Knee Articular Cartilage Repair Rehabilitation Program – Tanner / Fowler
(Microfracture, OATS, ACI)

The Gundersen Health System Sports Medicine Knee Articular Cartilage Repair Rehabilitation Program is an evidence-based and tissue healing dependent program which allows patients to progress to vocational and sport-related activities as quickly and safely as possible. Individual variations will occur depending on surgical details and patient response to treatment. Dr. Tanner and Dr. Fowler utilize this general rehabilitation program following various articular cartilage repair procedures of the knee. Please contact us at 1-800-362-9567 ext. 58600 if you have questions or concerns.

Phase I: 0-6 weeks	Phase II: 6-12 weeks	Phase III: 12+ weeks	Phase IV: 4-18 months
PROM: • CPM machine (6-8 hours/day, 2-8 weeks) • Gradually return ROM with emphasis on early return of extension • **Progression of ROM is patient specific** • **Check with MD for ROM restrictions** • PF joint mobs to prevent scar formation (caution with PFJ repairs)	**PROM:** • Progress to full ROM using stretching, soft tissue mobilization • Manual therapy as needed • **Progression of ROM is patient specific** • **Check with MD for ROM restrictions** • Goal: Full PROM/AROM by ~12 weeks	**PROM:** • Full	**PROM:** • Full
AAROM/AROM: • **Check with MD for ROM restrictions**	**AROM:** • **Check with MD for ROM restrictions**	**AROM:** • Full	**AROM:** • Full
WBing: • **Check with MD for WB / Bracing restrictions** • Pool/aquatic therapy once incisions healed	**WBing:** • **Check with MD for WB / Bracing restrictions** • Goal: Full WBing by ~12 weeks	**WBing:** • Full • No impact loading (i.e. running, jumping, plyometrics)	**WBing:** • Full • Progress low – moderate impact activities
Modalities: • Pain/Effusion: Cryotherapy, compression, IFC • Quad Function: NMES, Biofeedback	**Modalities:** • Pain/Effusion: Cryotherapy, compression, IFC • Quad Function: NMES, Biofeedback	**Modalities:** • Pain/Effusion: Cryotherapy, compression, IFC	**Modalities:** • Pain/Effusion: Cryotherapy, compression, IFC
RX: <u>Recommendations</u> • Quad Sets, SLR, Bike PROM • Weight shifting within MD weight bearing restrictions • Hip Abduction, Clamshells, Gluteal Sets • Transversus Abdominus/core activation progression • Outcome Measures: Tampa Scale of Kinesiophobia, KOOS, IKDC 2000 **Goals:** Decrease swelling, gradually restore PROM and weight bearing, volitional control of the quadriceps	**RX: <u>Recommendations</u>** • Progress to WBing or machine exercises within MD restrictions for WBing and ROM • Leg press, forward lunges, wall slides, lateral step ups, etc. • Progress single plane to multi-plane; bilateral to unilateral **Goals:** Progresses from partial WB to full WB while full ROM and soft-tissue flexibility is achieved	**RX: <u>Recommendations</u>** • Continue exercises per phase II with goal of improving strength, endurance, and proprioception • Continue on step down/home program • Return to light activities (Golf, recreational walking, biking)	**RX: <u>Recommendations</u>** • Return to Sport activities (Plyometric, agility drills) – **WHEN CLEARED BY MD** • Advanced strengthening as appropriate • Average time for return to sport: **ACI** 18-25 months; **OATS** 6.5-7 months; **Microfracture** 8-17 months

Factors to Consider During Individualized Cartilage Repair Rehabilitation*	
Considerations/Specific Factors	**Implications**
Individual	
Athlete's age	Slower cartilage repair with increased age
Body mass index	More gradual progression BMI > 30 kg/m2, general health, nutrition
Type of sport	Higher demand on repair tissue in impact sports
Competitive level	Competitive athletes have better outcomes
Psychological	Less fear of reinjury and higher self-efficacy are associated with better outcomes, goals, motivation
Lesion/defect	
Defect size/depth	Smaller defects frequently improve faster with rehabilitation.
Repair technique	More rapid rehabilitation progression with restorative techniques
Defect location	Immediate weight bearing for patellofemoral defect (knee brace locked in full extension). Femoral condyles - avoid compression, trochlea/patella - avoid shear. Contact surface between the femoral condyle and tibia starts at the anterior surface of the condyle with the knee in extension, and shifts posteriorly as the knee flexes. Patellar/Trochlear ROM Considerations: • Articulation in PF joint begins at 10-20° knee flexion. • At 30°, contact area is 2 cm^2 at inferior patella facet. • 60° of flexion - middle facet. • 90 ° degrees - superior facet and contact area 6.0 cm^2.
Duration of symptoms	Longer recovery if symptoms persist longer than 12 months (deconditioning)
Cartilage quality	Slower rehabilitation progression with generalized joint chondropenia
Concomitant injuries	
Concomitant procedures	Modified protocols for anterior cruciate ligament reconstruction, meniscal repair, osteotomy, etc.
Meniscus status	Slower rehabilitation progression after meniscectomy (especially lateral meniscus)

*Adapted from Mitthoefer et al. 2012

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Knee Articular Cartilage Repair References

Mitthoefer K, Hambly K, Logerstedt D, Ricci M, Silvers H, Della Villa S. Current concepts for rehabilitation and return to sport after knee articular cartilage repair in the athlete. *J Orthop Sports Phys*. 2012; 42(3): 254-273.

Wilk KE, Macrina LC, Reinold, MM. Rehabilitation following microfracture of the knee. *Cartilage.* 2010; 1(2): 96-107.