



**TaLLer**<sup>LTD</sup>

In association with The Paley Institute

## **A Guide to Leg Lengthening**

Now available at Schoen Clinic London

## Introduction

This booklet is designed to help you understand the science behind bone lengthening and guide you through the process required to make you taller. It should provide you with helpful information and answer questions you may have, if you have any further questions please ask.

It is important to us that you fully understand what is involved in bone lengthening and that you participate in the procedure to gain the most from your treatment. There are limitations to how much lengthening may be achieved by any procedure and potential complications such as stiffness may limit how much you can be lengthened.

Physiotherapy is essential, maintaining mobility and movement in your joints throughout lengthening by exercising and stretching is very important.

## Osteoclasis and the Ilizarov technique

Osteoclasis is the term used when a bone is intentionally fractured to correct a deformity. The principle that healing bone can be shaped or stretched was harnessed by Dr Ilizarov in Siberia in 1950. He found that it was possible to stretch the existing bone to lengthen it and therefore grow the bone.

We have learnt that the ideal rate to grow or lengthen a bone is 1 mm per day. Dr Ilizarov used a complex system of pins with a frame for his technique. We now have a much simpler device and technique available for you, the Precice nail is the device which we have used to allow us to lengthen the bone remotely. The Stryde nail now allows one to bear weight through the bone during the distraction phase making it easier to mobilise in the post-operative period, this is a major improvement.

## The Surgeon

Ian Bacarese-Hamilton is an established Orthopaedic Surgeon in London. He trained in Medicine at Charing Cross and Westminster Hospital Medical School and his surgical training included spells at University College Hospital, Chelsea and Westminster Hospital and the Royal National Orthopaedic Hospital. He was appointed a Consultant in Trauma and Orthopaedic Surgery at The Whittington Hospital in North London twenty-five years ago and developed his private practice at the Princess Grace Hospital in Central London. He is also on the Consultant Staff at King Edward VII Hospital. Ian has now moved to Schoen Clinic in Marylebone in order to further his practice.

Ian has extensive experience in Trauma and Orthopaedic Surgery and a long-standing interest in leg lengthening. Having seen the technique and results possible at The Paley Institute in West Palm Beach he has teamed up with Dr Dror Paley to bring this facility to Central London.

## The Technique

TaLLer uses the most cutting-edge technology available in the world today with an implantable limb lengthening device for stature lengthening. This involves inserting a telescopic intramedullary nail (a tube-like device into the marrow cavity of the bone). The best device available today is the Precice STRYDE nail from Nuvasive Specialized Orthopedics. The Precice has excellent rate control and patients tell us that there is very little pain associated with the lengthening process. The Precice is the only device on the market that has a reverse mechanism which is a very important safety feature. We are now using the Precice STRYDE nail which is the newest and strongest version and allows weight bearing through the bone in the post-operative period. This is a major advantage allowing the patient to walk and weight bear after surgery.

## The Operation (surgery)

Surgery is designed to allow the Stryde nail to be fitted into the bone which is to be lengthened, both sides to be lengthened will usually be operated on at the same time.

For femoral surgery this involves making a small cut over the point of the femur at the greater trochanter and preparing the bone. The nail is introduced into the medulla (marrow area) of the bone after the bone has been divided. Locking screws (two above and two below the osteotomy) are inserted through the bone and the nail to fix it in position. These locking screws will hold the nail in place whilst the bone grows over the nail.

Soft tissue releases may be performed at the same time to allow the tissues to yield as the bone grows, this will involve a further incision just above the knee.

