Tibial Tubercle Osteotomy with Plate Fixation

Setting	Staff	Patients
Physiotherapy	Musculoskeletal Physiotherapists	Tibial Tubercle Osteotomy (TTO)

PROTOCOL

This protocol is a general guide to rehabilitation. The time scales are an approximate guide and may be altered depending on various factors such as pain, swelling and muscle control. Pain along the osteotomy site is very common for up to 4 months postoperatively and should not prevent participation in rehabilitation. The patient's management should be tailored to meet individual objectives.

The tibial tubercle is osteotomised and distalised/medialized to either:

1. Correct patella alta and lateral patella conflict
2. To stabilize the patella

Rehabilitation aims to protect the osteotomy in the early stages and to maximise the range of motion, strength and function.

Please check the post-operative notes for any variation in management.

PREPARATION FOR SURGERY

- Build muscle strength. It will be easier to bounce back after surgery
- Ensure a full range of motion. Preoperative stiffness leads to post-operative stiffness
- Prepare your home. Stairs can be difficult in the first few days. Do you have a downstairs bed and bathroom?
- Social-supportive friends and family are very helpful
- Work preparation. Does your workplace know you are having surgery? Have you considered sedentary work whilst undergoing rehabilitation?
- Stop smoking and restrict alcohol intake

WEEKS 1–3

Aims

- Decrease/control swelling and pain
- Full active and passive extension, flexion
- Good quads contraction and ability to SLR in a brace
- Full weight-bearing as tolerated with brace locked in extension
- When not mobilising the brace can be removed
- Consider rectus femoris length and positions to stretch

POST-OPERATIVE

- Active and active-assisted knee flexion out of brace
- Static and inner range quadriceps exercises, straight leg raise taught (test rather than exercise)
- Mobilise weight-bearing as tolerated with crutches in a brace locked in extension
- Ankle dorsiflexion/plantarflexion exercises, including weight-bearing calf stretches
- Swelling management
- Scar management following wound review
- Start basic proprioception, balance and coordination training
- Consider core and hip stability exercises
- Education regarding rehabilitation, and what to expect at each milestone. Address any fear-avoidance issues—reiterate the importance of the patient taking responsibility for increasing ROM and function

Contraindications

- No resisted open-chain quads

WEEKS 3–6

2/52 Clinic review for removal of sutures and X-ray.

Aim

- Full extension (normal/hyper-extension) and near full flexion
- Good activation of quadriceps and straight leg raise with no lag
- Minimal pain
- Mild/stable effusion
- Normal gait pattern without crutches
- ROM 0°–90°+
- Mobile without brace ASAP

POST-OPERATIVE

- Swelling management
- Discard brace
- Mobilise weight-bearing as tolerated with crutches
- Wean off brace ASAP, use crutches for knee control
- Open and closed chain knee flexion exercises
- Scar mobilisation—soft tissue techniques to rectus femoris gentle stretching, concentric and eccentric exercises
- Patella mobilizations
- Proprioception, balance and coordination training
- Core and hip stability exercises

Precautions

- Avoid overstressing fixation with overpressure into flexion

Contraindications

- Resisted open-chain quads—due to healing osteotomy site

WEEKS 6–12

Aim

- Controlled pain and swelling. Full ROM including rotation
- Full ROM—must exceed 90° flexion (at 6/52)—if not, contact consultant team
- Increase strength and control ensuring good proximal alignment
- X-ray review at 6/52—to review osteotomy site healing

POST-OPERATIVE

Exercises need to be tailored to their functional aim.

- Once 100° flexion is achieved and has minimal swelling, can start using a stationary bike on minimal resistance
- Progressive closed chain, eccentric control exercises
- Road cycling—no clips or cleats, flat pedals only
- CV fitness
- Proprioceptive exercises—add controlled rotational exercises
- Swimming—freestyle and pool walking

Contraindications

- No resisted open-chain quads or impact activity until osteotomy united

Considerations

- If not regained full flexion, include rectus femoris stretches and caudad patella mobilisation
- Multigym if fully weight bearing with symmetrical gait and low/moderate pain and or swelling

WEEKS 12–16

Clinic review

At 4/12 the osteotomy site should be united and confirmed on X-ray.

Aims

- Full pain-free TFJ & PFJ ROM
- Full-length rectus femoris
- Good quads and pelvic control in single knee dip
- Raise fitness targets and set new goals
- Increase speed of balance reactions and improve coordination
- Normal gait in running. Good control of cutting, pivoting, stopping and starting if required
- Sport-specific exercises progressively sequenced to include walking followed by running forwards/backwards/sideways, changing directions
- Advice on returning to training

POST-OPERATIVE

- Increase fitness
- Introduction of impact work—only if a full range of extension, eccentric quadriceps control with correct alignment. And X-ray has confirmed union
- Gradual increase in resisted open-chain/closed chain quadriceps
- Continue with proprioceptive training—increase rotational control
- Initiate running—gradual paced change of terrain/gradient and duration
- Progressive introduction of dynamic activity:
  - jumping/hopping (start on the trampette, emphasis on alignment of both push off and land)
  - change of direction; start single direction and progress to cutting, multidirectional and pivoting
  - stopping/starting and acceleration/deceleration
  - backwards running

MONTHS 6+

Aims

- Non-contact sports training
- Suggest return to sport at 6–9 months

POST-OPERATIVE

Before returning to sports training

- Satisfactory single limb dynamic control
- 85% hop for height, length and cross over
- 80% strength of non-involved limb
- Confidence in knee
- Return to activity non-contact training initially

Clinic review at 1 year for X-ray and outcome scores. If all well patient is discharged.

FUNCTIONAL MILESTONES

Activities

- Sedentary work
- Driving
- Active job/on feet all-day
- Manual work
- Very heavy manual job/ladders etc

Timescales

- 4–6 weeks as tolerated
- 6–8 weeks, once good muscle control and can control car
- 2–3 months
- 12 weeks/liaise with consultant
- 3 months+

REFER BACK TO THE CLINIC

- Signs of infection
- Thrombosis
- Persistent stiffness > 6/52

Seen in the clinic at approximately

2/52, 6/52, 16/52, 1 year