Ann & Robert H. Lurie
Children's Hospital of Chicago®

Preparing for Periacetabular Osteotomy (PAO) Surgery

A Guide for Patients and Families

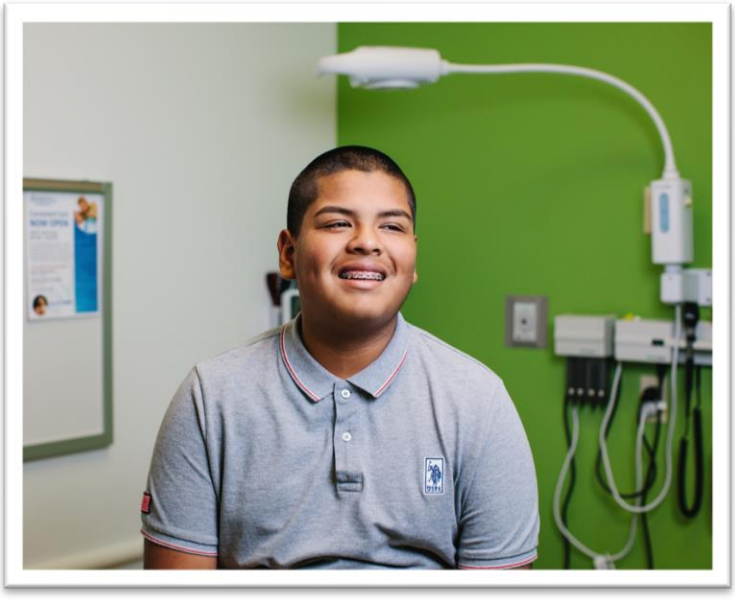
The Division of Orthopaedic Surgery & Sports Medicine

Table of Contents

A Guide for Patients and Families

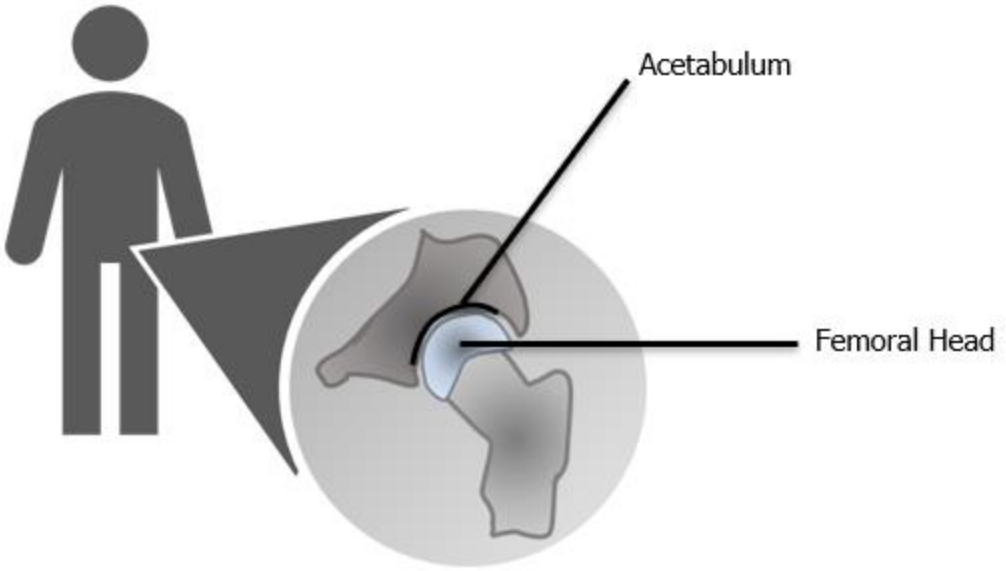
What is a PAO?

A Periacetabular Osteotomy (PAO) is a surgery used to correct a condition called *hip dysplasia*. Hip dysplasia is when the hip socket, or *acetabulum*, is too shallow to provide proper support for the femoral head during walking and running. During a PAO, the acetabulum is moved so that it covers more of the femoral head in order to improve the stability of the hip joint. The goal in the near term of the PAO surgery is to improve hip function and decrease hip pain. It also decreases damage inside the joint that may lead to hip arthritis over time. The PAO keeps the stability of the pelvis, but allows precise correction of even severe dysplasia.



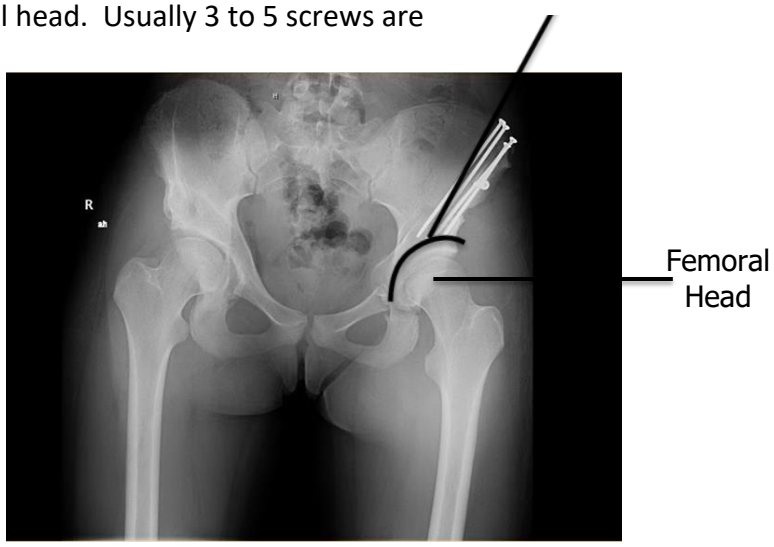
The Hip Joint

The hip is a ball-and-socket joint made of bone that connects the top of the leg to the trunk of the body. The ball is also called the *femoral head*, and it sits at the top of the thigh bone. The femoral head fits into a socket which is called the *acetabulum*. The acetabulum supports and protects the femoral head, which allows the leg to move freely.



How is a PAO performed?

The pelvis will be cut around the acetabulum during surgery. The acetabulum will then be shifted so that it better covers the femoral head. Usually 3 to 5 screws are used to hold the acetabulum in its new position. Over time, new bone will grow where the cuts were made, fusing the corrected acetabulum to the rest of the pelvis.



Sometimes added repairs or procedures are done to the hip joint at the same time as the PAO. For example, a hip *arthroscopy* may be done. This uses a special scope to see the inside of the joint, and also allows a repair to be made if needed. Other repairs may include an *arthrotomy* (to fix any damage to the rim of the joint) and a *proximal femoral osteotomy* (to correct the upper part of the femur).

Finally, between 9-12 months after the PAO, the screws that were used to hold the bone in place are typically removed during a brief outpatient procedure. Once the PAO has been done, the femoral head

and acetabulum are in proper position, and are better lined up. Now the cartilage, a soft tissue that is on the inside of the joint, can handle the pressure created from using the hip joint in normal activities.

PAO and You

The Division of Orthopaedic Surgery and Sports Medicine at Ann & Robert H. Lurie Children's Hospital of Chicago has expertise in the diagnosis and treatment of hip disorders. You may schedule an appointment with us to discuss even the most complex hip problems. The Division of Orthopaedic Surgery and Sports Medicine, Departments of Nursing, Pain Management, Physical Therapy, Radiology and Anesthesia work closely together as a team.

Our goal is to provide treatment programs that relieve present symptoms and strive to keep the hip working well. We provide direct patient care, and are also active in teaching and research for hip related disorders. In patients who, along with their doctor, choose PAO to treat their hip dysplasia, we expect that their pain and function will be improved by the surgery for a number of years and, hopefully, for a lifetime. In all cases, the decision-making process is one of open and honest communication between the doctor and the patient.

Preparing for Surgery

Preoperative (before surgery) Appointment

A preoperative clinic appointment will be needed before surgery. This is a meeting in clinic for you and your parents to ask questions about the procedure and recovery. We will also go over the instructions received in the surgery folder and review your health history, including all medicines that you take. In addition, you will be examined and any radiographic imaging (X- ray, CT scan, MRI) that may be needed before surgery will be arranged.

Checklists

Before the date of the surgery, you must do the following:

- ☐ Have a preoperative History & Physical (exam) by your pediatrician/primary care provider within 30 days before surgery
- ☐ Get clearance letters (including recommendations) from the specialists you see (i.e. cardiologist, pulmonologist, otolaryngologist, endocrinologist, urologist, etc.)
- ☐ Start taking a Multivitamin with Iron one month before surgery
- ☐ Stop taking Aspirin and Ibuprofen medicines (Advil, Aleve, Motrin, Nuprin and Naprosyn) two weeks before surgery
    - Note: Patients may take Tylenol as needed during the two-week period before the surgery
- ☐ Discuss and decide blood donation options with the healthcare team. The options include:
    - Direct Donor (friends and/or family)
    - Autologous Donor (your own blood)
        - Note: There are age and weight requirements for Autologous Donors
    - Hospital Blood Bank (from different donors)

- ☐ Bring any necessary forms to the preoperative clinic appointment (homebound form from school, Family and Medical Leave Act (FMLA) for parent, etc.)
- ☐ Notify the team if you are allergic to any medicines
- ☐ Collect items you may want to bring to the hospital, such as: laptop/tablet, DVD's, hygiene items (soap, shampoo, toothbrush, etc.), cell phone, underwear, loose running-type shorts, loose fitting t-shirt, sneakers or slip-on sandals/rubber soled slippers