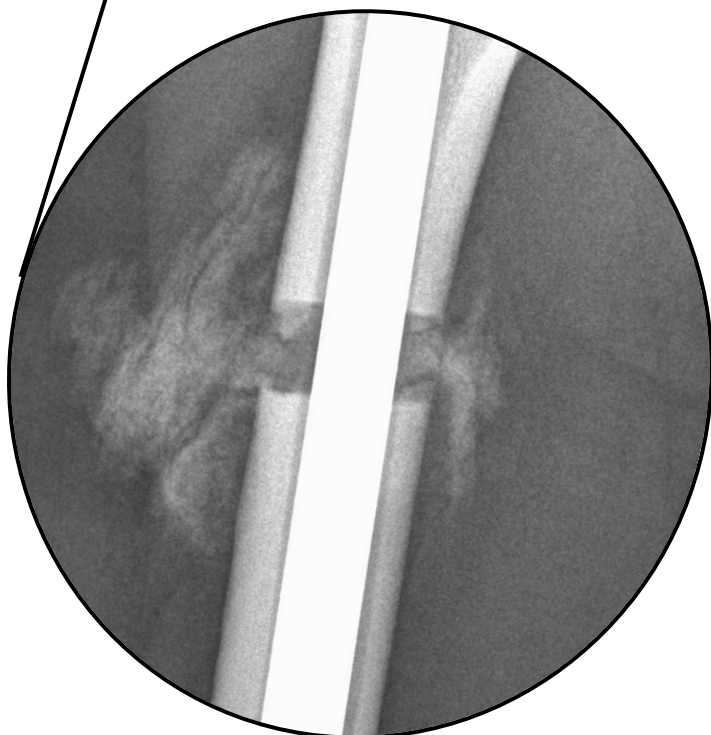
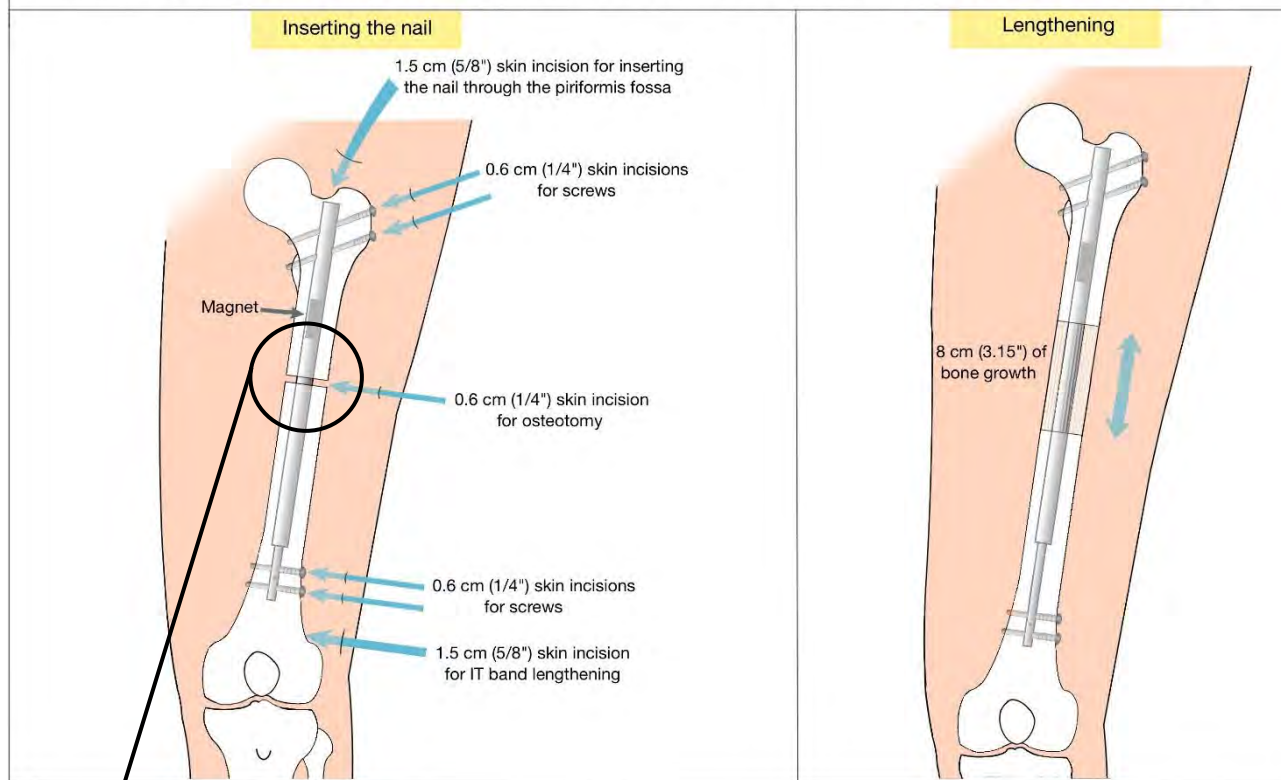
## Lengthening

The distraction process will start in the operating theatre where we will check the nail and the External Remote Control (ERC) and start the distraction in order to ensure that it is functioning. We would usually distract the bone 1mm and then show you how to do this on the ward after surgery. There is then a latency period of about a week while the fracture haematoma organises before lengthening continues.

