

POST-OPERATIVE ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION REGIME
SPORTS INJURY SURGERY, OSWESTRY.

(6 Pages)

| PHASE OF REHABILITATION | STAGE OF PTG REMODELLING | IDEAL CRITERIA | REHABILITATION GUIDE | GOALS |
|---|--|----------------|--|--|
| <p align="center">PHASE 1 Day 1-Discharge</p> | <p>The graft is at its strongest at this stage, with respect to the soft tissue.</p> | | <ul style="list-style-type: none"> • CPM as tolerated • Cryocuff/ Ice. • Patella mobilisations. • EOR E mobilisations • Hamstring (H) and calf stretches. • Ankle exercises. • Passive F over edge of bed. • Static quadriceps (Q). • Co-contraction Q and H. • Avoid 'heavy' eccentric Q, which may overload the harvest site. • Prone H, con/ecc/isomet. • Prone SLR. • PWB with elbow crutches to comfort. • Cricket splint insitu for first week to reduce haemorrhage and prevent intracondylar notch scarring. Can be removed for exercises and sleep. • Mini squats. • Heel raises. • Weight transferring. | <ol style="list-style-type: none"> 1. Reduce inflammation. 2. Gain full terminal E 3. Promote distal circulation. 4. Gradually regain ROM. 5. Introduce early Q/H work. 6. Promote early mobility. |

| PHASE OF REHABILITATION | STAGE OF GRAFT REMODELLING | IDEAL CRITERIA | REHABILITATION GUIDE | GOALS |
|------------------------------|--|--|--|---|
| PHASE 2 Discharge-10 Days | No initial blood supply to graft, results in avascularisation of the soft tissue aspect. | <ul style="list-style-type: none"> • Full active and passive E. • Mobilise independently +/- aids. | <ul style="list-style-type: none"> • Static bike no/low resis. as tolerated. • Gradually increase weight bearing. • Gait re-education (wean off splint and elbow crutches). • Low step-touch→step up. • Active OKC Q 90°-45°. • Progress H work re: Reps/Resis, as able. • Other muscle groups not to be neglected. | <ol style="list-style-type: none"> 1. Promote early function. 2. Increase ROM. 3. Encourage weight bearing. 4. Improve muscular strength/endurance and control. |

| PHASE OF REHABILITATION | STAGE OF GRAFT REMODELLING | IDEAL CRITERIA | REHABILITATION GUIDE | GOALS |
|----------------------------------|---|---|---|---|
| <p>PHASE 3 Day 10-Week 6</p> | <p>Avascularisation of graft leads to continual decrease in graft strength. The graft becomes enveloped in a synovial sheath.</p> | <ul style="list-style-type: none"> • Minimal discomfort. • SLR with no lag. • AROM = Full E – 100° | <ul style="list-style-type: none"> • FWB. • Gait with predictable changes in direction. • Prone auto-overpress F →develop Q stretch • Step ups (for/back/sideways) →height/reps/resis/speed. • Leg press →reps/resis/speed. • Early plyometrics. • Rowing →dist/speed/resis. • Progress proprioception →wobble boards/sit-fit/trampette/crash mats/etc. • Gym ball, Theraband work • Hydrotherapy/swimming (AVOID breaststroke legs until 3 month stage) • Progress general leg exercises VMO, ab/adduction,gluteals, etc. • Upper body. • Muscle balance as appropriate. • Flexibility as appropriate. | <ol style="list-style-type: none"> 1. Progress functional activities. 2. Prevent anterior knee pain. 3. Prevent scar adherence. 4. Prevent joint stiffness 5. Restore normal gait pattern. 6. Promote appropriate muscle strength/power and endurance. 7. Improve proprioception. 8. Maintain cardiovascular fitness. 9. Encourage patient compliance. |

