CHILDREN'S KNEE SPECIALIST
Mr John Jeffery

Medial Patellofemoral Ligament (MPFL) Reconstruction + Tibial Tubercle Osteotomy (TTO) Post Operative Guidelines

INTRODUCTION

This is a general guide to rehabilitation for patients who have undergone an MPFL + TTO by Mr John Jeffery, Consultant Orthopaedic Surgeon and Children's Knee Specialist.

Please note, when it comes to rehab, one size does not fit all. Rehab is physio led and may differ from these guidelines as a result of therapist preference, patient progress and local practices. Please check the post-operative note for any restrictions or variations from these guidelines.

GUIDANCE

The time scales are an approximate guide and may be altered depending on various factors such as pain, swelling and muscle control. The patient's management should be tailored to meet individual objectives.

PHASE 1: Extension (week 0-2) Immediate post-operative stage. No initial blood supply to the graft. **Primary aims:** Control pain and swelling, achieve full extension and quadriceps activation.	• 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 weightbearing calf stretches • Swelling management Cautions: • Knee brace must be on and locked straight whenever mobilising - can be unlocked or removed when not mobilising
PHASE 2: Flexion (week 2-6) Graft fixation and osteotomy healing. The graft undergoes avascularisation which reduces its strength. The graft is at its weakest at 6 weeks. The osteotomy site unites. **Primary aims:** Maintain full extension and achieve >90 degrees flexion. Normal symmetrical gait pattern without crutches.	• Discard brace • Swelling management • Mobilise weight-bearing as tolerated with crutches • Wean off brace ASAP, use crutches for knee control • Scar management following wound review — soft tissue techniques to rectus femoris gentle stretching, concentric and eccentric exercises • Start basic proprioception, balance and coordination training • Consider core and hip stability exercises • Closed chain knee flexion exercises • Hamstring donor site management—soft tissue techniques, gentle stretching, concentric and eccentric exercises • Patella mobilizations — no lateral glides • Gait re-education; sit to stand, stair re-education — encourage incorporation into ADL • 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 Precautions: • No resisted open-chain quads due to osteotomy site • No resisted hamstrings or flicks for 8 weeks (if hamstring graft used) • Avoid overstressing fixation/osteotomy with overpressure into flexion Contraindications

PHASE 3: Strength (week 6-12) Graft revascularization. Osteotomy consolidation. The graft gains a blood supply and goes through the process of ligamentisation. The osteotomy site consolidates and strengthens. **Primary aims:** Achieve full range of motion. Introduce low-impact cardiovascular exercises. Build proximal strength and control.	• Exercises need to be tailored to patient's 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 allowed in flat pedals only • Cardiovascular fitness • Proprioceptive exercises — add controlled rotational exercises • Swimming—freestyle and pool walking Precautions: • No resisted open-chain quads or impact activity until osteotomy united • No resisted hamstrings until 8 weeks • No breaststroke until 3 months

PHASE 4: Sport-specific rehab (>12 weeks)
 	
Graft strengthening. By this stage the graft fixation and osteotomy are consolidated.
 	
Primary aims: Introduce high-impact cardiovascular exercises. Increase fitness and work towards normal gait in sprinting and good control of cutting, pivoting, stopping and starting.
	• Increase fitness
	• Introduction of impact work — only if an X-ray has confirmed osteotomy union and the patient has a full range of motion with eccentric quadriceps control and correct alignment.
	• Gradual increase in resisted open-chain/closed chain quadriceps (avoid pain)
	• 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

RETURN TO SPORT

Final decision on return to sport is up to the individual physiotherapist after assessment of the patient's progress and milestones. Return to training and non-match play can be expected at about 4 months post op.

We do not recommend returning to competitive/contact pivoting sport (i.e. match play) until 6 months post-surgery and this should be built up to in a graded fashion as with any rehabilitation. We do not have a preferred return-to-play criteria to use but example criteria include:

- >80% hop height, length and cross over
- >80% strength of non-involved limb
- Confidence in knee
- Awareness of safe positioning of limp and cutting/landing technique (see poweruptoplay.org)

FUNCTIONAL MILESTONES SUMMARY

Activity	Time Scale
High-impact exercise (jogging)	3 months
Sport-specific drills	4 months
Non-match sport	5 months
Competitive sports	6 months

RED FLAGS

The following should prompt urgent referral back to clinic:

- Redislocation/rupture of graft
- Signs of infection
- Thrombosis

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