Individual instructions will be given on how to use the ERC and you will be supported until you are confident and feel able to carry out the adjustments yourself. The handset is normally used 4 times per day, each use will result in lengthening of 0.25 mm so that with 4 uses the bone will lengthen 1 mm per day. The ERC needs to be placed in a specific position on your limb for the device to work, you will be shown where this is. The site will be marked for you with an indelible marker in the operating theatre during the operation and this mark will remain whilst you are lengthening.

## Lengthening the femur with Precice

Femur: Piriformis Fossa Entry for Antegrade PRECICE Nail Insertion, Skin Incisions, and Lengthening Site



Early distraction with the Stryde Nail, bone formation can be seen in the fracture gap.



Bridging callus (new bone) spanning the fracture gap after distraction.

## Using the ERC



The handset contains a strong magnet. Please be aware that when the handset is turned on, the magnet is activated. Metal objects, watches, mobile phones and credit cards should not be placed near the device. Family members or carers with a heart pacemaker should not be present when the device is turned on.

## Mobilising after Surgery

You will begin to mobilise with the nursing staff and therapists attending to you in hospital. Limited weight bearing is allowed in the leg being lengthened. The Stryde nail allows for increased weight bearing and mobilisation with crutches. If both legs are being lengthened at the same time you will require significant support and will be shown how to mobilise whilst in hospital. The amount of weight bearing allowed with the Stryde nail varies according to the size of the nail used, you will be advised how to mobilise until the lengthening process is complete and during the consolidation phase.

The consolidation phase is the period from when lengthening stops until the bone hardens and usually takes one month. Full weight bearing is permitted after consolidation.

## The Soft Tissues

The bone is lengthened slowly, at a rate of 1mm each day, during this period the soft tissues will need to stretch to maintain mobility. Muscles can become tight and it is very important to maintain good movement in the hips, knees and ankles. These joints will become stiff if they are not stretched, physical therapy will help you with exercises and stretches to help prevent this.

If you are not able to maintain good joint movement the amount of lengthening may be limited; start stretching early and keep it up.

The nerves in your leg are also stretched as the limb is lengthened. If you notice a change in sensation, get pins and needles or numbness it is important that you temporarily stop the lengthening and contact a member of the team.

## Physiotherapy

Physiotherapy is required to maintain a programme of exercises and stretches throughout the lengthening procedure. We can organise physiotherapy to start prior to surgery to make it easier for you. The soft tissues will stretch as the bone lengthens if the exercise programme is strictly followed, therapy will require regular attendance. Stiffness may limit how much you can lengthen and will be monitored for you. Weekly X-rays will help to see the bone lengthening and new bone formation. The lengthening process may need to be curtailed if new bone fails to form or if stiffness prevails.

## Consolidation

Once you have finished the distraction process and you have achieved the desired length the new bone will gradually consolidate or harden. This may take a period of six weeks but may take longer. With the Stryde nail you may be able to fully weight bear during this period, but you should walk with the protection of crutches until the bone consolidates fully. You will be advised by your team who will be reviewing your x-rays regularly.