Day before surgery:

- ☐ Contact the operating room nurses at **312.227.5050** the business day before surgery between the hours of 12 p.m. and 4p.m. for your instructions, including:
    - IT IS IMPORTANT FOR YOU TO STRICTLY FOLLOW THESE DIRECTIONS. THE SURGERY WILL BE CANCELLED IF YOU DO NOT FOLLOW THEM.
    - What time to arrive at the hospital
    - The last time you can have anything to eat or drink
- ☐ Wash with antibacterial soap the night before surgery (shower or bath)

Day of surgery:

- ☐ Check in at the 2nd floor concierge to receive ID's for you and your family to wear.
- ☐ Check in at 7th floor desk. You will be taken to the preoperative holding area.

After check-in:

- We will take your vital signs and confirm the last time you ate and drank.
- The doctor (may possibly include a resident) will discuss the procedure and get written consent from you, and/or your parent or guardian.
- The doctor will do a *Time Out Procedure* and mark the hip that will have surgery.
- The anesthesiologist will discuss their role in the procedure and answer any questions.
- The anesthesiologist may start an IV (intravenous line), give you medication to relax and draw blood samples for lab tests.
- Your family will be taken to the family waiting area and may visit you in the recovery room after your surgery.
- A surgical liaison will provide updates for your family (a family member can leave their cell phone number if they choose to leave the waiting room).

The Operating Room:

- You will be covered with a warm blanket.
- You will be given anesthesia through your IV. It will make you feel like you are in a very deep sleep.
- You will breathe oxygen through a special mask while you are under anesthesia.
- While you are under anesthesia a catheter (flexible tube) will be placed into your bladder to collect your urine during the surgery.
- Your entire leg and hip area will be cleaned with antiseptic solution.
- Surgical drapes and towels will be placed around the surgical area to keep it sterile.
- Your surgery will be performed.
- A Cell Saver system will be used during the surgery to collect and filter blood that has been lost. The blood is then given back to you through an IV.
- You will be in the OR for 6-9 hours depending on the complexity of your surgery.

- Most often the incision will be closed with dissolvable stitches (sutures). It will then be covered with a sterile dressing, or bandage.
- You may have drainage tubes coming from the hip and thigh area (these will be removed 1-2 days after surgery).
- You will lie on your back with pillows under your knee on the side of the operation and transported to the Post-Anesthesia Care Unit (PACU).
- Your family will meet you in the PACU.

Your Hospital Stay

- You will be in the hospital for 3-4 days, but this may vary depending on your progress and recovery.
- All rooms are single patient rooms.
- Most often PAO patients stay on the 19th floor.
    - Call the following Main Desk phone numbers with any questions, to speak to the nurse or to have a call transferred to your room:
        - 19th floor 312-227-1900
- Visiting hours are 10a.m-8:30 p.m.
    - Only 2 or 3 people (parents or guardians, and visitors) are able to visit at this time; with only 2 visitors allowed at the bedside at a time. Parents/Guardians are allowed to stay at the bedside all day/night (24 hours a day).
    - During flu season there are visitor restrictions. No more than 2 people at the bedside, and no one under the age of 18 years may visit. Ask staff if you have any further questions about rules for visiting hours.

***** Visitor guidelines may change with Flu/RSV season, or anything else like COVID rates. Please check with your care team about any visitor policy changes *****

- A parent or guardian may sleep in the room on the couch.
- There is a lounge and shower available for parents/guardians.
- The care team will stop by on daily rounds. The care team includes: attending doctor, resident doctor, APN (advanced practice nurse), RN (nurse), Pain Team (anesthesia), Physical Therapist, Social Worker (if requested) and Child Life Specialist (if requested).

Pain Control

- Each day a member of the Pain Team will visit you at your bedside and do a pain assessment. They will use a pain scale (a set of questions that the team will ask you about your pain), to see if any changes to your pain control are needed. The goal is to keep you comfortable.
- *Epidural analgesia* will typically be given the day of surgery. This is a way to give you steady pain medicine through a tiny tubing that enters into your back.
- PCA (patient-controlled anesthesia) is pain medicine in a small pump connected to the IV line. You will be able to give yourself your own pain medicine by pressing a button attached to the pump.
- You will be given pain medicine by mouth after the epidural is removed and the PCA is stopped.
- You will not leave the hospital until your pain is under control with pain medicine by mouth.

- Prescription medicine for pain will be given to you before you leave the hospital. These medicines cannot be called in to your local pharmacy.
    - Fill this prescription at the Walgreens pharmacy located on the 3rd floor of the hospital – do this *before* you go home.
    - The inpatient orthopaedic nurse practitioner (APN) or the orthopaedic resident doctor will give you the prescription.
    - The pharmacy MUST have the original prescription.

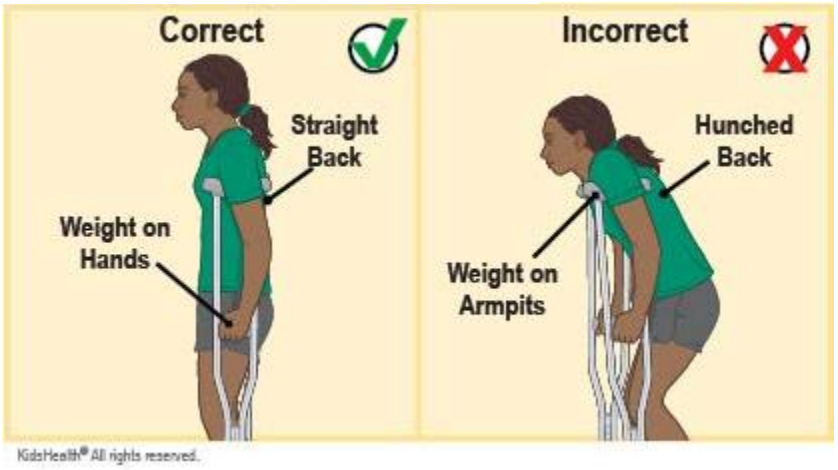
Walgreens Pharmacy – located on 3rd floor

Physical Therapy at the Hospital

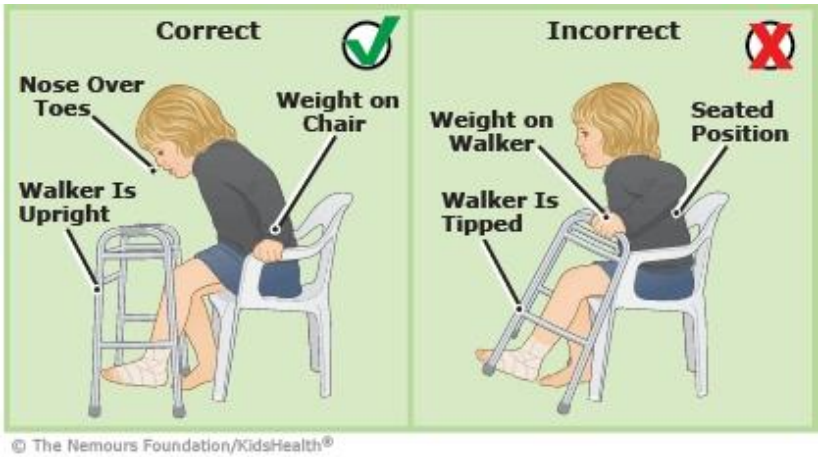
Physical therapy begins in the hospital.

- A physical therapist (PT) will work with you while you are in the hospital.
- PT will check your strength and range of motion.
- Crutches or a walker will be given to you while you are in the hospital. Your physical therapist will decide which works best for you.
- PT will measure you for the right sized crutches or walker.
- PT will show you how much weight you can put on your leg.
- PT will teach you how to do the following using your crutches or walker:
    - Use the stairs
    - Get in and out of bed
    - Get up and down from a chair
- Most patients will need to use crutches or a walker for about 3 months after surgery.

Using crutches



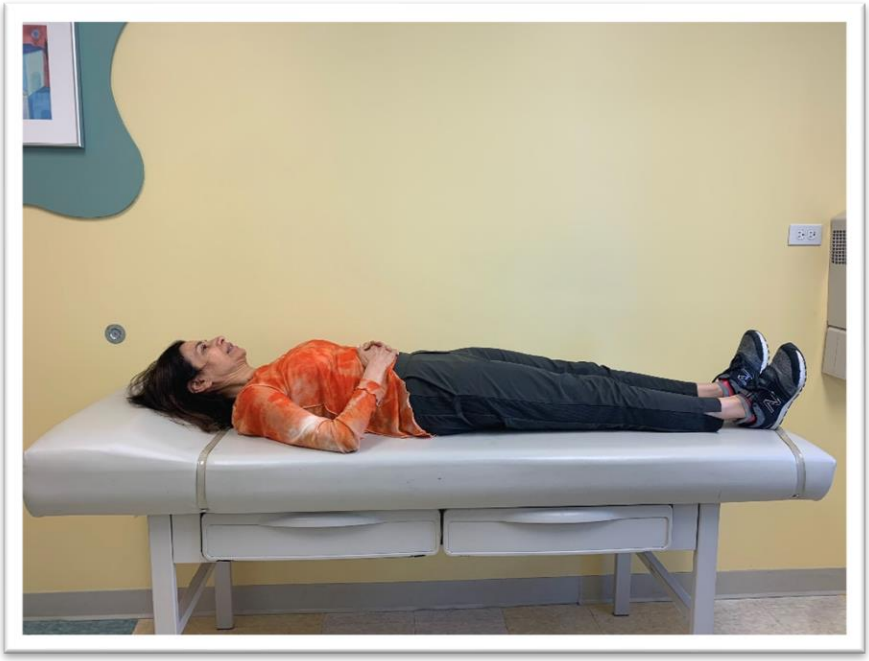
Using a walker



Post-operative (after surgery) Guidelines:

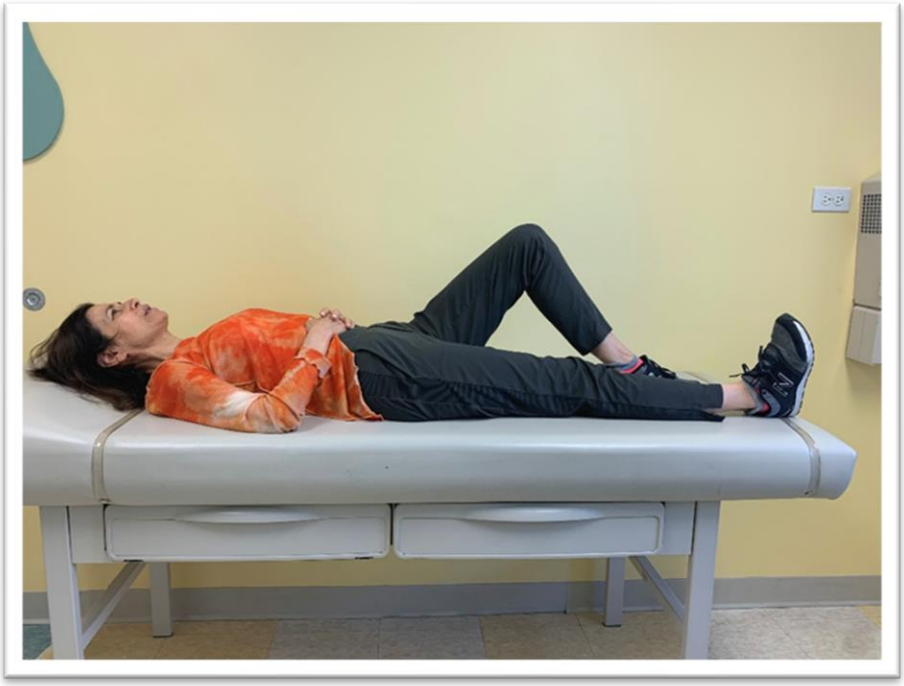
POD #1 (Post-operative day 1):

- Avoid hip flexion greater than 90 degrees until the second post-operative visit (usually scheduled for 6 weeks after the surgery)
- No *open chain exercises* should be started until about 6 weeks after surgery or until cleared by the doctor. This includes straight leg raises or any exercise which may use a long lever arm at the hip.
- A home exercise program (HEP) includes isometric exercises like quadriceps sets, gluteus sets and ankle pumps.



Picture 1: Quadriceps Sets

Tighten muscles on top of thigh by pushing knees down into flow floor or table.
Hold _____seconds. Repeat _____times.
Do _____sessions per day.



Picture 2: Gluteal Sets
Tighten muscles in the gluteal area by squeezing the buttocks together.
Hold _____seconds. Repeat _____times.
Do _____sessions per day.

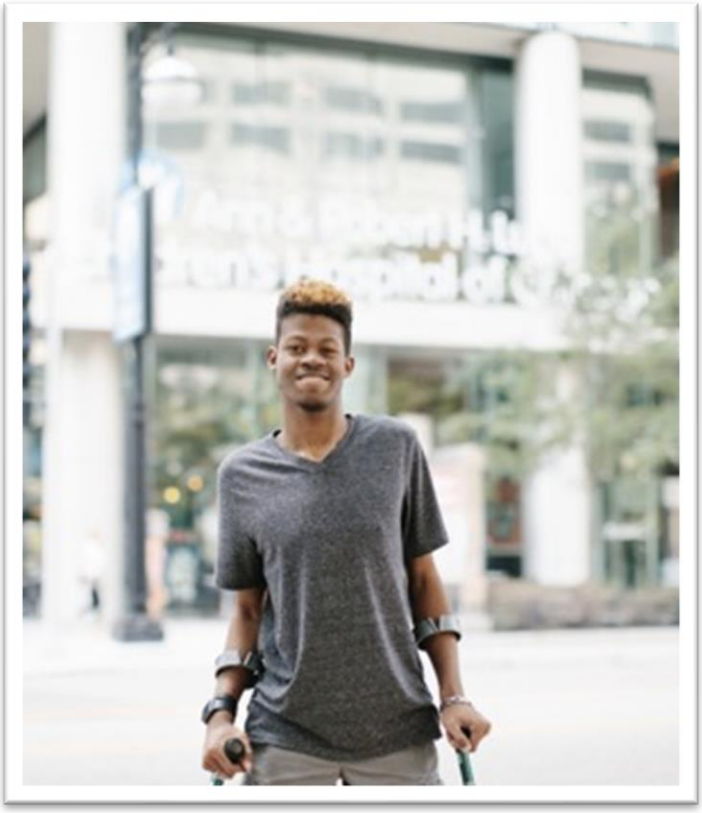
Picture 3: Heel slides
Tighten stomach muscles as you slowly slide heel toward your buttocks. Bend knee as much as as possible. Hold in this position for 30 seconds. Then, return heel to the resting position by sliding heel back down until leg is straight on floor or table.
Repeat _____times. Do _____sessions per day.

