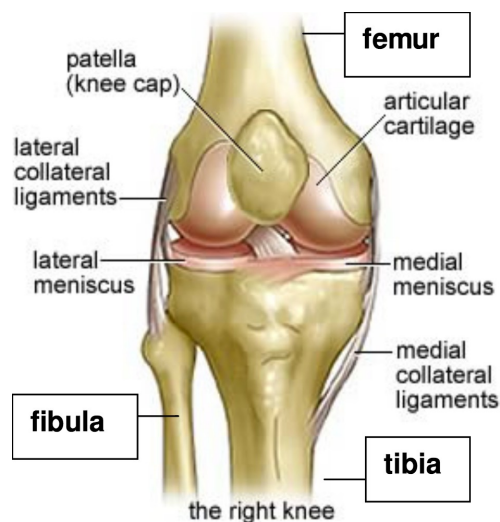


Patient Information And Rehabilitation Guidelines Following High Tibial Osteotomy Surgery

This booklet aims to improve your understanding of high tibial osteotomy surgery and the rehabilitation afterwards.

Anatomy

Osteoarthritis can affect any joint in the body but is more common in joints in the lower limb weight-bearing joints, eg hip and knee.



A joint is formed where two bones meet. The ends of the bones, which form the joint, are covered in articular cartilage.

This provides a smooth, slippery and low friction surface that also cushions the joint. Healthy cartilage absorbs stress and allows the bones to glide across each other smoothly.

Osteoarthritis

The word arthritis means joint inflammation. Also known as 'degeneration' or 'wear and tear' arthritis, osteoarthritis is the most common type of arthritis and develops over a long period of time.

It affects the articular cartilage, which can start to wear away. Sometimes this affects one side of the knee joint more than the other.

What is high tibial osteotomy (HTO)?

This is an operation, which aims to change the weight bearing forces that pass through the knee.

If you have osteoarthritis (wear and tear) and it only affects one side of the knee, it may be appropriate to have a HTO.

The operation is aimed at younger patients to avoid/delay total knee replacement. This is because total knee replacement does restrict activity levels and having one at a young age means it is more likely to wear out.

Benefits of surgery

Pain is usually the common complaint. This operation aims to reduce or get rid of the pain. Treatment will be successful for 70 to 90 out of 100 people and unsuccessful for 30 to 10 out of 100 people. Other benefits include improved lifestyle and delay to full knee replacement.

Alternatives to HTO surgery

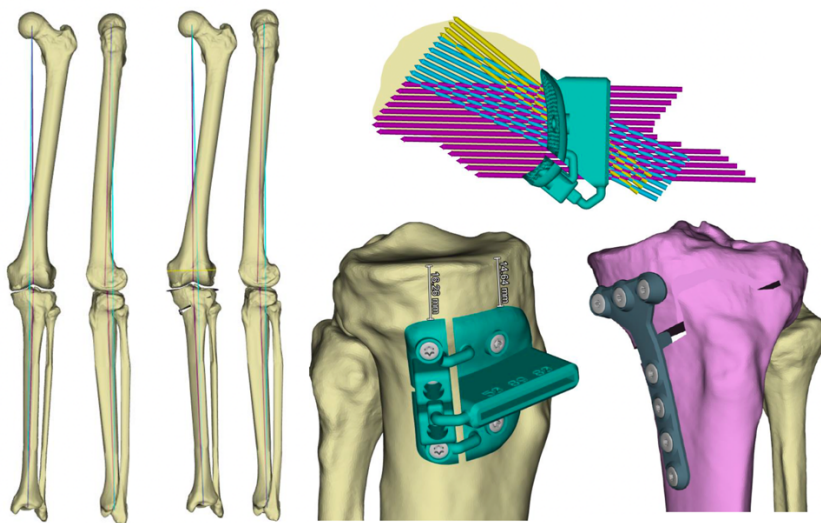
Alternatives to surgery include:

- Conservative measures, these include painkillers anti-inflammatories, using a walking stick, shoe insoles and knee braces.
- Accepting the pain caused and limitations that your arthritic knee places on your quality of life and deciding to live as you are, doing nothing and not having an operation.
- A unicompartmental (or partial) knee replacement. This replaces the osteoarthritic side of the joint and replaces it with metal and plastic. This is still a knee replacement, it does **not** allow you to return to high impact activities (e.g. running). In younger patients it is likely to wear out and require revision.
- Total knee replacement. This remains an option but in younger patients it too is likely to wear out and require revision. It also will not let you return to high impact activities.

