



STAGE	GOALS	PHYSIOTHERAPY
Stage 1 Acute Recovery Day 1 to Day 10-14	Reduce swelling Wound healing Full passive extension Establish thigh muscle control	Wearing hinge brace set at 0-30 degrees 24 hours per day Isometric quadriceps strengthening Quadriceps – Straight leg raise exercise Ice therapy Partial weight bearing on crutches in extension brace Passive extension exercises, active flexion, heel slides, Range of Motion 0-45 degrees. Cocontraction exercises in extension
Phase 2 2 to 4 weeks	Reduce swelling Good scar healing Full extension Increase quadriceps strengthening in 0-45 degrees Increase hamstring strength in 0-45 degrees Range of motion 0-45 degrees Improve quadriceps strength (decrease knee extension lag) Wean off crutches	Wearing brace adjusted to 0-45 degrees for 24 hours per day Ice therapy Gentle patella mobilisations +/- taping if wound healing allows Compression Manual therapy Gait re-education Exercise – Active assisted range of motion (0-45 degrees), hamstring curls (0-45 degrees) , continue quadriceps activation, Cocontraction exercises hip abduction, adduction exercises, heel raises. basic proprioceptive and balance exercises
Phase 3 4 to 6 weeks	Full extension Normal gait Brace off at night, no crutches and graduated full weight bearing Range of motion 0-90 degrees (graduated progression)	Active assisted range of motion 0-60 degrees Hamstring curls 0-90 with light weight Continue all rehabilitation as above Progress hamstring, pelvic stability, heel raises, core stability, proprioception, balance exercises



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Phase 4 6 to 8 weeks	Range of motion 0-120 degrees Improvement in proprioception Wean off brace Improve motor control Improve standing balance Improve single legged control	PHYSIOTHERAPY Wear brace at full range of motion then gradually wean off brace Active assisted range of motion 0-120 degrees Straight leg raise without weight (Attention to quadriceps -VMO control) Sitting quadriceps activation with sit to stand (no brace) Graduated leg weight exercises start at 1kg to straight leg raise Add step down quadriceps control exercises Leg press with light weight Shallow squats/ wall squats Stationary bike 5- 10 mins begin Continue pelvic, core, balance and proprioception exercises Walking – forwards and backwards on flat graduating distance starting at 50 metres Treadmill moderate speed and slight incline Hydrotherapy exercises – squats, deep water running, gait retraining, flutter kicks with knees extended and upper body strengthening walking retraining
Phase 5 8 to 12 weeks	Full knee range of motion Improve functional walking Improve muscular strength and function	Removal of brace all together (but could occur earlier if achieved in phase 4, check with surgeon) Continue all above exercises with no brace Hamstrings curls with full range, light to moderate resistance (theraband or resistance machine) Progress quadriceps step downs Leg press (0-90 degrees) light to moderate resistance (gym) Dura discs and trampoline for dynamic proprioception and balance retraining Continue and advance motor control exercises eg pilates Treadmill and stationary bike progression to 20-30 minutes Hydrotherapy (2 x per week) Gradually increase walking distances no slopes, start 15 minutes
Phase 6 3-4 months	Establish endurance and ensure correct muscle synergy (motor control patterns) Reverse compensatory habits (especially with walking and standing) Establish all activities of daily living with ease, i.e. sit to stand, stairs, walking	Quadriceps/gluteal control in standing/step ups/step downs Motor control exercises for everyday activities (sit to stand, stairs, walking) Continue as above hydro, Pilates, fitness work Graduated return to cycling Hydrotherapy Increase walking speed, short distances, no down slopes for 15-20 minutes graduated programme
Phase 7 4-6 months	Equal quadriceps and hamstring flexibility ensure normal gait pattern 30 – 40 minutes	Continue motor control exercises, proprioceptive and balance exercises Add more dynamic, functional exercises – figure of 8s, gentle loops, large zigzags in controlled environment Treadmill walking progressions Quadriceps and hip flexor stretches Continue hydrotherapy (add swimming laps) Continue and progress Pilates programme Plyometric (jumping) exercises Add surface changes and speed progressions Running on treadmill and stationary/exercise bike outside (work up to 30mins) Cycling 1 hour on flat and gradually increase



STAGE	GOALS	PHYSIOTHERAPY
Phase 8 6 months +	<p>Gradual return to sport specific drills and training</p> <p>Equal leg strength, balance and motor control side to side</p> <p>Improve walking distance, speed and agility</p> <p>Increasing cycling/walking/ jogging programme</p> <p>Return to training for particular sport graduating from straight line then progress to directional</p> <p>Contact sport in 12 months</p>	<p>Continue agility, functional/dynamic drills – sports specific if needed</p> <p>Plyometric (jumping) exercises</p> <p>Direction change exercises (shuttle runs, figure of 8s, side to side steps)</p> <p>Add down slopes and hills and stairs</p> <p>Progress surface changes and speed progressions</p> <p>Running on treadmill and stationary bike</p> <p>Cycling increasing endurance, speed and strength</p>

Appendix

Co-Contraction Exercises

In relation to the knee these exercises ensure that both the hamstring muscle group and the quadriceps muscle group contract simultaneously to achieve a bracing effect on the knee joint. Not only will these two groups be contracting, however, but stabilisers above and below will also contract such as gluteals, psoas, TFL, adductors and calf muscles. To initially teach a co-contraction, it is easiest to place a rolled pillow under the knee and ask the patient to push into the pillow. This will switch on the hamstrings and gluteals. They should then tighten the quadriceps. A co-contraction should initially be held for approximately 15 seconds.

Open -v- Closed Chain Exercises

Closed kinetic chain exercises are performed with the foot placed on a surface (eg floor, step, pedal) and the entire limb is bearing an axial load. Joint compression occurs when the limb is loaded by body weight and this provides inherent joint stability and allows more strenuous strengthening without the degree of shearing forces, or anterior tibial displacement that occurs with conventional open kinetic chain exercises. Closed chain exercises performed with co-contraction of hamstrings and quadriceps also lessen the patello-femoral joint forces. The closed exercises place functional stresses on the joint and entire limb. These exercises can easily be designed to be specific to normal weight bearing activities used for ACL as well as sport.

Plyometrics

Plyometrics exercises are characterised by very powerful muscle contractions in response to a dynamic loading or stretching of the muscles involved in the exercise. The muscles are pre-loaded with an eccentric contraction before a powerful concentric contraction. Plyometrics help to improve muscle power in the later stage of rehabilitation. Examples are box drop jumps, bounding and hopping.

Risks and Complications

Post operative complications are not common but can occur and it is important for every patient to be aware of the potential warning signs.

Infection i.e. redness, swelling and or pain in the knee area

Deep Vein Thrombosis – these are clots in the deep veins of the leg due to immobilisation and surgery where wound healing and swelling is present. This may present as hot, tender, swollen, red calf pain. These symptoms need to be addressed

Unusual swelling and bruising

Damage to nerves or blood vessels – this may present as tingling, numbness or sensation changes around the wound area.

Please contact your treating Dr or your GP immediately if you are concerned about any of the above.

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