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Tibial Tuberosity Transfer (TTT)

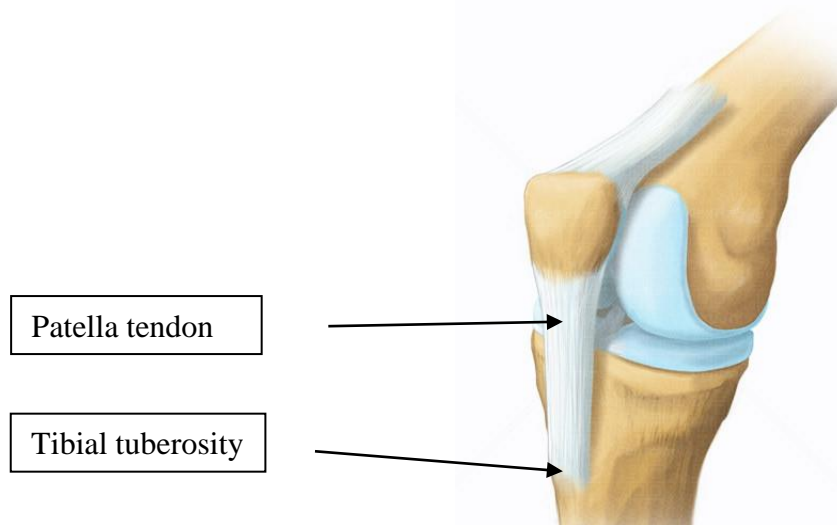
Patient information

Introduction

The kneecap (patella) usually runs up and down the centre of a groove (trochlea) on the front of the thigh bone (femur). This coordinated movement is controlled by the hip and thigh muscles and various ligaments. The thigh muscles are attached directly to the kneecap and this in turn is connected to the shin bone (tibia) by a strong ligament (patella tendon) which inserts into a region known as the tibial tuberosity, the lump on the front of the shin.



Normal patella (above) on the front of the femoral groove (below)

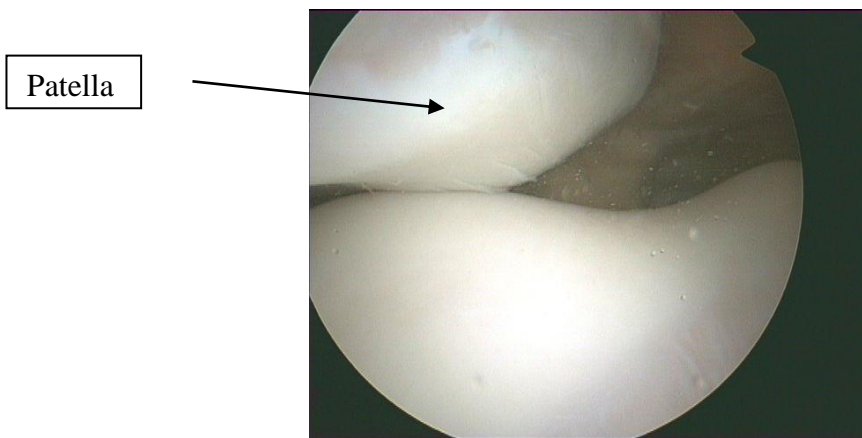


If the patella does not track down the centre of this groove it is described as 'mal tracking' and it will result in overload of one side of the patella joint (usually the outer side). There are many causes of this mal tracking but left untreated it can lead to significant pains over the front of the knee and ultimately some degenerative changes (arthritis). Initial treatment should include strengthening exercises to improve (in particular) the gluteal and medial quadriceps muscles. If this is not successful then an operation may be recommended to try and improve the tracking and reduce the 'patella overload' and so reduce the pain.

The position of the tibial tuberosity is not the same in everyone and sometimes it is positioned towards the outer (lateral) side of the shin bone which may predispose to maltracking. If this is the case and symptoms persist, it can be moved and fixed in a position which is more towards the inner aspect of the shin, thus improving the tracking.