| PHASE OF REHABILITATION | STAGE OF GRAFT REMODELLING | IDEAL CRITERIA | REHABILITATION GUIDE | GOALS |
|---------------------------|---|---|--|--|
| PHASE 4 From Week 6-12 | Bone blocks unite with surrounding bone and revascularisation of the graft commences. An increase in graft laxity is usually apparent on testing between ~ week 10-12. | <ul style="list-style-type: none"> • 'Normal' gait pattern, pain free. • Full ROM. • 1 leg balance ~1 min. | <ul style="list-style-type: none"> • Progress above as able. • Trampette jogging. • 'Power' walking . →duration/incline/decline/cadence. • Isokinetic H. | <ol style="list-style-type: none"> 1. Continue to promote specific function. 2. Increase muscle work and control through range. 3. Isomet. Q strength = 75-85%. |
| PHASE 5 From Month 3 | By month 4 complete revascularisation with the laying down of collagen occurs. A gradual increase in strength is gained as the graft remodels. | <ul style="list-style-type: none"> • 30 min. 'Power' walk. • Row 2000m within 15 min., mod resis. • H ~90% of contra-lateral side. • Adequate dynamic proprioception. | <ul style="list-style-type: none"> • Isokinetic Q. • OKC Q →reps/resis/speed/con/ecc/isomet. • Plyometrics, drops from 6-18"/ bounding, etc. • Hopping →stride/direction/stops/speed. • Jogging →Running Surface/distance • Progress to incorporate: Agility, run/ sprint/cut/pivot/ accelerate/ decelerate. | <ol style="list-style-type: none"> 1. Bias to specific function/sport. |
| PHASE 6 From Month 5 | | <ul style="list-style-type: none"> • Dependent on sport. • 80-90% isomet. and isokin. Q strength of contra-lateral side. • Proprioception ~90% contra-lateral side. | <ul style="list-style-type: none"> • Non-contact training. • Non-contact sport. | <ol style="list-style-type: none"> 1. Prepare physical and psychological ability for complete return to unrestricted function. |

| PHASE OF REHABILITATION | STAGE OF GRAFT REMODELLING | IDEAL CRITERIA | REHABILITATION GUIDE | GOALS |
|---------------------------------|---|---|---|---|
| <p>PHASE 7 From Month 6</p> | <p>Gradual organisation of collagen. At 1 year the graft resembles the appearance of a ligament with densely organised collagen bundles. Graft strength is thought to range from 30-60% of the original. The laxity of the graft appears to be linked with muscle strength.</p> | <ul style="list-style-type: none"> • Symptom free training. • No residual complications. • Psychologically prepared. | <ul style="list-style-type: none"> • Earliest return to contact sport. | <ol style="list-style-type: none"> 1. Unrestricted confident function. |

REFERENCES:

De Carlo, M., Klootwyk, T.E., and Shelbourne, K.D. (1997). ACL surgery and accelerated rehabilitation: revisited. JOSR. 6:2:144-156.

Doyle, J., Gleeson, N.P., and Rees, D., (1999). Psychology and the ACL injured athlete. Sports Med. 26:379-393

Gleeson, N.P., Doyle, J., Rees, D., Bailey, A.K., Walters, M., and Minshull, C. (1998). The effects of ACL reconstruction surgery and acute physical rehabilitation on neuromuscular modelling associated with the knee joint. JOSS. 15:1

Gleeson, N.P., Rees, D. and Rakowski, S. (1996). Reliability indices of anterior tibio-femoral ligaments function in the normal and ACL deficient knee. S. Haake (Ed.). *The Engineering of Sport*. Rotterdam: Balkema 37- 42.

Irrgang, J. J., and Harner, C. D. (1997). Recent advances in ACL rehabilitation: Clinical factors that influence the programme. JOSR. 6:2:111-124.

Lloyd Ireland, M., Gaudette M., and Crook, S. (1997). ACL injuries in the female athlete. JOSR. 6:2:97-110.

Mangine R. E., and Kremchek, T. E. (1997). Evaluation-based protocol of the anterior cruciate ligament. JOSR. 6:2:157-181.

Ryder, S. H., Johnson, R. J., Benyon, B. D., and Ettlinger C. F. (1997). Prevention of ACL injuries. JOSR. 6:2:80-96.

Swanik, C. B., Lepahart, S.M., Giannantonio, F. P., and Fu, F.H. (1997). Re-establishing proprioception and neuromuscular control in the ACL-injured athlete. JOSR. 6:2:182-206.

Wilk, K. E., Zheng, N., Fleisig, G. S., Andrews, J. R., and Clancy, W. G. (1997). Kinetic chain exercise: Implications for the anterior cruciate ligament patient. JOSR. 6:2:125-143.