OSCELL REHABILITATION FOLLOWING AUTOLOGOUS CHONDROCYTE IMPLANTATION **PFJ**

Patient Details: **Co-morbidity:**

Note to Therapist: **This is a guide to progression, not an exhaustive list of rehabilitation and does not replace clinical reasoning.*
**Treat any soft tissue symptoms on their merit.*
**Objective Tests can be used as an indication for progression, examples are provided.*
**Special Instruction(s) includes specific post-operative advice for the individual patient based on their surgeon's recommendation (as applicable). This will be completed on discharge or follow-up clinic appointments.*

PHASE & OBJECTIVE INDICATION FOR PROGRESSION		RANGE OF MOVEMENT	ACTUAL ACTIVITY LEVEL	ADVISED WtBear STATUS	ACTUAL WtBear STATUS	STRENGTHENING	GOALS	OJECTIVE TEST	SPECIAL INSTRUCTION
PHASE 1 **Post operative**	***In-patient*** **Post-Op** **0 – 6 hours**	Rest in full extension splint.		Weight-bear to comfort		Circulatory Exercises.	Allow early cell adherence.		
PHASE 2 **Proliferation/** **Protective**	***6hours – Day 3***	Continuous passive movement machine. 0°-30° (increase range as comfort allows), for 4-12 hours per day. Limit active ROM 0°-30° in splint				Low resistance isometric exercises. Q and H contractions. Maintenance exercises for rest of body. Passive patella mobilisations, AVOID compression with glides.	Restore full passive extension. Prevent adhesions. Aid joint nutrition. Pain relief. Reduce deconditioning. Improve confidence. Restore function for discharge home.	PROM Independent gait with the use of crutches.	

	From discharge home **PROM = 0°-30°** **Independent mobility with elbow crutches as required**	Passive patella mobilisations (AVOID compression with glides) No limit to passive ROM				Gentle use of exercise bike or pedal set at home with no resistance and no limit to range, but do not force a full revolution. Either high seat or sitting behind pedal set. *Up to 20 mins, twice daily*. To be progressed gradually.			
	From Week 3					Active exercises against gravity 0° - 30°.	Increase strength.	PROM	
	From Week 4 **Full passive extension**					Add low resistance to active exercises 0° - 30°. Vary speed of contractions. CKC exercises. Hydrotherapy.	Increase strength and proprioception. Improve muscle endurance.	PROM AROM SLR	
	From Week 5 **Full active extension** **SLR ≤10º lag**								

PHASE 3 **Transitional/** **Loading**	***From Week 6*** **SLR with no lag.** **Weight-bear 100% body weight.**	Care with active 30° - 50°	MINS CYCLING ACHIEVED= DISTANCE WALKING=			Full weight-bearing gait re-education if required. Gait with predictable changes in direction. Low resistance stationary cycling. Prone auto-over press F → develop into Q stretch. Gymball and Theraband work. Lower body active exercise [exception of through range OKC Q] → resis/reps/sets/speed. OKC Q working between 0° – 30° and 90° – 50° Active assisted OKC Q 30° - 50° Muscle balance exercises as appropriate. Core stability exercises as appropriate. Flexibility exercises as appropriate. Correct muscle balance as indicated.	As transitional stage of repair is reached beneficial loading is increased. Promote independent function. Improve stability and movement control.	Independent gait with no aids. PROM AROM	
	From Week 7	**Driving if can perform emergency stop. You are advised to contact your insurance company.**							
	From Week 9 **Normal symmetrical gait.** **PROM =** **Full E - ≥100º F**					PWB (parallel bars) jumps, hops, leaps → control technique/speed/reps. Proprioception → single leg stance/ wobble boards/ Trampette/ crash mats/etc. Rowing → dist./speed/resis. X-Trainer → dist./speed/resis.	Increase dynamic stability and balance. Promote neuromuscular responses.	AROM PROM Single leg stance Clam Planks	