## Progress X-Rays

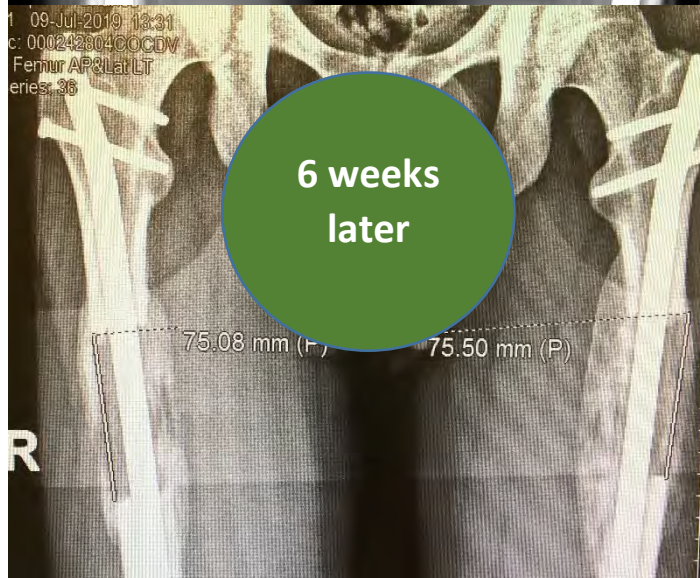


Early distraction of the femur using the Precice nail.



X-rays showing the same femur after consolidation six months later.

# Progress X-Rays





## General Advice

### Preparing for Surgery

You should prepare for surgery much like you would prepare for any significant event in your life. Ensure that you are psychologically ready and have had all your questions answered. You should be physically fit and well nourished. If you have been unwell or feverish or if you have been on medication inform your team. It is important that you understand what you are embarking on and are fully committed to the programme of stretches and exercises which you may have already started.

### Diet

Simple Multivitamins containing Vitamin A, C and D are recommended and should be taken daily. You may feel less hungry after surgery, but it is important to eat well throughout the lengthening process.

### Constipation

Most painkillers can cause constipation. To relieve the symptoms of constipation drink plenty of water and eat food that contains fibre such as wholemeal cereal, wholemeal bread, fruit and vegetables. Prune juice can be very effective and may be started before coming into hospital.

### Smoking

We strongly advise that you do not smoke or spend any time in a smoky environment. Smoking is known to delay bone healing and increase the risk of complications. There are many options available to help you stop smoking. Leg lengthening is not advised in smokers.

For advice, help and support:

Call Smokefree National Helpline on 0300 123 1044

### Contraception pill or Hormone Replacement Therapy (HRT)

Women will need to stop taking the oral contraceptive pill or HRT six weeks before treatment, make sure that you have discussed this with your doctor. Alternative forms of contraception should be used during this period.

### Medication

Please advise the nursing or medical staff if you are taking any medication. This should include any blood thinning medicines such as Aspirin. Non-Steroidal Anti-Inflammatory drugs such as Voltarol or Nurofen should be avoided as they may slow down the formation of new bone.

## **Allergies**

Please advise the nursing or medical staff if you have any allergies.

## **Coming into hospital**

You will be admitted to Hospital on the day of your operation. Unless otherwise instructed, you should attend the admission lounge at 7am, from here you will be allocated a room and a ward. Full details about coming in to hospital will be given to you at your pre-operative assessment.

## **Travel to hospital**

A detailed map of the hospital site as well as advice on public transport and parking can be provided, please ask.

If you are travelling by car, you may find it easier to sit in the front seat with the seat pushed back, cushions can be used to support your legs during lengthening.

## **Hospital stay**

You are likely to stay in hospital for 5 days at the time of surgery. Whilst in hospital you will be taught how to use the ERC for lengthening and how to mobilise using crutches. The advice given to you and the exercises and stretches you perform are extremely important and will help to keep you supple. Pain control will be established, and you will be given appropriate medication to go home with.

## **Day of discharge**

We aim to have you discharged from hospital before 11.00 am on the day of discharge. Please ensure that your family member or carer is ready to collect you and that you have any medication you may need.

## **Driving**

You should not drive until the bone has healed. Applying pressure to the limb, such as when braking suddenly, may damage the mechanism of the nail. This may lead to failure of treatment and further surgery. You will need to discuss your return to driving with the DVLA and your insurance company.

## **Common emotional problems**

Coming in to hospital for surgery may be stressful and it is not unusual for patients undergoing prolonged treatment to experience some degree of emotional turmoil. During limb lengthening there may be times when you feel it will never end, reduced mobility will curtail your social life and you will be more dependent on others for your daily needs.

Not everyone suffers emotional problems, but you should be aware that they can occur, and you should seek advice from your nurse or doctor if you feel you need any extra support.

## Care of your surgical wound

The wounds from surgery will have been sutured and dressed in the operating theatre. The dressings used are waterproof and will allow you to shower and wash. The dressings are best left undisturbed for at least ten days. You will be provided with fresh dressings should you need them. Once the wounds are dry they can be left open to the air. It is important to wash your hands with soap and water and dry them on a clean towel before touching your wounds or dressings.