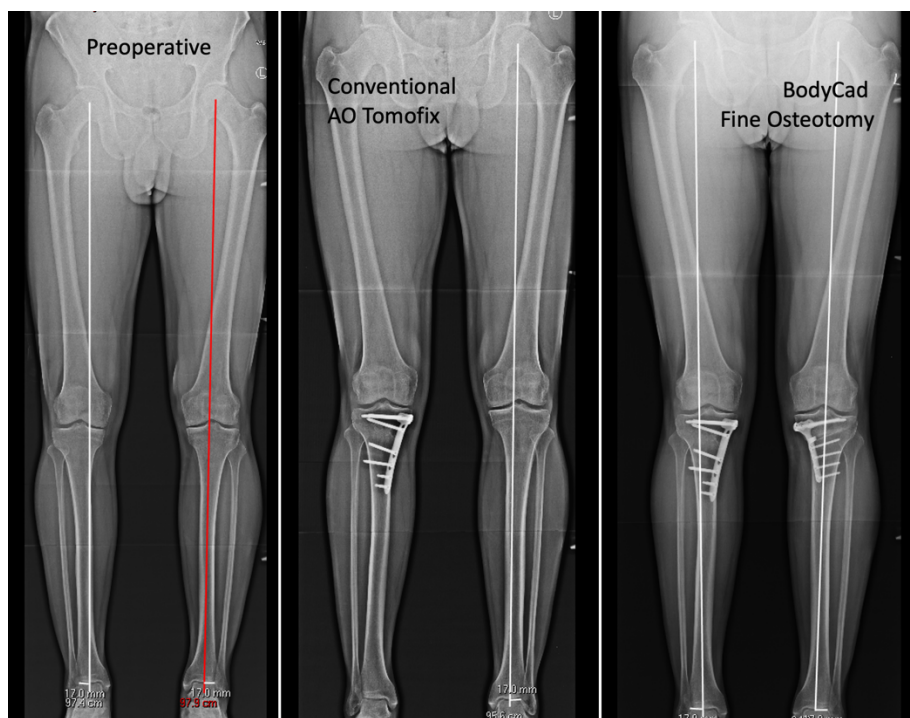
The procedure

The shinbone (tibia) is cut. A piece of bone is sometimes taken from the front of the pelvis and this bone graft is placed into the cut made in the shin. A metal plate (the AO Tomofix or BodyCad Fine osteotomy plate) is used to hold the cut tibia and bone graft in place. The knee can change position so that instead of the leg being bow legged, it can look slightly knocked kneed. This is normal.

Using the BodyCad system, preoperative 3-D planning merges weightbearing radiographs and CT scans. The upper end of the tibia is cut, using cooled drilling via patient specific cutting guides, obliquely to a bone “hinge” at the lateral side. This promotes earlier healing of the bone cut and reduces the risk of damage to the nerves and blood vessels at the back of the knee.



A precise trapezoidal wedge opening of the cut is designed. Pain relief lasting up to 20 years can be expected when the target correction to 3-6° valgus is achieved. The osteotomy is secured with a bespoke plate and screws designed to fit the new bone shape perfectly.



