CHILDREN'S KNEE SPECIALIST
Mr John Jeffery

Anterior Cruciate Ligament (ACL) Reconstruction Post Operative Guidelines

INTRODUCTION

This is a general guide to rehabilitation for patients who have undergone an ACL reconstruction 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.

A NOTE ON MENISCAL PRECAUTIONS

If a meniscal tear has been repaired at the same time as ACL surgery and needs protecting, then meniscal precautions apply.

These patients should have a hinged range of motion brace limited to 90 degrees flexion which is to be worn when weight bearing for the first 6 weeks. This can be removed when not weight bearing. At 6 weeks the brace can be discarded.

Patients are to avoid weight bearing squats over 80 degrees for meniscal repairs for the first 3 months.

Any patient who has had a meniscal repair who gets a persistent/recurrent effusion and mechanical block to range of motion needs to be referred back to Mr Jeffery.

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. The knee is painful and swollen with lack of full extension. There is no initial blood supply to the graft at this stage. **Primary aims:** Control pain and swelling, achieve full extension and quadriceps activation.	• Swelling management • Regular analgesia if required • Exercise to regain full extension • Closed chain quadriceps exercises – emphasis on alignment and co-contraction • Aim to FWB supported with crutches for stability if needed • Donor site management • Begin proprioception, balance and co-ordination training • Consider core and hip stability exercises Precautions: • No resistance exercises
PHASE 2: Flexion (week 2-6) Graft fixation healing. The graft undergoes avascularisation which reduces its strength. The graft is at its weakest at 6 weeks. **Primary aims:** Maintain full extension and achieve >90 degrees flexion. Normal symmetrical gait pattern.	• Continue swelling management – pain/swelling should now be settling • Scar management • Progress closed chain quadriceps exercises with co-contraction • Continued donor site management – soft tissue techniques, gentle stretching, concentric and eccentric exercises • Proprioception, balance and co-ordination training • Aim to achieve controlled single knee dip to 40 degrees. • Consider core and hip stability exercises • Once 100° flexion is achieved, can start using a static bike Precautions: • Avoid open chain exercises especially 0–30 degrees flexion • If hamstring graft, then avoid resisted hamstrings/flicks

PHASE 3: Strength (week 6-12) Graft revascularization. The graft gains a blood supply and goes through the process of ligamentisation **Primary aims:** Achieve full range of motion. Introduce low-impact cardiovascular exercises. Build proximal strength and control.	• Cycling – can begin static bike/road cycling with normal pedals only (no clips or cleats) • Swimming – can begin freestyle swimming and pool walking (no breaststroke until 3 months) • Exercises can be tailored to the patient's individual functional aim • Proprioceptive exercises – add controlled rotational exercises • Aim to achieve controlled single knee dip to 80 degrees. • Add lateral lunges • ONLY if patient has full, pain-free range of motion with eccentric quadriceps control and correct alignment then can introduce running – start with trampette jogging and then progress to running on the treadmill Precautions: • Be aware of patients progressing too rapidly during this phase if patient's pain and swelling has not settled • Need to ensure appropriate strength and control before progressing to phase 4

PHASE 4: Sport-specific rehab (>12 weeks)
 	
Graft strengthening. By this stage the graft fixation is consolidated. At 4 months there is complete revascularization of the graft, laying down of collagen and gradual increase in strength.
 	
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.
	• Progressive introduction of resisted hamstrings and hamstring flicks
	• Start open chain exercises – no resistance initially then gradual increase in resistance
	• Introduce neurocognitive rehabilitation exercises
	• Can introduce high-impact cardiovascular exercises such as running
	• Plyometrics should not be introduced until the patient has good proprioception and control
	• Continue with proprioceptive training – increase rotational control
	• 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
	• Sport-specific drills can be introduced from 6 months

	• If available, consider sports psychology interventions for athletes Precautions: • Re-rupture risk is highest during this phase – patient should incorporate an injury prevention program into their rehabilitation (poweruptoplay.org)

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 9 months post op.

We do not recommend returning to competitive/contact pivoting sport (i.e. match play) until 12 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**
Sedentary activity	4 weeks
Low-impact exercise (swimming, cycling)	2 months
High-impact exercise (jogging)	3 months
Plyometrics	4 months
Sport-specific drills	6 months
Non-match sport	9 months
Competitive pivoting sports	12 months

RED FLAGS

The following should prompt urgent referral back to clinic:

- Signs of infection
- Thrombosis
- Re rupture
- Persistent stiffness > 8/52

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