult to pee or you might pee without realizing it. These issues usually get better within a few days as your bladder muscles get strong again.

Constipation (difficulty or inability to have a bowel movement) is common after scoliosis surgery. Constipation is a side effect of some of the medications you take for pain, as well as from not moving around much initially after surgery. Stool softeners and laxatives will be prescribed if needed. It is important to drink a lot of fluids and to walk to make this better. Tell your nurse if you have not had a bowel movement within 3-4 days after surgery. Chewing sugar-free gum can also help start your bowels moving.

**Going home**

Upon discharge, you will be given prescriptions if needed for medication to take at home. Discuss these medications with your NP, pharmacist or physician. You will require a follow-up appointment at the Scoliosis Clinic 4-6 weeks after surgery. Please contact the clinic or speak to the NP about arranging this.

**Caring for your incision**

Your incision will be stitched on the inside with dissolvable stitches. Once your incision is dry (no fluid coming out), you do not need to keep it covered with a gauze dressing. If you’re still using a dressing, it should be changed every day or if it’s coming loose. You will have little pieces of special tape called “Steristrips” on your incision. The Steristrips should be left on as
long as possible to minimize the size of the scar. Once the Steristrips fall off, it is common to find clear threads coming from the incision. These can simply be trimmed off level with your skin with small scissors.

You can have a shower once you are home; just make sure someone is home with you as you might feel dizzy or faint. Do not soak in a bath or go swimming until the scabs and Steristrips have all fallen off your back. You do not need to put anything on your incision. It is important to protect your incision from sunlight for it to heal properly. Use strong sunscreen, or wear a tee-shirt when you’re out in the sun for one year.

While your incision is healing, it is important to have someone check your incision for any signs of infection. **An infection may appear red, swollen, have pus draining out, open up or have increased pain. Please contact your surgeon or NP right away if this occurs.**

**Pain**

Take your pain medications as prescribed. Your pain should get less and less and you can take the pain medications only when needed. Most patients no longer require prescription pain medication after about 2 weeks. Regular Tylenol can be used as well. You **SHOULD NOT** take anti-inflammatory medication (Ibuprofen, Advil, Motrin) after scoliosis surgery for 6-12 months. This can interfere with the bone graft formation.

**Going back to school**

You can start going back to school after a few weeks, or whenever you feel up to it. You may want to start going half-days at first until you re-gain enough energy to last the whole day. Since you cannot carry a heavy backpack, it’s a good idea to get two sets of books: one for at home and one for at school. If your school has busy hallways, it’s also a good idea to leave class about 10 minutes early to avoid getting bumped in the hallway and to give yourself extra time. While sitting in class, you may feel the need to change position often or get up and walk around. Ask your teacher if you can sit at the back of the class so that you do not disturb other students.

**Eating Well**

It may take a few weeks to regain your regular appetite. It is important to eat nutritious foods so that you have energy to do things and heal well. You may get constipated as a result of pain medication and not moving around as much as you normally did. Be sure to drink plenty of fluids and eat high fiber foods like fruits and whole grains to help keep your bowels moving. If you are having trouble with regular bowel movements, speak with your NP or pharmacist. Foods high in iron such as red meat and green vegetables are good to help raise the level of iron in your blood.
Activities

- When you first go home, you will be very tired and likely need a lot of rest periods. Be as active as you can be but rest when you feel tired.
- Your energy will come back slowly and you will be able to do more. After about 2 months you should have all your old energy back.
- Avoid extreme movements in which you twist or bend.
- Avoid lifting any more than light objects (no more than 5 pounds or 2 kilograms) for the first 3 months.
- Walking is permitted right away, but other activities need to be resumed slowly.
- No contact sports are allowed for one full year. Non-contact sports can be resumed after 3-6 months.
- Please refer to your surgeon’s specific instructions about when to resume different activities.

