

Hip Dysplasia - PAO

The hip joint is a ball and socket joint consisting of the acetabulum (socket) and the femoral head (ball). Acetabular dysplasia (abnormal formation of the socket) is an underdevelopment of the hip socket where the acetabulum or cup is congenitally shallow. The upper portion or roof of the acetabulum is obliquely inclined outward (dashed yellow line) rather than having the normal horizontal orientation. Because of these abnormalities the femoral head is incompletely covered and abnormally high stress on the outer rim of the socket (red asterisk) leads to premature degeneration of the articular cartilage.

The PeriAcetabular Osteotomy (PAO) is a surgical procedure aiming to correct this deficiency of the hip socket. If the dysplasia is significant and is left untreated then there is a strong likelihood for early onset of hip osteoarthritis (right figure below).

Periacetabular Osteotomy involves performing several bone cuts (osteotomies) around the acetabulum and redirecting it in an optimal position so that the femoral head is adequately covered. The osteotomy is then stabilized with screws.



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Rt - Normal head coverage with sourcil angle (dashed yellow line= Acetabular inclination) in the normal range of 0-10 degrees.
Lt - Femoral head sub-luxation (blue "shenton" lines) due to vertically inclined Acetabulum. Reduced femoral head coverage is seen.

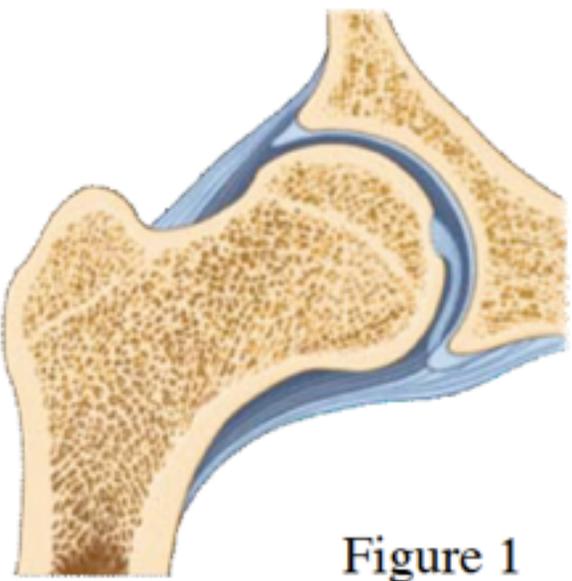


Figure 1

Normal acetabular coverage over femoral head

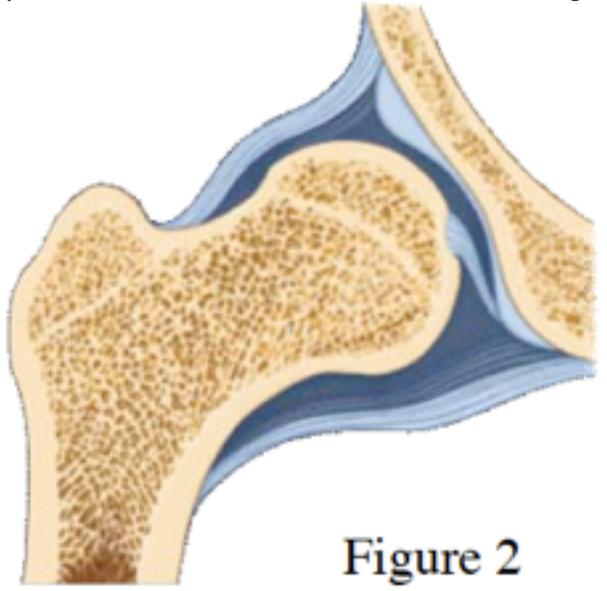
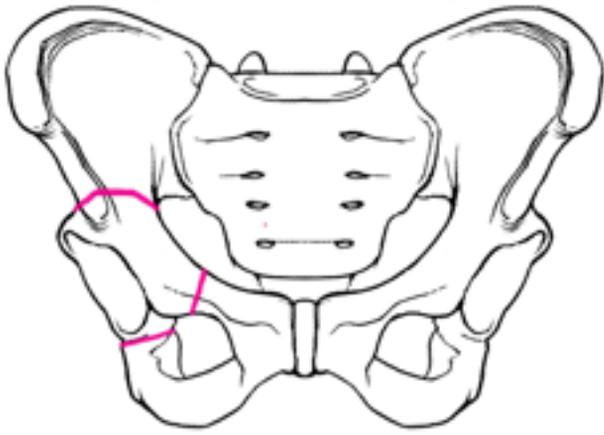


Figure 2

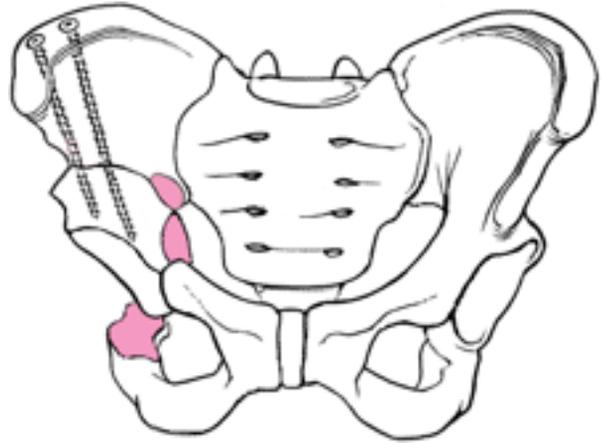
Lack of femoral head coverage results in instability (sub luxation) and early arthritis



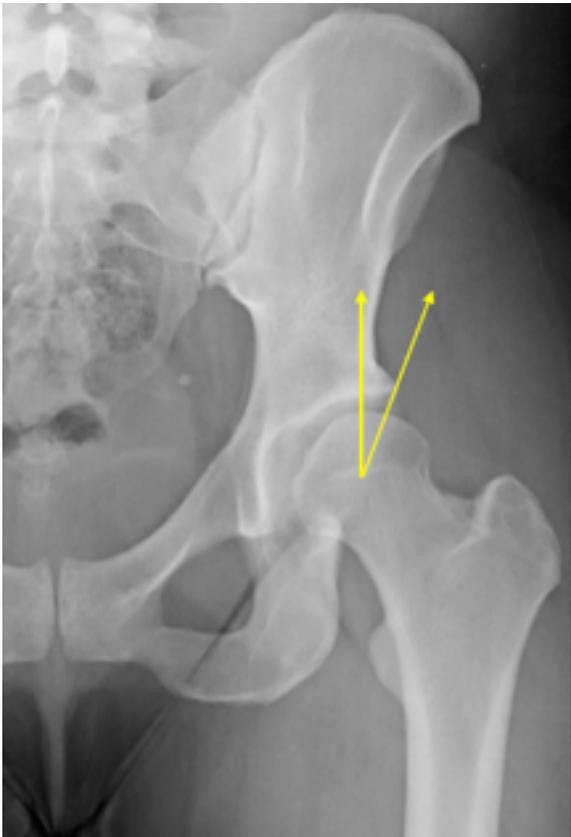
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- Osteotomy cuts around the acetabulum



- Osteotomy fixed with screws



- The femoral head is incompletely covered by the acetabulum
 - Sourcil (roof of Acetabulum) obliquely inclined outward



- The femoral head is now sufficiently covered by the acetabulum
 - Sourcil (roof of Acetabulum) is horizontal



- Prior to proceeding with the surgical procedure, **dGEMRIC MRI** is used to indicate acetabular cartilage status
- This will tell us if the cartilage is still viable and good enough to take the new role designated during the realignment procedure.

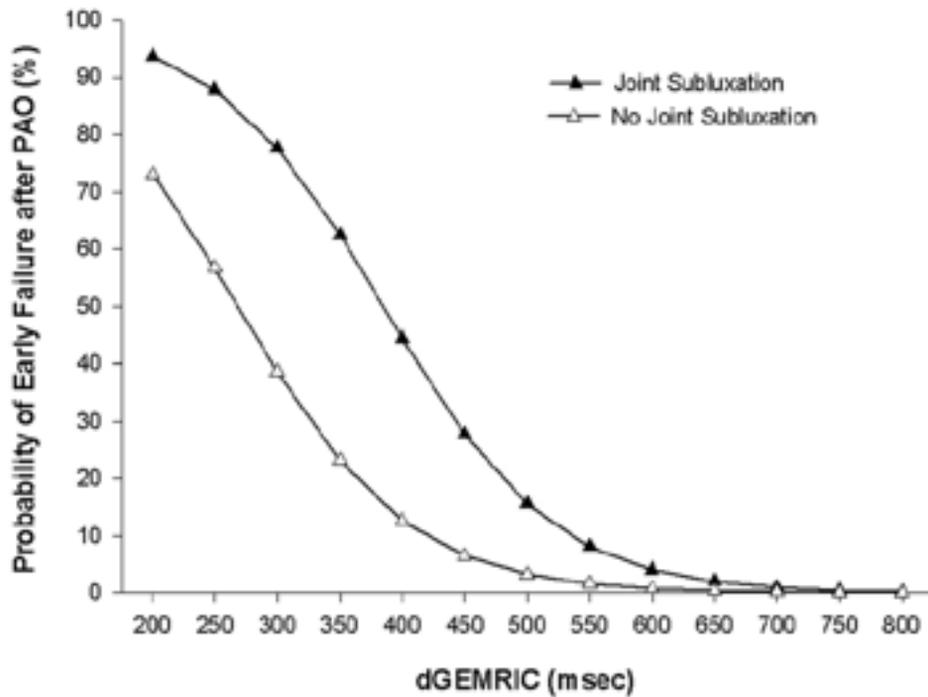
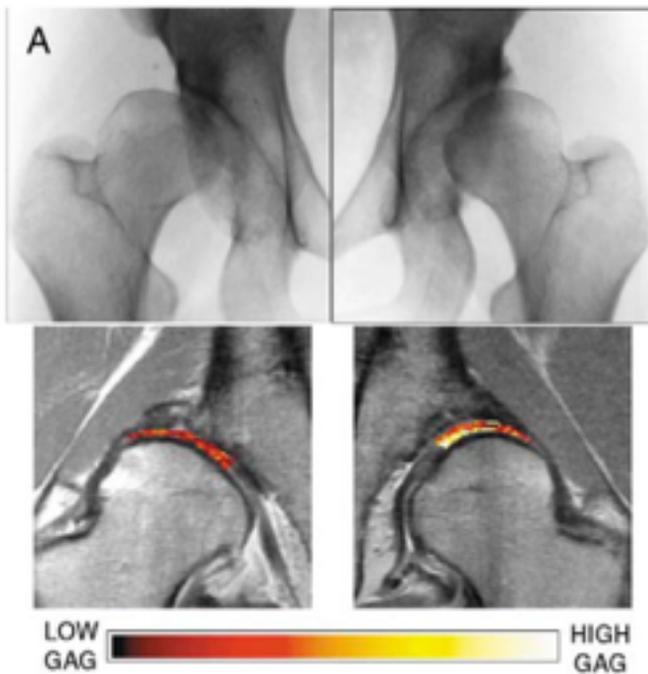


Fig. 4

Calculated probability of failure after periacetabular osteotomy (PAO) according to the dGEMRIC index. A failed result is defined as a hip that underwent secondary arthroplasty, had increased pain, or had increased joint-space narrowing.

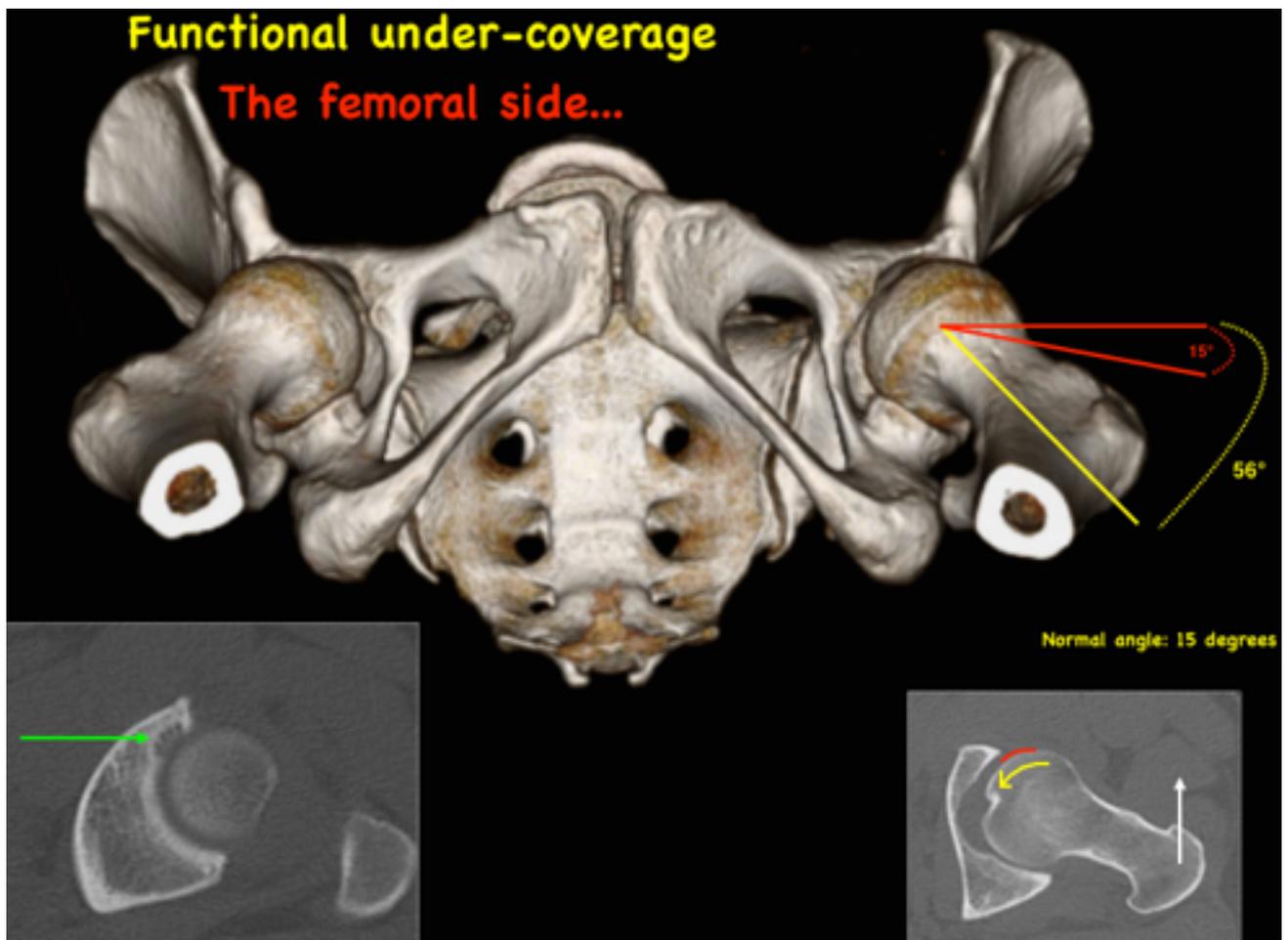


Hip Dysplasia - DFO

The hip joint is a ball and socket joint consisting of the acetabulum (socket) and the femoral head (ball). Hip dysplasia can also come from the femur side (as opposed to the socket side as previously explained) when development of the femur bone resulted in sub-optimal rotational anatomy. In this case, the femoral head is pointing too much to the front of the socket, thus putting abnormal stress on the anterior cartilage and labrum.

Normal rotational angle for the femur bone is around 15 degrees. If the angle exceeds 30 degrees and anterior damage is seen on imaging modalities, DFO is considered.

The De-rotational Femoral Osteotomy (DFO) is a surgical procedure aiming to correct this sub-optimal anatomy of the femur bone. If the wrong anatomy is significant and is left untreated, there is a strong likelihood for early onset of hip osteoarthritis.

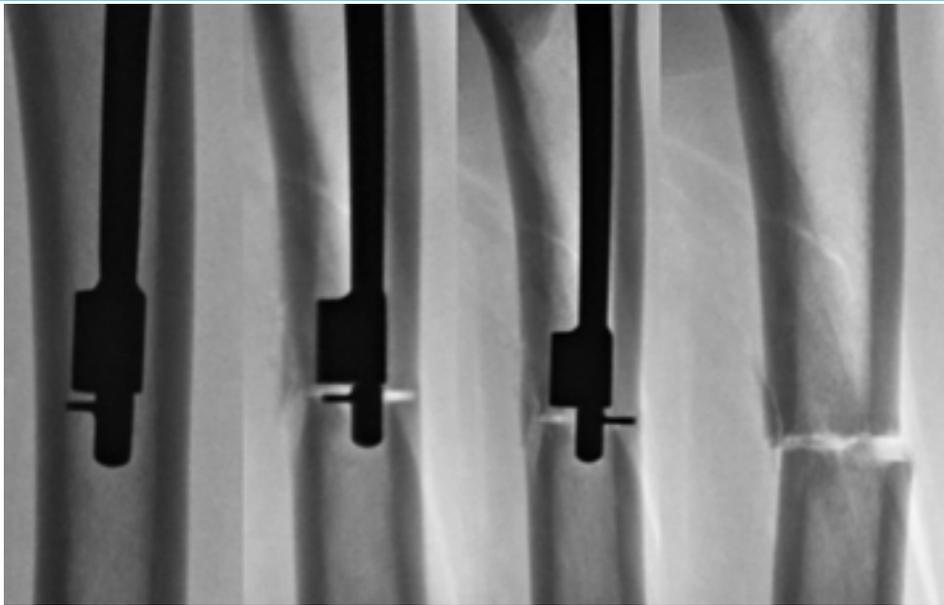


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The DFO procedure involves performing a bone cut (osteotomy) at the upper 1/3 of the femur bone. A manual saw cuts the femur from the inside-out, and redirects it in an optimal position to restore normal anatomy. As a result, the femoral head is adequately covered and stress from the anterior socket is relieved.

The osteotomy is then stabilized with a long nail which enables partial weight-bearing immediately after surgery.



Preparation for the PAO surgery - (DFO post operative course is similar but usually much shorter, averaging 2-4 days in the hospital)

Get as fit as you can within the constraints of your condition. If weight-bearing exercise is difficult, you can use an exercise bike or swimming to improve overall fitness.

Have a general check up with your PCP or with a physician if advised by Dr. Mei-Dan.

Stop smoking at least 6 weeks prior to surgery as this interferes with wound and bone healing, and puts you at risk of a postoperative chest infection.

If you are overweight, it is wise to be aware of good eating habits and lose weight before surgery. Obesity adds time to the length of surgery and increases risk of slow wound healing.

We are using a cell-saver device which enables us to save most of the blood that you lose during the procedure. It is then given back to you.

The hospital will tell you what time to arrive on the morning of surgery and the time to begin fasting. (Usually fasting begins at midnight prior to day of surgery.)

BEFORE THE OPERATION

Cease anti-inflammatory medication 2 weeks prior to the operation - Aspirin, Nurofen, Voltaren

Cease supplements that can act as blood thinners 2 weeks prior to the operation -
Garlic, Ginseng, Ginko, Ginger

Cease Warfarin 5 days prior to surgery, in consultation with your prescribing doctor

At the hospital

A nurse will attend to your admission in pre-op, and check your blood pressure, pulse, oxygen levels and the pre operative checklist. Please let your nurse know if you have any skin abrasions or rashes. If there is a significant risk of infection, the operation may be cancelled.

Prior to going to operating room the anesthesiologist will discuss the anesthetic and pain management options with you, There are three types of anesthetic: general, spinal, and epidural block. You may have a combination of these options to achieve the best results.

Finger and toenails should be free of nail polish. Upper leg and groin area may be shaved.



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Pre and intra operative

You will be transferred to the operation room (OR) on your bed. A drip (intravenous infusion or IV) will be inserted for administration of the anaesthetic, IV fluids, medications and possible blood transfusion. Once you are asleep, a urinary catheter will be inserted to make you more comfortable during the postoperative period.

The operation usually takes 2.5-4 hours followed by ~2 hours in recovery before being taken back to your room. The whole process, including entering the surgery room until returning to recovery, will be ~4-5 hours due to the time required to put you to sleep, position you on the operating table and waking you up after surgery is completed.

In Recovery

When you wake up in recovery there will be an oxygen mask on your face, a pulse monitor on your finger, a blood pressure cuff on your arm and adhesive dots on your chest connected to the heart monitor.

You will have a drip in your arm and a urinary catheter in your bladder connected to a bag on the side of the bed.

A nurse will be with you to monitor your recovery until you are ready to go back to the orthopedic floor.

On the Orthopedic unit

Once in your hospital room, nurses will be monitoring your vital signs, including conscious state, pulse, respirations, blood pressure and oxygen levels. They check your leg circulation and surgical dressings.

Your intravenous fluid input and the urinary output (via the catheter) are also monitored. You will receive prophylactic IV antibiotics and blood replacement as needed, per doctor's orders.

You will be asked to periodically take a few deep breaths and cough to encourage expansion of the lungs properly after the anaesthetic.

You will also be asked to move your feet up and down to help the circulation in your legs.

Pneumatic stockings will remain on both legs to help prevent blood clots (DVT) forming.

The nurses will ask you to rate your pain level on a scale of 0 -10 and your medication will be adjusted accordingly to keep you pain free.

When you are fully awake you may start to sip water. Nausea is a common side effect of some anesthetics and IV medication can be given to combat this as needed. If there is no nausea, fluid intake can be increased as desired.



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Day one post operation

A light diet typically commences the evening of your surgery or the next morning.

Pain is typically monitored via epidural for 2-4 days after your surgery. Only after a successful pain window will the epidural be discontinued. After that time, your pain will continue to be managed with IV and oral medication.

A blood test will be taken to check your postoperative haemoglobin and electrolyte levels, and an X-ray will be performed to evaluate the osteotomy.

Day two post operation

You will get out of bed with the physical therapist and a nurse assisting you. You will stand by the side of the bed using the walker and take a few steps. You may feel a little lightheaded at this stage, so you will be helped back to bed.

You will repeat this again later in the day.

A new dressing may be applied to the surgical incisions.

Day three post operation

Your epidural and urinary catheter will probably be removed 36-72 hours after surgery.

This will enable quicker progression to therapy exercises and a faster recovery.

You will stand again with the assistance of the physical therapist. Occupational therapy may assist with showering or a bed bath.

Laxatives are often given to combat constipation, a not uncommon side effect from medications and anesthesia.

You may get up again in the evening for another short walk.



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Days four to six post operation

At this point, your pain is likely managed with IV and oral medication.

The physical therapist will see you almost every day to guide you through the exercises and mobility regime. You will walk using a walker and progress to crutches with partial weight bearing, unless recommended otherwise by Dr Mei-Dan.

Occupational therapy will continue to teach you safe techniques for showering reducing the chance for a fall or sliding mishap.

You will sit in a chair for each meal for a maximum of one hour.

You will become independent getting in and out of bed.

The physical therapist will teach you how to negotiate the stairs and guide you on other measures for safety, including fall prevention.

***Discharge day is ~ day 4-7 post operation,
depending on your condition, pain level and mobility status***

After Discharge

You will continue with a daily blood clot prevention treatment for 14-21 days or as ordered by Dr. Mei-Dan, in the form of pneumatic calf sleeves and 81mg aspirin.

Please let Dr. Mei-Dan know if you are allergic or sensitive to aspirin.

You will see Dr Mei-Dan and his team 14 days after surgery to follow up on your progress.

Continue protected weight bearing on crutches for 6 weeks post operation.

You will need plenty of rest.

It is normal for the leg to feel heavy.

You will return to the clinic again, for your review with Dr. Mei-Dan, 6 weeks post operation.

Progress to full weight bearing at 6-10 weeks post operation or as advised.

Further review by Dr. Mei-Dan occurs at 3 months post operation, when an x-ray will be taken.

You may experience relative weakness in the leg for up to 6 months.

Return to sporting activities as advised by Dr. Mei-Dan.



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After discharge instruction: REPORT TO YOUR SURGEON

- Temperature higher than 38.5C (101.3F)
- Severe pain and increased swelling
- Calf pain and swelling
- Unusual amount of drainage on the dressing, or a foul odour at the dressing site
- Shortness of breath or chest pain

Complications from PAO surgery are uncommon but include the following:

- Deep Vein Thrombosis (blood clot in the leg)
- Pulmonary Emboli (blood clot in the lung)
- Infection
- Bleeding
- Non union of the osteotomy
- Nerve injury (Sciatic, Lateral Femoral Cutaneous Nerve)

Lateral Femoral Cutaneous Nerve (LFCN) is a sensory nerve covering the lateral aspect of the thigh. This nerve lies in close proximity with the main surgical cut and as so it is not uncommon to have some sort of paresthesia, following its sensory distribution, after a PAO.

This minor side effect would usually resolve within days to a few months.



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