Surgical wounds go through several stages of healing, it is normal to have:

- Tingling or itching
- A slight lumpy feeling around the scars
- Bruising around the wound
- A pulling feeling around the wound closure

## Scars

Scar tissue should be protected from the sun by using sun block. The scars are not usually a problem but if there is concern about hypertrophic scars or keloid formation scar reduction patches may be used after healing.

## Review

You will have been told when you need to be seen in clinic after discharge from hospital, usually within a week and then weekly. The outpatient review may take some time as you will need to have x-rays before you see your team to monitor your progress, we will coordinate your appointments for you.

## Location of services

Outpatient and Inpatient Services are now all based at

Schoen Clinic London,  
66 Wigmore Street,  
Marylebone,  
London W1U 2SB

## Leisure time – sport and holidays

Your consultant will advise you on when you will be able to go back to playing sport after consolidation. Swimming is generally permitted but always check first. We can organise hydrotherapy for you at an early stage, it can be very helpful.

## Travel

We advise you not to travel too far during the lengthening process. If you want to go away on holiday you should discuss this with your consultant. Should you need to travel by aeroplane you may need to explain your situation to the airline.

## Potential Complications

### Deep Vein Thrombosis (DVT)

A deep vein thrombosis (DVT) can occur after any surgery or sometimes after a long flight or period of immobility. This is treated by medication which thins the blood. Risk factors for this occurring will be assessed and if necessary you be placed on anticoagulation therapy. Most patients are prescribed medication such as Xarelto (rivaroxaban) or Aspirin to help reduce the risk of DVT and PE (pulmonary embolus).

### How can I help prevent DVT?

See Appendix 1.

### Infection

The following may be signs of wound infection. If any of these are present, contact your team or GP as soon as possible

- Increased pain in the area
- Spreading redness of the skin
- Increased discharge or pus
- Increased swelling
- A temperature or feeling unwell
- Delayed wound healing
- General malaise

If you were to get an infection within the bone or around the nail, the nail may need to be removed and you will require additional treatment.

### How can I help prevent infection?

See Appendix 2.

### Joint stiffness and soft tissue tightness

Stiffness may be a problem which will affect your ability to mobilise and can limit how much you grow. It is of prime importance that you perform the exercises and stretches you have been shown regularly. In severe cases surgery may be required to release tightness in the soft tissues to allow a full range of movement or the lengthening may need to be stopped.

### How can I help prevent joint stiffness?

See Appendix 3.

## **Joint instability**

Following long lengthening procedures there is a small risk of subluxation or dislocation of the neighbouring joint. This applies to the hip when lengthening the femur and to the knee when lengthening the tibia. We will monitor this during the lengthening process and although it can usually be prevented with physiotherapy, it may lead to abandoning further lengthening.

## **Nerve and blood vessel injury**

Rarely nerves and blood vessels can become damaged. This can occur at the time of surgery or during the subsequent lengthening of the bone. You should inform your team if you experience pain, numbness or pins and needles. Should this occur during the lengthening process we may slow down the rate of adjustment or even stop lengthening. Usually this wears off, but in some cases, it may become permanent.

## **Failure to gain length/delayed union**

This may occur if bone does not form during lengthening or takes a long time to mature. Other reasons for failure to gain length relate to problems with stretching the nerves, blood vessels, muscles and tendons. Your consultant will advise you about treatments should this arise. It may be necessary to slow down the distraction or even stop it. If despite these changes bone healing remains poor the lengthening can be reversed until better bone formation is seen. The bone can then be relengthened, the Precice nail is the only device which allows us to do this.

## **Problems with the nail**

The nail or screws holding the nail in place may become loose, fracture or there may be a problem with the mechanism in the nail. Should this occur, further surgery in the form of exchange nailing may be required.

## **Refracture**

Fractures following removal of the nail are a rare problem. If this were to occur, it would probably require further surgery in the form of re-nailing. For this reason, the nail is not unusually removed until the new bone is strong enough, at about two years following lengthening.