PHASE 4 **Strengthening**	***From Month 3*** **Single leg stance ≥80% parity.** **Clams 10 reps with 10 sec hold ideal control [L] & [R].** **Directional planks 30 sec hold ideal control.**	No limit to active ROM	MINS CYCLING ACHIEVED= DISTANCE WALKING=		Step-ups (for/back/sideways/over) → height/reps/speed. Leg Press/ Squats Through range OKC exercises. Train strength and endurance 3 – 4 x per week. Train strength and endurance on separate days. Have a minimum of 24 hours between strength days. **Strength:** 10 – 20 min CV warm-up (exception of jogging/running). Choose a load 1 – 12 RM. Choose numbers of sets and rest time between sets. Alternate upper/lower body exercises within session. Moderate to fast speed under control. Vary load/set/rest between sessions. Adjust if necessary based on symptoms. **Endurance:** Gradually progress toward ≥45 min continuous CV exercise (exception of jogging/running). Choose a load 15 – 20 RM. Choose numbers of sets and rest time between sets. Alternate upper/lower body exercises within session. Moderate to fast speed under control. Vary load/set/rest between sessions. Adjust if necessary based on symptoms. Add FWB double footed plyometrics control technique/speed/reps.	Improve strength, power and endurance. Continue to improve neuromuscular performance. Varied exercises to prevent staleness. Prevent over-training.	Single leg squat 30º Jumps in place 5 RM	

	From Month 6 **AROM Full E - ≥100º F** **Single leg squat 30º, 5 sec hold with good alignment.** **5 simultaneous jumps in place with good alignment.** **5RM ≥80% parity.**				Progress to single footed plyometrics as dictated by control. Introduce jogging when Q strength and control is adequate. Advance dynamic proprioceptive exercises e.g. volleying football, throwing, catching, racket and ball while balancing on trampette. Swimming including breaststroke. Independent cycling outdoors.	Improve dynamic function.	Hop for distance. Vertical Jump	
	From Month 8 **Hop for distance ≥80% parity.**				Running outdoors.	Increasing load and functional activities to aid remodeling. Increase confidence.	AROM As indicated for individuals sporting or functional goals.	
PHASE 5 **Remodel/** **Function**	***From Month 9*** **AROM Full E - ≥120º F**				Add agility drills when sufficient control and confidence is achieved e.g. twist/turn/pivot/cut/accelerate/decelerate/direction. Progress from predictable agility to unpredictable. Perturbation training e.g. therapist randomly nudges patient off balance during a single leg throw-catch drill.	Injury prevention.		
	From Month 12 **All tests ≥80% parity.**				Earliest return to contact sport.	Normal function will encourage continued remodeling.		

KEY:

CKC	**Closed kinetic chain**
CV	**Cardiovascular**
FWB	**Full weight bearing**
H	**Hamstrings**
[L]	**Left**
OKC	**Open kinetic chain**
Q	**Quadriceps**
[R]	**Right**
RM	**Repetition maximum**

RJAH Orthopaedic Hospital NHS Foundation Trust

PATIENT ACTIVITY DIARY

PLEASE RECORD PATIENT'S WEIGHT
…….KG

JBR/SR/AKB 2015

Bailey AK, Minshull C, Richardson J, Gleeson NP. Improvement of outcomes with non-concurrent strength and cardio-vascular-endurance rehabilitation conditioning after ACI surgery to the knee. *Journal of Sports Rehabilitation.* 2014;23:235-243.

Ebert JR, Fallon M, Zheng MH, Wood DJ, Ackland TR. A randomised trial comparing accelerated and traditional approaches to postoperative weightbearing rehabilitation after matrix-induced autologous chondrocyte implantation: findings at 5 years. *Am J Sports Med*. 2013:2;40(7):1527-37

PLEASE RECORD ACTUAL ACTIVITY LEVELS AND WB STATUS WHERE APPLICABLE AND BRING THIS DIARY WITH YOU WHEN YOU ATTEND EACH CLINIC APPOINTMENT

Special Notes: