Patient and Family Guide to Limb Lengthening using a PRECICE Nail

The Orthopaedic Limb Reconstruction Department
The surgical procedure involves the PRECICE Nail, being inserted into the central canal of the bone and secured with bolts. An osteotomy (a cut in the bone), is created to allow the bone to get longer.

In order to place the nail in the bone, your surgeon has to make a cut in the skin. There will also be cuts at the osteotomy site and also where the bolts have to go in. There may also be scars where a temporary external fixator is placed to line up the bone (this is removed before the surgery is over). If soft tissue releases or nerve decompressions are performed, this will also leave scars. In a tibia, you will also have scars where screws are inserted to keep your knee and ankle joint stable.

WHAT IS A PRECICE NAIL?

A PRECICE Nail is an internal device used to lengthen a limb. For decades, external fixation was successfully used for limb lengthening. The PRECICE nail, uses the same principles of limb lengthening but because it is inside the bone there are less complications.

The PRECICE nail is lengthened using an External Remote Control (ERC).
The lengthening process, starts at between 5 and 7 days following surgery. You will be taught how to use the ERC. You will be supervised and supported carrying out initial adjustments.

There will be a marked area on the limb. This corresponds to the magnet inside the nail. Once turned on, the ERC turns gears inside the nail, making it lengthen. Your team will give you a marker and it is important to colour in the mark regularly so it doesn’t disappear.

The ERC must be kept accurately on the mark while it is turned on. Downward pressure must be applied to the ERC. Keeping the ERC in the correct place and pushing down is important, to ensure that the magnet is stimulated properly so that lengthening is accurate.

SAFETY ALERT

The ERC contains a strong magnet. Please be aware that the magnet is ALWAYS turned on; even when the device is not plugged in to the electrical supply. Safety is of utmost importance at all times. No metal objects, credit cards, phones, underwire bras, should be placed near the device at this time as it may cause damage to these items. Persons with a pacemaker, should not be present when the handset is near them; so safe storage should be considered.

MRI SCANNING

You cannot have an M.R.I. while the PRECICE Nail is in your limb. The nail is NOT compatible with M.R.I. scanning. If in doubt please contact your hospital nurse.

NEW BONE AND TISSUE GROWTH

Over the following weeks, as the limb lengthens, new bone forms slowly. Soft tissues in the limb; in particular muscles; start to react to being stretched. Muscles get tight and sore and can contract to cause deformity which can be permanent.

In order to prevent this from happening, your physiotherapist will show you specific exercises to carry out several times daily. It is of utmost importance that you carry out this regime exactly. All joints above and below the limb being lengthened are at risk of developing pain and deformity and putting further lengthening at risk. You may also be required to attend the hospital regularly to meet with your physiotherapist. If you do not keep up with your therapy, then lengthening has to stop.
NERVES

Nerves in the limb are also being stretched to grow. If you notice a change in sensation, any pins or needles feeling, or numbness, it is important that you inform your team at the hospital. If the nerve has not already been decompressed, you may need a procedure to be carried out on the nerve.

HOW LONG DOES IT TAKE TO LENGTHEN

This will depend on the lengthening target e.g. lengthening a limb 5 cm= 50mm.

Lengthening is usually carried out at a rate of 1 mm daily in the femur bone and 0.75mm in the tibia bone. You will be monitored closely at clinic and have regular-rays or as directed by the team to review the quality of the new bone and to review the functioning of your muscles and joints.

Lengthening 5cm would then take 50 days. This process may be speeded up, slowed down or even reversed depending on bone growth quality. This is the lengthening phase.

You are not able to walk or stand on the limb that is being lengthened during this phase. The nail is not designed to be walked on and it will break.

The Consolidation Phase, is where the new bone begins to become stronger. During this phase, your surgeon and physiotherapist will tell you how much weight you can put through your leg.

The amount of weight bearing increases as more bone forms until you are finally fully weight bearing again. The PRECICE Nail itself, stays in position for approximately 18 to 24 months. The PRECICE Nail is usually removed surgically at some stage once the bone is healed.

LIVING WITH A PRECICE NAIL AND THE LENGTHENING PROCESS

PAIN

There are different stages of pain:

1. Pain following initial surgery: This is managed using intravenous access or nerve blocks in conjunction with oral medication. Surgical pain is managed well and should last only 48 hours. It is advised that you always adhere to the pain management regime you are given.

2. Pain from the lengthening process is common as the soft tissues; in particular muscles; are being stretched in order to grow.

You will be prescribed a specific regime of pain medication that you must take regularly as advised. Physiotherapy must be considered similar to pain medication because if the physiotherapy regime is not adhered to then pain will increase. You must keep in close contact with your physiotherapist and Clinical Nurse Specialist regarding pain management.

We advise avoiding non-steroidal anti-inflammatory medication and some surgeons ban them completely. These medications are given in the immediate days following surgery but not after this time; as they are thought to interfere with new bone formation.
Surgical wounds go through several stages of healing:

- **Day 1-5** Inflammation is present, some swelling, reddening, slight clear bloody discharge. Some discomfort. You may have absorbable or non-absorbable stitches or paper stitches called steri-strips. You will be taught any relevant wound care that may be need to be done in your first week only at home. You may bathe or shower at home as normal unless specifically advised not to.
- **Day 5-14** Scabs form.
- **Day 14 onwards:** Scabs fall off and the scar begins to develop and strengthen.

**It is normal to have the following:**
Tingling, itching, slight lumpy feeling at the wound site, bruising at wound site and around it, a pulling tight feeling at wound site. It is **not** normal for a wound to ooze beyond day 5. If it does, your surgeon or nurse specialist should be contacted.

**PHYSIOTHERAPY**

A compliant regime is necessary throughout the whole process of lengthening. As the bone is being lengthened, so are the soft tissues i.e. muscle, tendons and ligaments. If stretching exercises are not done these tissues will tighten and limit range of movement in the surrounding joints. If this happens, lengthening may have to be slowed or stopped. Exercising muscles maintain overall strength also.

**Aims of physiotherapy**

- Maintain normal range of motion to surrounding joints
- Maintaining muscle strength and length
- Helps manage pain control
- Re-education of normal gait of lower limb
- Encourages functional activities

**PRE-OPERATIVE EDUCATION**

Discuss reasons for physiotherapy and its aims with patient and carer. Demonstrate exercise programme and provide a rehabilitation programme for home.

Assess mobility and plan for any necessary mobility aids after surgery. Liaise with others on Multi-disciplinary team e.g. Occupational Therapy.

**POST-OPERATIVE EDUCATION**

Commence range of motion exercises immediately: aim is to achieve normal range for the patient prior to commencing lengthening phase.

- Mobility: if lower limb is involved, the patient is not allowed weight bear on the affected limb.
- Stairs practice
- On discharge planning: a regular regime will be planning with the patient and family.
A healthy balance diet is important to aid with bone and wound healing. In addition your surgeon may ask you to take vitamin D and calcium in the weeks prior and during lengthening. Due to the pain medication that you will need to take you may have the following: loss of appetite, constipation. You will be advised before you are discharged on management of these issues. It is important to eat regularly and maintain as health a diet as possible. If you are not healthy there will be a delay in your bone healing.

**SMOKING**

Smoking directly interferes with wound healing and new bone formation.

**SCHOOL**

It is important that you attend school as normal. Your nurse will liaise with your school, regarding your return and special requirements e.g. locker access, explanation on not weight bearing and using crutches etc.

**LEISURE TIME / SPORT HOLIDAYS**

It will be some time before you can return to contact sports. Whilst you can travel / fly by plane, you should not book any foreign holidays without a discussion with your consultant for advice.

**Remember:** it is now very important to use sun block appropriately due to your scars.

**NOTE**

- **Contraceptive pill:** it is necessary to discontinue this medication for six weeks prior to surgery as it can cause risks during surgery of blood clotting.

- **Allergies** to foods/ medication or other.

Please advise your nurse if this is relevant.

**MEDICATION**

Please advise us of specific medication you are taking regularly as it may interfere with pain medication we prescribe.
The following are signs of wound infection that you must contact the nurse specialist at the hospital.

- Increased pain at the wound site
- Spreading redness
- Increased discharge / ooze
- Any ooze beyond day 5
- Increased swelling

If infection occurs, and if it spreads to the PRECICE Nail, the procedure may need to be discontinued and the nail removed. The lengthening can sometimes carry on then by using an external fixator.

JOINT STIFFNESS / INSTABILITY AND TIGHTNESS

As mentioned earlier, adherence to your prescribed physiotherapy regime at home is essential. Lengthening will always be unsuccessful without therapy. You may be linked in with a physiotherapist near your home. However, some surgeons may require you to come to the hospital regularly to meet with the therapist. Splinting of some joints may be used. In severe cases of complications with joints, surgical intervention may be necessary to correct a problem and maintain normal function.

PREMATURE CONSOLIDATION

Your bone may start to heal ahead of time and need to be re-fractured in order to proceed with the lengthening process. This is one reason why you are reviewed regularly with x-ray imaging. Re-breaking the bone is carried out as a day procedure under general anaesthetic. Lengthening then proceeds some days later.

DELAYED UNION AND FAILURE TO GAIN REQUIRED LENGTH

Occasionally people fail to form mature strong bone. Lengthening may have to be stopped before the required target is reached. Reasons for this may be poor diet, poor compliance with physiotherapy regime or poor general medical condition.

NAIL PROBLEMS

The PRECICE Nail, or the bolts securing the nail may loosen, or fracture. This is very rare but would mean a surgical procedure to fix / exchange screws or nail and continue or possibly convert to an external fixator in order to continue with your planned lengthening process.

FRACTURE OF YOUR NEW BONE

Following the lengthening procedure and when you are allowed to fully weight bear without using crutches and go back to “normal life activity”, it is possible that the new bone created will fracture. This is very rare and you must adhere to specific instructions that you are given regarding returning to normal activities.

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