POD #2 (Post-operative day 2):

- The epidural is usually removed by POD #2. You will likely be started on pain medications by mouth when the epidural is stopped.
- Your strength will be checked before out of bed (OOB) exercises begin.
- Your first OOB exercise will be to transfer from the bed to the chair.
- Other OOB activities will be started, including weight bearing exercises. The PT will direct the weight bearing activities, [usually 1/6 BW (body weight), or 30 pounds, is the amount of weight allowed on the leg on which you had surgery].
- Gait (walk) training will be started when cleared by the doctor.

POD #4 (Post-operative day 4):

- You will be gait trained on crutches or on a walker.
- The weight bearing limit will be about 1/6 BW (about 30 lbs).
- You will move to the next level of PT when you can safely move on your own.



Going Home from the Hospital

- You will be discharged when you can sit comfortably; walk well with crutches or a walker in the hall and on stairs; use the bathroom and have good pain control taking pain medicine by mouth.
- You will receive your prescriptions from the orthopaedic team. These will be based on your needs as decided by the team, and may include:
    - Pain medicine
    - Medicine for muscle spasms
    - Stool softener
    - Anticoagulation medicine (also called "blood thinners" – like Baby Aspirin or Lovenox)
- Your first post-operative's appointment will be scheduled before you leave the hospital, and will be included in your discharge instructions.
- You may travel home by car.

Managing at Home:

- A rental wheelchair will be ordered by the orthopaedic surgery scheduler when you are ready to go home. You will need to use the wheelchair for about 12 weeks after surgery to go longer distances. The rental equipment company can deliver the wheelchair to your home.
- You may purchase a shower chair and/or bedside commode at a hospital equipment store or purchase these items online.
- Most patients do not need a hospital bed, and can safely go up and down stairs with crutches/walker.
  NOTE: This is decided on a case-by-case basis after a home assessment has been done.
- For drivers, you will not be able to drive while taking narcotics. Ask the doctor when you will be cleared to drive. This is typically 4-6 weeks after surgery, but may vary.

Pain Medication

Medication	Frequency	Reason for Use
Opioid pain medication (oxycodone)	Every 4-6 hours as needed	For pain/discomfort
Diazepam (Valium®)	Every 6 hours as needed	For muscle spasms
Colace®	Twice daily	For constipation/stool softener
Senna®	Every evening	For constipation/stool softener
Multivitamin with iron	Daily	Dietary supplement
Acetaminophen (Tylenol®)	Every 4 hours as needed	For pain/discomfort
Ibuprofen (Advil®, Motrin®)	Every 6 hours as needed	For pain/discomfort

- Your child will be sent home with a prescription for oral pain medication.
- Be aware that opioids may cause drowsiness and constipation. Increasing daily fiber and fluid intake will aid in offsetting these side effects.
- The combination of pain medicines (opioids), iron and a decrease in normal activity will cause constipation. This should be treated with over-the-counter (OTC) stool softeners (Senna®, Colace®).
- Your child should continue to take the iron and vitamin supplements for four weeks after surgery.
- Your child may experience shoulder soreness for two to three months. Acetaminophen (Tylenol®) and/or prescribed Diazepam (Valium®) should be used to treat this, if needed.

Physical Therapy at Home

Activities and weight bearing after surgery:

General comments about PT

- You will be checked on your PT progress at your clinic appointments. The doctor will see how you are doing in your PT program and make changes if needed.
- Do not move to the next level of exercise until the doctor tells you.
- You should contact the doctor's office if you have any questions.
- The PT from the orthopaedic clinic is also a good resource for information and questions.
- Your strength and ROM (range of motion) will be assessed.
- You will begin A/AROM (active assist range of motion) of the involved hip within the limits set by the orthopaedic doctor.

ROM is usually flexion and extension 30-90 degrees, abduction/adduction 0-15 degrees and internal/external rotations 0-15 degrees. You can sit at 90 degrees.

  - ROM restrictions will be adjusted for each patient
  - With the assistance of Physical Therapy, you will get up out of bed on POD #1.
  - The parent or caregiver will be taught how to help with the exercises.
  - PT will see you 1-2 times per day for ROM exercises

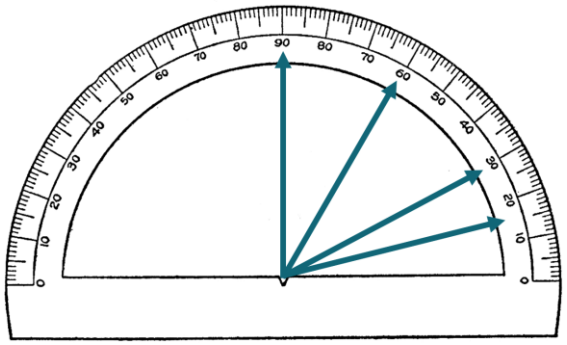
0-6 weeks after surgery: Use 2 crutches or walker (with 30 pounds flat foot weight bearing, or 1/6 of BW)

- Avoid hip flexion greater than 90 degrees until the second post-operative visit (usually scheduled for 6 weeks after the surgery)
- No *open chain exercises* should be started until about 6 weeks after surgery or until cleared by the doctor. This includes straight leg raises or any exercise which may use a long lever arm at the hip.
- A home exercise program (HEP) includes active exercises like quadriceps sets, gluteus sets and ankle pumps.

6-12 weeks after surgery = 2 crutches or walker (with weight bearing as tolerated)

- Outpatient physical therapy will begin 6 weeks after surgery.
  - As before, HEP includes active exercises like quadriceps sets, gluteus sets and ankle pumps.
  - Formal PT includes ROM (range of motion), gait, early strengthening and gravity-assisted only.
  - You will be given gravity-assisted exercises by PT that include: heel slides, isometric abduction/adduction, supine (lying on your back) abduction/adduction, bridges and long arc quadriceps.
  - You may also begin by lying prone (on the stomach; face down) to increase hip extension. Tip: Try lying over a pillow first.
  - PT will decide if you may go down to using just 1 crutch during this time.

- Activity – If you have access to a pool:
  - Begin by walking in chest-deep water (1/6 BW) or waist-deep water (1/2 BW).
  - Progress to standing ROM exercises, like side stepping, for example.
- Activity – If you have access to a stationary bike, you can begin by riding with the seat elevated (raised) and without resistance.



9 weeks after surgery

- Activities: Antigravity exercises to include hip flexion, abduction/adduction and extension
- Resistance: Using TheraBand, if appropriate
- Education: Weaning to one crutch, if appropriate

3 months after surgery

- Activities:
  - Jogging and progressive resisted exercises, depending on the patient's strength
  - Side-lying hip abduction/adduction

NOTE: Keep in mind these are only guidelines.
Each patient is assessed on an individual basis.
The exercises listed above are based on how the typical, or average, patient progresses.
Every patient is different.

Work and School

1. Plan on being homebound from school or work for a couple of weeks.
2. A letter can be given to your school to request homebound instruction which may include a teacher or tutor coming to your home.
3. Restrictions (limits) on your activities will be necessary when you return to work or school.
4. The team will give you a letter that details your restrictions at your post-operative clinic appointment when they release you to go back to work or school.
5. Your strength will return gradually after surgery. You may increase your activity as directed by your doctor.

Post-operative Clinic Appointments with Your Doctor

All appointments will include a clinical exam and radiographic imaging (X-rays). They are usually done at the following time points after surgery:

- 1-2 weeks
- 6 weeks
- 12 weeks

NOTE: Keep in mind these are only guidelines. Each patient is different, and post-operative recovery times may vary.

X-Ray Images of Hip before/after Surgery

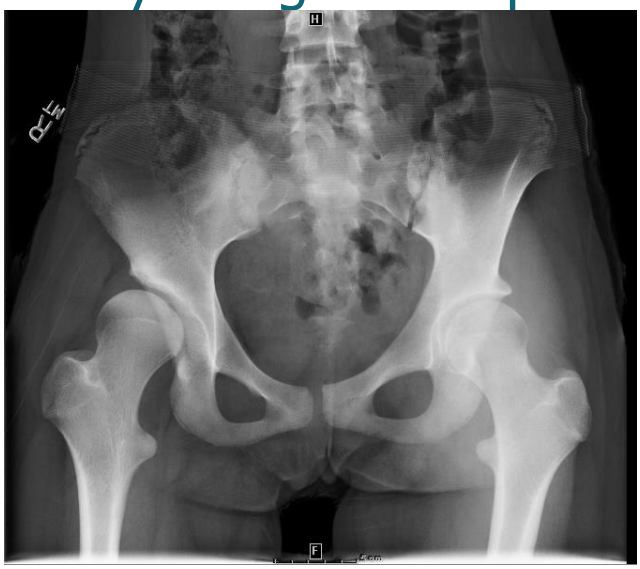


Image 1: Before surgery -- Hip dysplasia

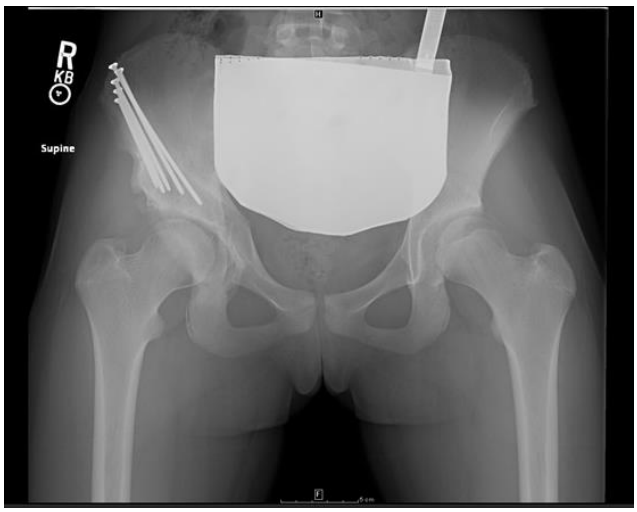


Image 2: Hardware inserted during corrective surgery

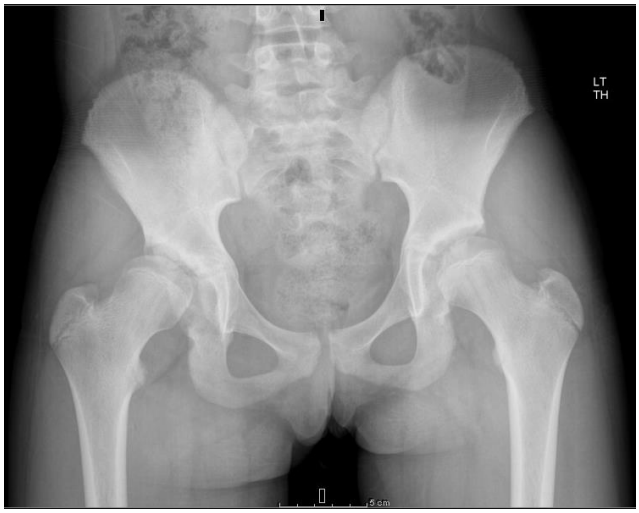


Image 3: After surgery, with hardware removed

Common Questions You May Have After Surgery

1. *When can I shower?*
    - Answer: 3 days after surgery
2. *When can I bathe in a bathtub or swim?*
    - Answer: 2 weeks after surgery
3. *When can I remove the dressing?*
    - Answer: The orthopaedic team will remove the hospital dressing at the 1st post-operative clinic appointment, which will be 1-2 weeks after surgery. The incision will be well-healed by then, and no longer needs to be covered. The Steri-Strips will fall off on their own.
4. *When can I lie on my operative side and my stomach?*
    - Answer: 4 weeks after surgery
5. *What are the signs and symptoms of infection at the incision site?*
    - Answer: Increased redness, swelling, tenderness, pus drainage (colored yellow, green or white), unusual smell or a fever higher than 101 degrees (by mouth). Numbness or tingling in the skin of the thigh is normal for several months after surgery, but this will gradually lessen.

NOTE: If you have any urgent questions of concerns, please call the Orthopaedic Division at 312.227.6190 during business hours (8:30 a.m. to 4:30 p.m.) Monday through Friday.

- **If you have questions in the evening or weekend hours, call the hospital operator at 312.227.4000, and ask for the" Orthopaedic Resident on-call".**
- **If you have an emergency, go to your local emergency room.**

Other Frequently Asked Questions (FAQs)

- *What will the scar look like?*
    - Answer: The scar along the front and side of your hip will be about 6-8 inches long. Use sunscreen SPF 30 over the scar if it is exposed to the sun for 1 year after the surgery.
- *Any recommendations for reducing the appearance of the scar?*
    - Answer: Apply vitamin E (break open a capsule or use a lotion with vitamin E), and massage it into the scar twice a day after the incision has healed.
- *Will the hardware "set off" metal detectors in the airport?*
    - Answer: Because the screws are covered with muscle tissue they do not usually set off airport metal detectors.
- *When the hardware is removed is the same incision used?*
    - Answer: Yes. This is an out-patient surgical procedure typically done 9-12 months after the initial surgery. Crutches are recommended for the first few days, and activities can resume 3-4 weeks after the screws are removed.
- *When can I play sports?*
    - Answer: This is up to your doctor, but usually you may return to playing sports about 6 months after surgery.

Call 1.800.KIDS.DOC for an appointment to receive more information on PAOs.

Notes

Notes

All,
for
your
one.℠

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