## **Can I be worse off?**

The worst-case scenario could occur if there were uncontrolled infection, damage to the arteries and nerves or interruption of the blood supply to the muscles. There is a risk that this could lead to amputation of the limb.

## Frequently asked Questions

### Who requests this operation?

Most people who seek this surgery are unhappy with their body image. Body image is the way we perceive ourselves. In relation to height it is the way we perceive our own height and our body proportions. The psychologist Dr Walter Windisch, called this condition Height Dysphoria (Dysphoria literally means unhappy, the opposite of euphoria). In other words, unhappy with your height. Dr Dror Paley has called this Height Neurosis.

Some patients also have Body Dysmorphic Disorder. They usually also need psychological support and medication but may be candidates for this surgery. Psychiatric consultation is warranted in this group.

### What is the normal range of adult height in the population?

When assessing distribution of height in the population we consider the normal bell curve. We divide people by distribution around the mean (average). Normal height is considered  $\pm 3$  standard deviations (SD) from the mean. Stature below 3 SD from the mean in persons without a medical condition such as dwarfism or growth hormone deficiency is considered constitutional short stature. A physician defines the normal range of height between the 5<sup>th</sup> and 95<sup>th</sup> percentiles. The lower limit of so-called *normal stature* for men is 5'5" (166 cm) and for women is 5'0" (153 cm).

Percentile	SD	Height Women (in)	Height Women (cm)	Height Men (in)	Height Men (cm)
95	+3	68.5	174	74	188
90	+2	67.5	171	73	185
75	+1	66	167	71.5	181
50	Mean	64.5	163	69.5	176
25	-1	63	160	68	172.5
10	-2	61.5	156	66.5	169
5	-3	60	153	65	166

### What method do we use for stature lengthening?

At TaLLer we use the most cutting-edge technology available in the world today. We use an implantable limb lengthening device for stature lengthening. This involves inserting a telescopic intramedullary nail (tube-like device in the marrow cavity of the bone). The best device available today is the Precice Stryde Nail from Nuvasive Specialised Orthopaedics. It is currently the only FDA approved device on the market. The Precice has excellent rate control and patients claim little pain associated with the lengthening process. The Precice is the only device on the market that has a reverse mechanism. The ability to go in reverse is a very important safety feature. We are currently using the Precice Stryde which is the newest strongest version of this device and allows weight bearing during distraction.

## **What is the relationship of height to Height Dysphoria?**

While actual height is related to the condition there is no height threshold under which you cannot suffer from height dysphoria. Most of us would assume that you could only suffer from Height Dysphoria if you are 'short'. The problem is that the perception of who is short varies from person to person. That threshold differs along racial, national and cultural lines: 5'10" is tall in India but short in Holland.

The following anecdote illustrates the point: A man flew from Holland for a consultation regarding stature lengthening. He was 5'11" tall. He said that since he was a teenager he has suffered from feeling short. He is the shortest male in his family and even his sister is his height. All his friends are much taller. He reminded the surgeon that the Dutch are the tallest people in the world. He was the same height as the surgeon. The surgeon had never perceived himself as short nor had any of his family or friends. He therefore had difficulty considering this patient for stature lengthening. The patient was sent for psychological evaluation. The psychologists report showed he suffered from the same body image problem as all the other patients evaluated. Despite his seemingly tall height he suffered from Height Dysphoria.

Paley et al studied the relationship of starting height to the diagnosis of Height Dysphoria and found that patients starting height varied from 4'10" to 5'11" for males and 4'6" to 5'8" for women. While more of the patients were at the lower end of this spectrum, the fact that some were at the upper end clearly demonstrated that height is not the primary problem. The primary problem is the psyche's perception of height and proportion. We call this body image. Stature Dysphoria is a body image disorder. The patient perceives themselves as short irrespective of the actual height and irrespective of how others see them.

## **Is there a height threshold above which stature lengthening is not appropriate?**

Based on the above findings the answer should be no. It is the patient's perception that counts. As regards risks of the procedure they are no greater if you are taller. In fact, they should theoretically be less since the percent increase in length of a longer bone is less.

## **How much height can I gain with the Stryde Nail?**

Although the Stryde Nail can lengthen to 8cms in the femur, not every patient can safely achieve this much. We will only allow lengthening to the tolerance of the bone and soft tissues. The risk of complications increases with increasing length. Up to 5cm we see a low risk, 5-8 cm of lengthening is associated with medium risk, lengthening over 8cm in a single bone at any one time is considered high risk.

## **Can I have an MRI scan?**

**The Precice nail is not MRI compatible and you must not have an MRI scan whilst you have a Precice Nail in you. Please ensure that you inform all medical staff and radiographers that you have had this treatment.**

### **How long does it take?**

Every person is different and the amount of time it takes to lengthen a bone will vary. You will need to attend clinic every week whilst you are lengthening, during this visit you will have x-rays to check how well the new bone is forming. These x-rays and any symptoms will determine the rate at which we grow your bone. Bone is normally lengthened at a rate of 1mm/day therefore a 50mm (5cm) lengthening will take 50 days until you finish the lengthening process. 80 mm (8cm) of lengthening will take 80 days.

After lengthening the new bone will need to harden before you can fully weight bear and participate in sports. This period of consolidation will usually take six weeks.

### **Is it painful?**

Immediately following surgery you may have significant pain but you will be given good pain relief. Once the initial pain has eased you will receive tablets for pain relief. On discharge you will be given a supply of these which may need to be renewed. Please ensure your supply of medication does not run out.

You may experience pain during the lengthening process as the bone stretches alongside the nerves, muscles and blood vessels. This can be relieved with the appropriate medication or adjustments to the rate at which we lengthen, please inform us if your symptoms change or pain is not well controlled.

There are some pain killers that you best avoid as they may interfere with the process of bone healing. These are aspirin and Non-Steroidal Anti-inflammatory Drugs (NSAIDs) such as:

- Diclofenac (Voltarol),
- Ibuprofen (Nurofen),
- Naproxen,
- Indomethacin.

Please note that this is not an exhaustive list and that generic and commercial names may be different. Ask your chemist / pharmacist / nurse / GP for help if you are unsure.

### **When is the nail removed?**

It is recommended that the nail is removed at the end of lengthening at which time there will be no foreign material in you. We should wait for the new bone to be strong before the nail is removed to reduce the risk of fracture. The STRYDE nail is made of stainless steel but there are other materials including rare earth magnets inside the nail. The moving parts can also lead to wear and corrosion and for these reasons it is preferable to remove the nail.

We would usually remove the nail two years after lengthening, this will involve a short procedure when the existing scars may be used. The device should be removed by our team who are familiar with the device and have the appropriate equipment for removal.



## **Appendix 1**

### **Helping to prevent deep vein thrombosis**

Surgery and some medical treatments can increase the risk of developing DVT. If you are at risk of developing a DVT your team can take measures to help prevent a blood clot forming.

#### **Before going into hospital**

If you are going into hospital to have an operation and are taking the combined contraceptive pill or hormone replacement therapy (HRT) you should stop taking this six weeks before your operation. Alternative forms of contraception should be considered.

#### **While in hospital**

There are several things you and your team can do to help reduce the risk of getting DVT while you are in hospital. You can help by making sure you have enough to drink so that you do not become dehydrated. You will also be encouraged to move around as soon possible, exercising is very helpful. Depending on your risk factors and individual circumstances, several different medications can be used to help prevent DVT. For example:

- Low molecular weight heparin is often used whilst you are in hospital. This is given by subcutaneous injection.
- Anticoagulant medicines, such as Xarelto or rivaroxaban are often used to help prevent blood clots after surgery, including orthopaedic and lengthening surgery. This is taken orally.

Compression stockings or compression devices are also commonly used to help keep the blood in your legs circulating. Compression stockings are worn around the lower legs and fit firmly to help empty the veins and reduce the risk of DVT.

Compression devices are inflatable and work in the same way as compression stockings, inflating at regular intervals to pump the blood in your legs back to the heart.

#### **When you leave hospital**

You will need to continue to take anticoagulant medicine and wear compression stockings when you leave hospital. You should continue with the anticoagulant (Xarelto) until you are fully weight bearing unless you have problems such as bleeding when it may be stopped.

Your team will advise you about how to use your treatment, how long to continue using it, and who to contact if you experience any problems.

## **Lifestyle changes**

You can reduce the risk of getting a DVT by making changes to your lifestyle, such as;

- not smoking
- eating a healthy, balanced diet
- getting regular exercise
- maintaining a healthy weight or losing weight

## **Travelling**

See your doctor for advice before long-distance travel if you are at risk of getting a DVT, or if you have had a DVT in the past.

If you are planning a long-distance plane, train or car journey (journeys of six hours or more), make sure you:

- drink plenty of water
- avoid drinking excessive amounts of alcohol because it can cause dehydration
- avoid taking sleeping pills because they cause immobility
- perform simple leg exercises such as regularly flexing your ankles
- take occasional short walks when possible
- wear elastic compression stockings or flight socks

## **Appendix 2**

### **Helping to prevent infection**

Good hygiene is the primary way to help prevent infection:

- wash your hands well with soap and water after using the bathroom, after blowing your nose, coughing, sneezing, feeding or stroking your pet, visiting or caring for a sick person
- do not share dishes, drinking glasses or eating utensils
- do not pick at healing wounds
- if a person you know is unwell you should not allow them to visit

### **Dressings**

Waterproof dressings are used to cover the wounds and should not be disturbed. Resist the temptation to peek and leave the dressings in place for at least ten days after which time they will be reviewed in clinic. If the dressing should come off, replace it with a similar dressing which will have been provided for you.

### **Infection**

Antibiotics prescribed early can be very effective at treating infection.

If there are any signs of infection contact your team promptly.

Signs of infection include a spreading redness around the scar, increased temperature or heat around a scar, pain or swelling should be reported as should any discharge from the wound.

## **Appendix 3**

### **Helping to prevent stiffness**

Performing regular stretches and exercises is the best way to help prevent stiffness. Your Physiotherapist will teach you how to perform these and will check you regularly after discharge from hospital. You will need to spend some time doing these every day, get into a routine and do not give up.

Your muscles will start to stretch to keep up with the longer bone as it grows. This can be an uncomfortable process and you are likely to feel stiff during the lengthening phase. The discomfort will only be temporary until the muscle lengthening is complete and there is plenty that you can do to reduce the stiffness and maximise lengthening.

#### **Before Surgery**

Before the lengthening procedure you will be required to have a consultation with a specialist trained TaLLer physiotherapist. You will be prescribed a personalised exercise programme to complete at home to prepare you for surgery and to ensure that you can achieve the most out of your lengthening procedure. This consultation will usually take place 12 weeks before surgery.

#### **After Surgery**

Immediately after surgery you will be seen by a physiotherapist on the ward. Your physiotherapist will help you to get out of bed and teach you some gentle exercises and stretches.

#### **The lengthening process**

Once discharged from hospital you will be required to attend for physiotherapy most days of the week during the lengthening process. Your physiotherapist will use a combination of passive stretching and massage techniques to optimise the elasticity of your muscles and help you to achieve maximum length.

#### **Exercise**

In addition to specialised physiotherapy sessions you will be prescribed a personalised home stretching exercise programme that you will be required to complete 3 times per day. Most of the exercises you will be able to do on your own but for some you will require the assistance of a friend or relative.

## **Hydrotherapy (water-based therapy)**

Hydrotherapy can be started as soon as your wounds are dry after surgery, suitability for this therapy will be approved by your surgeon.

Hydrotherapy is a great environment to exercise in as the buoyancy of the water will reduce your body weight and allow you to mobilise without worrying about the weight bearing restrictions that are applied on land.

If you are keen and suitable your TaLLer physiotherapist will prescribe you an individualised hydrotherapy programme.

## **Massage**

Massage can help to reduce stress, pain and muscle tension whilst you are going through the lengthening process. Your TaLLer physiotherapist will use a variety of massage techniques to help reduce stiffness during your treatment sessions. They will also teach you some massage techniques to use on yourself at home to assist in reducing stiffness.

## **Heat**

Heat therapy can provide immediate relief from sore, tight and stiff muscles. Your TaLLer physiotherapist may use heat during treatment sessions or advise you to use heat at home.

## **Cold**

A device which uses cold therapy will be available for you to use on the ward whilst you are an inpatient, you can ask about taking this home with you if you find it helpful. It can be very useful in reducing swelling and relieving discomfort.