Complications

Complications do occur. Some are minor and some require further surgery. It is important you understand this before proceeding with surgery. Examples include:

Complications seen in 100 patients having an operation	Recorded in literature	Mr McNicholas' cases
Anaesthetic risks (please discuss with anaesthetist)	Not recorded here	Not recorded here
Hinge fracture	4 - 11	6
Donor site problems (if graft used)	20	5
Delayed union	4	5
Undercorrection	31	31
Overcorrection	19	13
Superficial Infection	3.4-7.1	8
Deep infection into the osteotomy/ joint	4	4
Popliteal Artery damage	V rare (case reports)	0
Amputation	V rare (case reports)	0
Deep vein thrombosis (clot in the calf)	4	0
Pulmonary embolism (clot in the lung)	0-0.02	0
Death	V rare (case reports)	0
Compartment syndrome	0-0.02	0
Knee stiffness	14	0
Hypertrophic scar	Not reported	1
Foot problems	V rare (1 case report)	1
Temporary nerve injury	2-25	5
Permanent nerve injury	4.7-14	0
Complex Regional Pain Syndrome (abnormal pain reaction may need medication, physio, pain clinic)	0.4-20	0
Further surgery to knee	33 at 10 years 54 at 15 years	8
Removal of metalwork	10-100	11
Conversion to total knee replacement	15 at 5 years 47 at 10 years	4

If you smoke, you will have to stop before the operation can be offered to you, as smoking could cause the bone not to heal and increase risks of chest infection and clots in the leg or to the lung.

You may be given a tablet or an injection of blood thinner to reduce risk of clot problems.

Pre-operative Assessment

An assessment of your fitness to undergo surgery including a detailed medical history, height, weight, blood pressure and pulse will be performed before surgery. Blood tests and a heart trace (ECG) may also be needed.

The Day of the Operation

You are asked not to eat anything for at least 6 hours before your operation, you may drink plain water until 2 hours before your operation.

You will be seen by Mr McNicholas and your Anaesthetist before your operation.

In the anaesthetic room, you will have a needle put into your arm and will be placed on an anaesthetic machine, local anaesthetic techniques will be used.

Surgery usually takes around 1 hour.

You will wake-up in the theatre recovery room. On return to the ward you will have the following:

- Dressings – wool and crepe bandage on the knee and a splint
- Drips and drains – there may be small tubes in the back of your hand. You might also have a tube into your bladder (catheter).
- Analgesia – this may be oral medication or patient controlled analgesia (PCA), which looks similar to a drip.

You can be **discharged from hospital if progressing well, managing exercises, and safe on the stairs.**

Discharge Instructions

The wound is to be kept dry until healed and the dressing is not to be disturbed unless soiled and a clean one applied.

Regular ice application (10-15mins every 1-2 hours) or wearing a cryocuff.

You will be given pain relieving medications to take home with you, please take these as prescribed to prevent pain from building up to a level that is hard to control.

Physiotherapy appointment arranged. Expect bruising in the thigh and lower leg.

Remember your scar and numb skin on the outside of your knee beside it are highly susceptible to the sun, and use of a higher factor sun block is advised.

General Advice

Return to work will depend greatly on the job that you do (desk-based jobs 2-4 weeks; manual jobs 6-12 weeks; jobs requiring ladders etc. 3-4 months).

Return to driving at 6 weeks for manual geared cars and automatic cars if it is the right leg that has been operated on. If it is the left leg that has been operated on, you may drive an automatic car once the wounds are healed at 2 weeks.

You should notify your insurance company of the procedure that has been undertaken to ensure that your cover is valid. For further information follow this web link: <https://www.gov.uk/driving-medical-conditions>

Flying is not permitted for 8 weeks following surgery due to a higher risk of developing a blood clot. For further information follow the web link below: <http://www.nhs.uk/chq/Pages/2615.aspx?C%20ategoryID=69>

Follow-up

You will be seen at 2-3, 6, 12 weeks and 3, 6, 9, 12 months, 2, 5, 10 years annually after that.

6-12 weeks

An x-ray will be used to check if the bone is healing. If not, weight bearing may need to be restricted but this is very unusual.

12 weeks+

Another x-ray is used to see whether the bone is fully healed. If it looks satisfactory the crutches are no longer needed.

If the bone healing is very slow a special machine can be used to stimulate bone growth around 3-4 months after the operation.

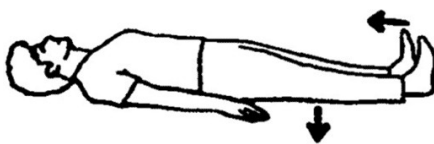
Rehabilitation (Physiotherapy) Programme

0-6 weeks

Using a plate called an A.O. Tomofix, or BodyCad you may have a splint on the first day until you can straight leg raise, then no splint would be needed. You may weight bear as tolerated and movement of the knee is allowed. You will probably need elbow crutches for 6-12 weeks.

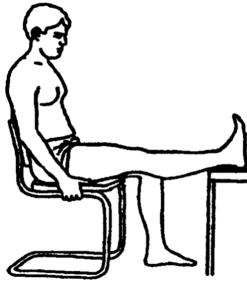
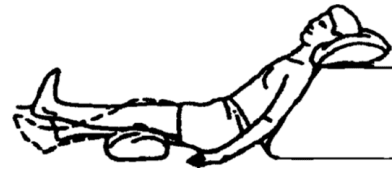
The following exercises need to be carried out 4 times a day.

1. Bend and straighten your ankles briskly. Repeat 10 times.



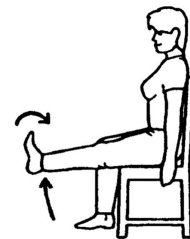
2. Lying on your back or sitting with legs straight. Pull your toes up towards you and push your knee down firmly against the bed. Hold 5 seconds. Repeat 10 times.

3. Sitting with back supported. Place a rolled towel under your knee. Pull your toes up towards you, straighten your knee and push it down against the towel. Hold 5 seconds. Repeat 10 times.



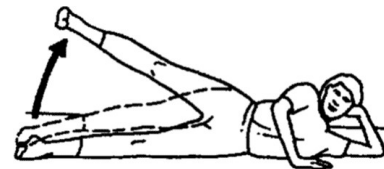
4. Sitting on a chair or bed with the leg to be exercised supported as shown. Use a rolled towel under the heel if sitting on a bed. Let your knee straighten in this position. Hold 5 seconds. Repeat 10 times.

5. Sit on a chair. Pull your toes towards you, tighten your thigh muscle and straighten your knee. Hold 5 seconds. Repeat 10 times.



6. Sitting on the bed place a sock on your foot. Place a slippery board/tray under your foot and a band around it. Bend your knee as far as possible. Gently pull the band to bend a little more. Hold 5 seconds. Repeat 10 times.

7. Lying on your side supporting yourself on your elbow. Roll top hip slightly forward, use top arm to support yourself in front. Keeping top leg straight lift it up towards the ceiling. Make sure the leg stays in line with your body and toes point forwards. Repeat 20 times.



VTE (blood clots)

VTE is a collective term for two conditions:

- **DVT** (deep vein thrombosis) – this is a blood clot most commonly found in a deep vein that blocks the flow of blood.
- **PE** (pulmonary embolism) – a potential fatal complication where a blood clot breaks free and travels to the lungs.

Whilst you are less mobile, especially during the first few weeks following your procedure, the risk of VTE is higher because of your immobility.

Mr McNicholas may prescribe you a tablet for six to twelve weeks or a daily injection of Clexane for 14 days to help thin your blood. If this is needed, you will be shown how to inject this drug yourself.

Symptoms:

- Swelling – you will have some swelling due to your surgery but if you have any concerns please call for advice
- Pain – any new pain we want to know about
- Calf tenderness
- Heat and redness compared with the other leg
- Shortness of breath
- Chest pain when breathing in

Things you can do to prevent VTE

- Move around as much as possible. Be sensible though, short and regular movement is best
- Drink plenty of water to keep yourself hydrated
- We strongly advise you not to smoke – this will have been discussed in pre op but we can also refer you to our smoking cessation team within the Hospital.
- Move your ankle around as much as possible to keep your calf muscle pumping

Small preventative measures can have a huge impact on your recovery.

Written by: Ms A Hatcher, Orthopaedic Physiotherapist Specialist
Mr Richard Norris, Orthopaedic Physiotherapist Specialist
Professor MJ McNicholas, Consultant Orthopaedic Surgeon
Miss F Rashid, Orthopaedic Registrar

Edited by: Mr MJ McNicholas

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