Patella sitting towards the outer (lateral) aspect of the femoral groove

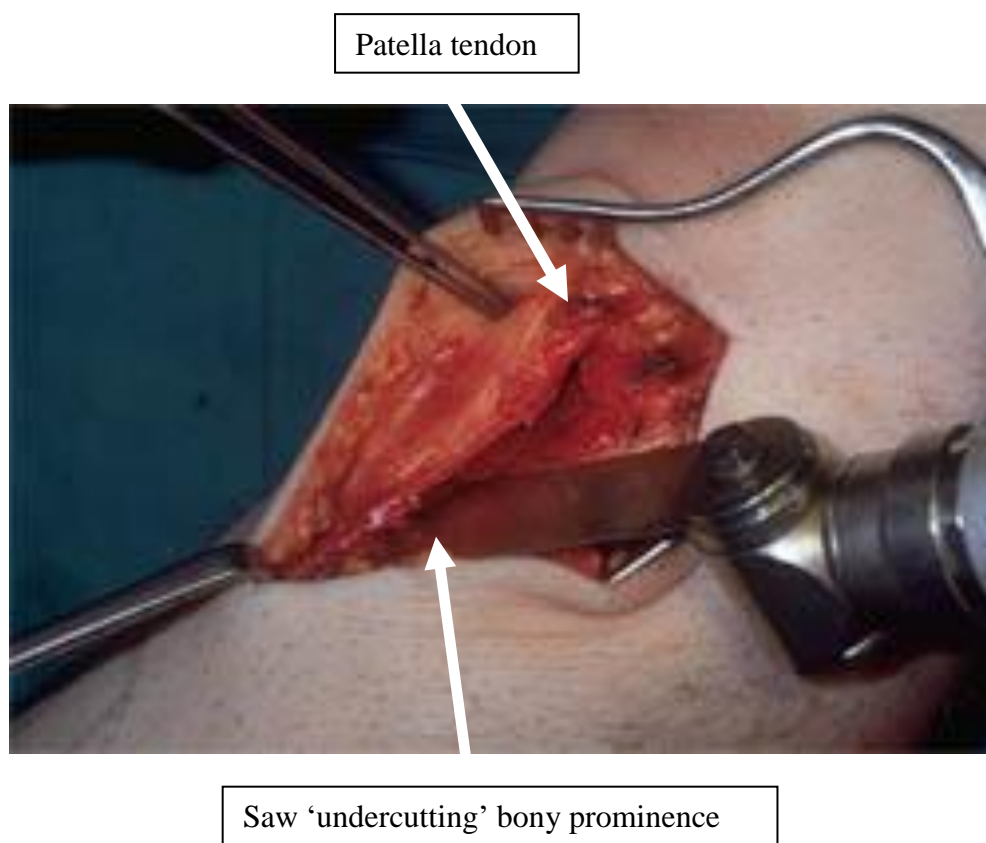


View through the arthroscope (from above) of a 'mal tracking' kneecap 'sitting' towards the outer (lateral) aspect of the femoral groove.

The position of the tibial tuberosity is described relative to the center of the groove on the front of the femur (trochlea) as a tibial tuberosity – trochlea groove (TTTG) distance. This is determined either by MRI or CT scan and is usually in the range of 10-12mm for both males and females. A value of 20mm or greater is considered abnormal. This value will determine the amount by which the bony attachment should be moved.

Surgical treatment

Following anaesthesia a tight inflatable band (tourniquet) is wrapped around your thigh which restricts bleeding into and around the knee during the operation. An arthroscopy (key-hole surgery) may be performed to assess the tracking before and address any irregularities on the articular surfaces. A longitudinal incision is then made on the front of the shin to expose the bony prominence (tuberosity). The prominence (with the attached patella tendon) is then undercut by a saw to create a long bony bridge which still remains attached at the bottom end.



The prominence is then moved towards the inner aspect of the shin by a predetermined distance (depending on the initial TTTG value). It is then secured by 1 or 2 screws which compress the bony surfaces in their new position and allows the cut surfaces to heal together.

The wounds are closed with sutures and a wool / crepe dressing applied to the knee.

When the bone cut is fully united these screws can be removed as they may be palpable and cause some discomfort when kneeling or loading the front of the knee.

Post surgery

Following the operation you will be required to mobilise 'partial weight bearing' using crutches for 1 month to reduce the load which is put through the front of the knee. This will protect the operation site whilst the bony surfaces start to unite.

You will have no splints, casts or braces and will be encouraged to regain a full range of movements as soon as possible.

Potential risks and complications

- **Post-operative bruising**

Due to the nature of the operation some bruising of the area is inevitable and there may be discomfort in the lower leg as blood tracks down into the calf.

- **Altered wound healing / sensation**

There may be some alteration of the sensation on the front of the knee which improves with time but may never fully recover.

- **Wound infection**

Despite the routine use of antibiotics wound infections may occasionally occur. Another operation may be required to wash out any infected wounds.

- **Anterior knee pain / Quadriceps wasting**

Any surgery involving the front of the knee is uncomfortable, with subsequent wasting of the quadriceps muscle. This may cause some difficulty with kneeling, squatting etc. Your physiotherapist will use techniques to reduce this pain and strengthen the muscles.

Approx. 1-5 / 100 patients

- **Blood clots (Deep Vein Thrombosis)**

These can occur in the lower legs following such surgery and can occasionally enlarge and move through the blood stream to the lungs (pulmonary embolus). However, having cut the bone and left exposed bony surfaces the use of blood thinning agents will significantly increase the risk of post-operative bruising and are avoided. Early ankle movements are essential to reduce the risk of clots and you will be encouraged by the physiotherapist to regularly undertake these exercises.

Approx. 1-5 /1000 patients

- **Stiff Knee**

Although rare, stiffness may occur following surgery. In some patients a manipulation and arthroscopy may be required to restore knee movement.

- **Severe pain**

Pain, stiffness and loss of use of the knee (complex regional pain syndrome) is rare and the cause is unknown. If this happens you may need further treatment including painkillers and physiotherapy. The knee can take months or years to fully recover.

Physiotherapy after your operation

Physiotherapy is an essential part of the surgical procedure, both to reduce the risk of post-operative complications and to ensure that you attain the best functional result. You must be committed to this in the weeks (and months) following the procedure if you want to do well.

Soon after your operation the physiotherapist will advise on some exercises to do whilst you are in bed to help reduce the likelihood of thrombosis. On the first post-operative day you will be helped to get out of bed and to start mobilising. You will rapidly progress to using crutches and be shown how to negotiate stairs. A booklet of recommended exercises will be provided for you to follow whilst at home.

When you are safe on crutches and the physiotherapist and surgeon are happy you can go home, usually on the day following surgery.