Anterior Cruciate Ligament Reconstruction Rehabilitation Guideline Document;

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Site	Service/Department/Unit	Disciplines
Fiona Stanley Hospital Fremantle Hospital	Hospital Wide	Medical, Allied Health

1. Introduction

Anterior Cruciate Ligament knee reconstruction (ACL-R) is a common surgery within the orthopaedic department of Fiona Stanley and Fremantle Hospitals. The patients then often require extensive rehabilitation within the physiotherapy department to reach their functional goals. The quality of the rehabilitation and communication between orthopaedic and physiotherapy departments is often crucial to a successful outcome.

This document aims to provide recommendations to staff working within the orthopaedic and physiotherapy departments regarding evidence based management of patients who have had an ACL-R.

2. Terminology

ACL-R	Reconstruction of the Anterior Cruciate Ligament of the knee is carried out when a patient has torn their ligament and surgical intervention is indicated. A graft is commonly taken from either the hamstrings or patella tendon of the patient.
ROM	Range of motion of a joint. The range that the joint is able to move through without restriction. Referred to in degrees.
Effusion	Swelling present within a joint
OKC	Open kinetic chain. An exercise where the patient is moving their lower limb and their foot is not fixed to the floor.
Plyometric drills	Exercises where a patient is commonly jumping or hopping and exerting high levels of force

The information provided in this document is based on its relevance to Fiona Stanley Fremantle Hospital Group (FSFHG) only. Due to differences in context, scope of practice and differences in service delivery, FSFHG does not make claim to its relevance or appropriateness for use within other organisations/sites.

Y-Balance	A physical test of a patients control and balance standing on one leg
RTS	Return to Sport – In this context this is often criteria based. i.e. when the patient is able to achieve specified testing scores and sufficient time has passed since surgery then they will be advised that they are fit to return to sport.
ACL-RSI	Anterior Cruciate Ligament – Return to Sport Index. A questionnaire based outcome measure that measures a patient's readiness to return to sport
TSK-11	Tampa Scale of Kineseophobia-11. A questionnaire based outcome measure which identifies a patient's level of fear relating to movement and re-injury
Hop Test Battery	A series of hop tests that help the clinician to decide if a patient is ready to return to sport. Commonly includes a single hop for distance, a triple hop for distance, a timed 6 meter hop and a triple cross over hop.
IKDC	International Knee Documentation Committee Questionnaire – a questionnaire that is designed to evaluate a patient's overall knee function
FIFA 11 / AFL FootyFirst	Established programs within the literature that are designed to prevent/minimise soft tissue injuries in athletic populations
Side hop endurance test	Side hop endurance test – two strips of tape are applied to the floor 30cm apart. The patient hops (single leg) side to side over the tape for 30 seconds. Their score is the number of successful hops without touching the line and the scores for left and right limbs are compared

3. Policy

The management of the individual patient remains the responsibility of the treating Medical doctor/Physiotherapist.

4. Guideline

4.1. Key Principles The aim of this document is to provide a framework for the medical team and physiotherapists in the management of patients who have undergone an ACL-R to ensure the best and safest outcome is achieved. The patient should progress through the individual stages of the rehabilitation as they meet the criteria that has been defined

This is a guidance document only and each patient's individual circumstances and situation must be taken into account when progressing through the stages to ensure that their rehabilitation is individualised appropriately

4.2. Pre-operative

Focus: Effusion control / muscle activation / restore ROM

Physiotherapy: Compression / home rehab / pool exercises

Conditioning: Off-feet / bike as tolerated

Progression: Surgery date / Identified ability to cope without surgical intervention

Medical Review: Only fit for surgery if full pre op extension, minimum 120deg ROM. Explain milestone based rehabilitation to meet long term goals and overall timeframes.

4.3. Stage 1: Post Surgery (~0 – 6/8 weeks)

Focus: Effusion control and tissue healing / restore ROM (Ensure full extension) / good patella mobility / Single leg static balance / muscle activation (quadriceps, hamstrings, calf complex – closed chain initially) / wean off crutches when gait normalised

Physiotherapy: Early stage home rehab / pool exercise when wounds healed / ice & compression if required

Conditioning: Upper body only – seated or lying

Progression: 120 degrees flexion / Full extension / No quads lag / Parallel squat / Minimal effusion / normalised gait pattern (Note: restrictions may be in place if a patient has had a concurrent meniscal repair)

Red flags: Wound not healing as expected / Poor patella mobility / Lacking full extension at 6 weeks / no quads control at 6 weeks. Contact medical team if any of these are present

Medical Review: Wound check & Review: Reiterate surgical findings and goals over next 6 weeks; If meniscal repair > protected weight bearing/brace ~ 4 weeks; Reiterate importance of full extension & brace at night in extension if needed-next review at 8 weeks (or sooner if extension an issue).

4.4. Stage 2: Progressive loading (~6 – 12 weeks)

Focus: Return to single leg loading (no plyometrics) / Single leg dynamic balance and proprioception / Double leg jumping and landing if appropriate

Physiotherapy: Progression of rehab (static > dynamic balance) / Pool rehabilitation / Early plyometrics - Force production and acceptance drills /
Hamstring graft - OKC from 4+ weeks 90-45^{o} WITHOUT resistance. Gradually increase working range weekly.
Patella tendon graft – OKC from week 4+ 90-45^{o} WITH resistance (if applicable). Gradually increase working range weekly.

Conditioning: Bike (once flexion >100^{o}) / Rower / Pool

Progression: 10s Single leg Stand (5+45 deg knee flexion) / 20+ Single leg calf raises / 15+ Single leg Squat (to bench) / 15+ Single leg bridges / 1.5 x Body Weight leg press (body weight +50%)

Surgical Review: Around 8 weeks; Ensure full extension, progressing flexion ~120deg +; out of brace/crutches, normal gait. First Assessment of graft-feel for Lachman Grade & End Point, No Pivot. Ideally minimal/no effusion.

4.5. Stage 3: Unilateral load acceptance (~12 – 24 weeks)

Focus: Return to running (settled knee, 20+ single leg squats, 20+ single leg calf raises) / controlled multi-directional movements / decelerations

Physiotherapy: Progression from stage 2 (strength training ++) / Introduce decision making drills / Plyometric drills / Hoping and change of direction can be commenced in the pool

Conditioning: Full lower body weights program / running drills / skipping

Progression: Y-balance test normal / 1.8 x Body Weight leg press (body weight + 80%) / Quadriceps & Hamstring strength aiming for 80% of unaffected leg (if testing available)

Surgical Review: Around 4 months. Allow running after only if minimal Effusion, Full ROM, Stable Knee (reassess graft), good quads tone and >80%

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bulk/circumference symmetry. Adequate single leg squat.

4.6. Stage 4: Sport Specific Task Training (~24 – 40 weeks)

Focus: Strength based / Multi-directional plyometric drills / Sport specific drills / High speed running

Physiotherapy: Isokinetic strength training / Increased demand and complexity with multi-directional tasks / Increase running drills intensity (accelerations and decelerations)

Conditioning: Non-contact sport drills / Full speed running

Progression: Acute:chronic workload ratio achieved (<1:2) / Side hop endurance test 95%+ / Quads and Hamstring strength aiming for 90%+

Surgical Review: Only have surgical review around 6 months if high risk candidate/not met milestones at 4 months/not progressing. If concern re ongoing swelling/any pain/loss of range, consider further MRI.

4.7. Stage 5: Return to Sport (~40 – 52 weeks)

Focus: High level plyometric drills as required / return to sport specific running

Physiotherapy: Contact drills (possibly with club physio) / High demand plyometric drills / RTS testing / FIFA 11+ (or similar) for on-going knee care

Conditioning: Full squad training / Reintroduction to contact drills as required (liaise with club physio)

Progression: RTS testing satisfactory – Hop test battery, Strength assessment (all 90%+), subjective testing (TSK-11 (aiming for <18), ACL-RSI (aiming for >80%) / Earliest return 40 weeks, preferably 52 weeks for return to competition

Surgical Review: RTS allowed after minimum 40 weeks (52 weeks if high risk/juvenile), and successful completion of RTS assessment. Has confidence, trust, fitness, stability, range. Re-test RTS if any deficiencies. Educate about fatigue management, long term injury prevention (FIFA 11, AFL FootyFirst)

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5. Compliance/Performance Monitoring

Compliance with this document will evaluated by the relevant departmental staff via routine clinical incident review processes.

6. Related Standards

6.1. NSQHS Standards

6.1.1. Comprehensive Care

6.1.2. Communicating for Safety

7. References

References are to include any texts or other site/organisation resources cited in the policy. Do not include a bibliography (list of relevant sources consulted but not cited) or acknowledgements. **All references are to be entered in Vancouver format. A formatting guide can be found at:** Curtin University Library: Vancouver Referencing

8. Authorisation

EXECUTIVE SPONSOR:					
Version	**Date Issued**	**Compiled/Revised By**	**Committee/Consumer Group Consulted**	**Endorsed By**	**Revision due**
1	mm/20yy	Job Title	Committee	Policy or Executive Committee	mm/20yy
2					