Exercises

It is important to try to relax and enjoy moving around when you go home. Do these exercises once or twice a day for the first month when you get home:
A video of these exercises is posted at www.scoliosisalberta.ca under Scoliosis Podcasts→Surgery→Post-Operative Exercises at Home

1. Sitting in a chair:
   Neck Exercises
   a) turn head to the left and right- 5 times each direction
   b) tilt head to the left and right- 5 times each direction
   c) make half circle with head down- 5 times

   Shoulders Exercises
   a) shrug shoulders up and down (emphasizing down)- 5 times
   b) move shoulders forward and back (emphasizing back)- 5 times
   c) make circles with shoulders forward and back (emphasizing back)-5 times

2. Standing:
   a) stand with your back against the wall, heels 3 inches from the wall
      - stand tall with shoulders back and down
      - breathe normally
      - use a mirror to help see if you are standing with good posture
   b) relax knees and tilt pelvis
   c) tuck chin in and aim to touch the back of the neck to the wall

3. Do neck and shoulder exercises standing up.

4. Aim to walk about making proper posture a habit.
**Children with Special Needs**

Many children with underlying health conditions such as cerebral palsy and neuromuscular conditions will require surgery for scoliosis. Scoliosis can progress quickly and become severe in children with these types of conditions.

The goals of scoliosis surgery for patients with neuromuscular disease include:

1. Correct, stabilize and prevent progression of the curve
2. Prevent long-term complications of severe scoliosis such as breathing and heart problems
3. Assist in seating positioning

**Hospitalization & Rehabilitation**

Each child is different, but the average time in hospital is 1-2 weeks after scoliosis surgery for children with neuromuscular conditions. Children with underlying conditions will often need to be admitted to the Pediatric Intensive Care Unit (PICU) after scoliosis surgery. Initially after the surgery, the nurses will turn the child in bed every 2 hours to prevent pressure sores. Our physiotherapists will start bed range-of-motion exercises as soon as the child is ready. Please check with our physiotherapists before starting any stretches or exercises in the hospital that you normally did at home prior to surgery. If the child is able to, we will also have them do breathing exercises with an incentive spirometer to prevent a chest infection.

The goals of rehabilitation are to regain strength and abilities that the child could do previously. It is normal to have fatigue, loss of muscle strength and pain after this surgery. For children with underlying medical conditions, it can be more challenging to regain skills they had prior to surgery. Some children require more time to regain these skills, so rehabilitation at the Glenrose Hospital for a few weeks after surgery may be helpful. Please ask your surgeon if they anticipate your child will require rehab at the Glenrose so this can be arranged.

**What to Bring**

Please bring a current list of your child's medications with you. If your child uses a breathing apparatus (C-PAP, BIPAP) please bring this with you as well. Also bring any mobility aids your child uses such as a wheelchair and/or AFO's. There are TVs at each bedside, but you can also bring special toys, music, and activities your child enjoys.

**Seating & Transfers**

As soon as the child is ready, we will help them get up to sit in a chair. We will use a mechanical lift when needed to assist with transfers. It is often difficult to sit upright.
and for long periods of time after scoliosis surgery. A reclining or tilting chair is often useful in the initial recovery period. After scoliosis surgery, the child’s wheelchair may require modifications in the cushions, lateral and head supports due to the significant change in body shape. The technique for transferring your child may need to be modified. Our physiotherapists and occupational therapists will work with you to ensure you are able to safely transfer your child prior to discharge home. Please contact your seating clinic for an appointment if wheelchair modifications are needed about 6 weeks after surgery.

**Assistive Devices**
While you are in the hospital, our occupational therapists and physiotherapists will work with your child to determine if any assistive devices will be required at home. Equipment such as a bath seats can be borrowed from local organizations on a temporary basis if needed.

**Wound Care**
Your child will have a long incision down the middle of their back. This will be closed with dissolvable stitches. The incision will be then taped with Steristrips and covered with a gauze dressing. While you are in the hospital the nurses will clean the wound and replace the dressing as needed. It is very important for the wound to stay clean of urine and stool. If the child is incontinent, it is important to protect the wound with an occlusive dressing until it is healed to prevent infection. The child is allowed to start having showers 4 days after surgery but should wait until the Steristrips have all fallen off and the wound is healed before having a tub bath. Sometimes dressing changes are still needed after you go home. If this is the case, we can arrange for a homecare nurse to come to your home. If there are any signs of infection (pus, opening of the incision, fever, swelling) please call your surgeon or Nurse Practitioner.

**Activities**
After scoliosis surgery, all children experience pain and fatigue for at least one month. Pain medications are typically needed for 2-4 weeks after this surgery. Typically about one month is needed off school before the child feels up to spending the whole day out of the house.
**When to Contact Us**

After reading this booklet, if you have any questions please call or email Sarah Southon, the Nurse Practitioner. After you go home, if you experience any of the following problems, please contact your NP or surgeon’s office right away:

1. Fevers or unusual sweating
2. Your incision looks red, more swollen, opens up or drains more fluid
3. Increased pain not relieved by your prescription
4. You have a fall or an accident and are concerned you may have hurt your back
5. You feel or see a lump or a change in your back

If you develop other symptoms, such as cough, urinary tract infection, vomiting, or other symptoms unrelated to your back, you can see your family doctor or pediatrician.

**Contact Information**

Scoliosis Clinics:
Stollery- (780) 407-3931
Glenrose- (780) 735-7999 extension 15281

Nurse Practitioner:
Sarah Southon
Email sarah.southon@ahs.ca
Phone (780) 407-1560
Pager (780) 445-5441

Orthopedic surgeons:
Dr Huang (587) 773-9362
Dr Moreau (780) 407-3317
Dr Mahood (780) 732-3713
Glossary

**Blood transfusion**- giving blood or blood products to correct a low blood count. The blood may be donated from a volunteer donor or from the patient him/herself (autologous).

**Bone graft**- small bone chips (taken either from the patient, from the bone bank (donated) or made synthetically) that are placed on other bones to cause fusion (joining) of bones.

**Chest tube**- a flexible tube that drains blood, fluid and air from the lining of the lungs and helps re-expand the lungs.

**CT (computerized axial tomography) scan**- uses high-powered x-rays to make a detailed picture of the inside of the body.

**Disc**- flat, round disc made up of cartilage that acts as a cushion between vertebrae.

**Hemovac drain**- a small flexible tube with a collection chamber that is put in during surgery to drain excess blood and fluid from the surgical site.

**ICE (Intermediate Care Environment) Room**- a hospital room in which the patients are closely monitored for the first day or two after surgery.

**Incentive Spirometer**- a device to encourage slow sustained deep breaths to help open small areas of the lungs after surgery.

**Intravenous (IV)**- a small tube placed inside a vein to give fluids, medications or nutrition directly into the blood stream.

**MRI - Magnetic Resonance Imaging**- a machine that uses a large magnet, radio waves and a computer to scan the body and make detailed pictures of the inside of the body.

**Monitor**- a computerized machine that is attached to the patient by wires (leads) which displays vital functions such as heart beats and breathing rates.

**Neuromonitoring**- a combination of tests used to assess the functioning of the spinal cord, nerves and muscles during spinal surgery. Small wires are attached to the patient and information is transferred to a computer.
**PCA (Patient-Controlled Analgesia) Pump** - a machine that delivers medication for pain through an IV line. When the patient needs pain medication, he or she pushes the button attached to the pump and the medication is given directly into the IV. The pump is programmed to only provide a certain maximum dose (for safety).

**Pedicle** - part of the spinal vertebrae that projects backward from the body of the vertebrae and forms part of the outer shell of bone around the spinal cord.

**Spinal fusion** - a surgical procedure in which small fragments of bone are laid down between roughened surfaces of spinal bones. Bone growth is stimulated and new bone “fuses” with the existing bone, keeping the instrumentation in place.

**Spinal instrumentation** - a combination of crosslinks, rods, hooks, wires, and screws that are attached to the spine. The spinal instrumentation holds the corrected spine in place until fusion is complete.

**Urinary catheter** - a small tube put in the bladder that drains urine into a bag.