

Noyes Knee Institute Rehabilitation Protocol: Meniscus Transplantation

	Postoperative Weeks					Postoperative Months			
	1-2	3-4	5-6	7-8	9-12	4	5	6	7-12
Brace: Long-leg postoperative	X	X	X						
Range of motion minimum goals: 0-90° 0-120° 0-135°	X	X	X						
Weight bearing: Toe touch – 1/2 body weight 3/4 to full Toe touch – 1/4 body weight 1/2 to 3/4 body weight Full	X	X	X						
Patella mobilization	X	X	X						
Stretching: Hamstring, gastroc-soleus, iliotibial band, quadriceps	X	X	X	X	X	X	X	X	X
Strengthening: Quad isometrics, straight leg raises, active knee extension Closed-chain: gait retraining, toe raises, wall sits, mini-squats Knee flexion hamstring curls (90°) Knee extension quads (90-30°) Hip abduction-adduction, multi-hip Leg press (70-10°)	X	X	X	X	X	X	X	X	X
Balance/proprioceptive training: Weight-shifting, mini-trampoline, BAPS, BBS, plyometrics			X	X	X	X	X	X	X
Conditioning: Upper body ergometer Bike (stationary) Aquatic program Swimming (kicking) Walking Stair climbing machine Ski machine		X	X	X	X	X	X	X	X
*Running: straight									X
*Cutting: lateral carioca, figure 8's									X
*Full sports									X

BAPS = Biomechanical Ankle Platform System (Camp, Jackson, MI), BBS = Biodex Balance System (Shirley, NY).

*Return to running, cutting, and full sports based on multiple criteria. Patients with noteworthy articular cartilage damage are advised to return to light recreational activities only.

SOURCE: Heckmann TP, Noyes FR, Barber-Westin SD: Chapter 30: Rehabilitation of meniscus repair and transplantation procedures. *Noyes' Knee Disorders: Surgery, Rehabilitation, Clinical Outcomes*, Saunders, Philadelphia, 2009, pp. 806-817.

Range of Motion, Flexibility, and Modality Usage Following Meniscus Transplantation

Time Postoperative, Frequency	Extension- Flexion Limits	Patellar Mobilization	Flexibility 5 reps x 20 secs	Electrical Muscle Stimulation 20 minutes	Cryotherapy 20 minutes
1-2 weeks 3-4 x/day, 10 minute sessions	0° - 90°	Medial- lateral Superior- inferior	Hamstring, gastroc-soleus	Yes	Yes
3-4 weeks 3-4 x/day, 10 minute sessions	0° - 120°	Medial- lateral Superior- inferior	Hamstring, gastroc-soleus	Yes	Yes
5-6 weeks 3 x/day, 10 minute sessions	0° - 135°	Medial- lateral Superior- inferior	Hamstring, gastroc-soleus	Yes	Yes
7-8 weeks 2 x/day, 10 minute sessions	0° - 135°	(if required)	Hamstring, gastroc-soleus, quadriceps, iliotibial band		Yes
9-52 weeks 2 x/day, 10 minute sessions	(should be full)		Hamstring, gastroc-soleus, quadriceps, iliotibial band		Yes

Muscle Strengthening Exercises Following Meniscus Transplantation

Time P.O., Frequency	Quadriceps Isometrics (Active)	Straight Leg Raises	Knee Extension (Active-assisted) 90° - 30°	Toe Raises	Wall Sits (to fatigue)	Mini-Squats	Lateral Step-ups (5-10 cm block)	Hamstring Curls 0° - 90°	Multi-hip (Flex, Ext, Abd, Add)	Leg Press 70° - 10°
1-2 weeks 3 x/day 15 minutes	1 set x 10 reps (every hour)	Flex 3 sets x 10 reps	3 sets x 10 reps							
3-4 weeks 2-3 x/day 20 minutes	Multi-angle 0°, 60° 1 set x 10 reps each	Flex, ext, adduction 3 sets x 10 reps	3 sets x 10 reps							
5-6 weeks 2 x/day 20 minutes	Multi-angle 30°, 60°, 90° 2 sets x 10 reps	Add Ankle wt ≤ 10% of bodyweight 3 sets x 10 reps	Active 3 sets x 10 reps		3 sets	3 sets			3 sets x 10 reps	
7-8 weeks 2 x/day 20 minutes		Add abduction 3 sets x 10 reps Add rubber tubing, 3 sets x 30 reps	Active 3 sets x 10 reps				3 sets x 10 reps		3 sets x 10 reps	
9-12 weeks 2 x/day 20 minutes		3 sets x 10 reps Rubber tubing, 3 sets x 30 reps	Active 3 sets x 10 reps		3 sets	Add rubber tubing, 0°-40°, 3 sets x 20 reps	3 sets x 10 reps	Active, 3 sets x 10 reps	3 sets x 10 reps	3 sets x 10 reps
13-26 weeks. 2 x/day 20 minutes		Rubber tubing, high speed, 3 sets x 30 reps	With resistance 3 sets x 10 reps			3 sets x 20 reps		Add resistance 3 sets x 10 reps	3 sets x 10 reps	3 sets x 10 reps
27-52 wks. 1 x/day 20-30 minutes		Rubber tubing, high speed, 3 sets x 30 reps	With resistance 3 sets x 10 reps			3 sets x 20 reps		With resistance 3 sets x 10 reps	3 sets x 10 reps	3 sets x 10 reps

P.O., postoperative; flex, flexion; ext, extension; abd, abduction; add, adduction; reps, repetitions

Aerobic Conditioning Exercises Following Meniscus Transplantation

Time P.O., Frequency	UBE	Bicycle (stationary)	Water Walking	Swimming	Walking	Stair Climbing Machine (low resistance, low stroke)	Ski Machine (short stride, level, low resistance)	Running (Straight)	Cutting	Functional Training
3-4 weeks 1-2 x/day	10 mins.									
5-6 weeks 2 x/day	10 mins.									
7-8 weeks 1-2 x/day	15 mins.	15 mins.								
9-12 weeks 1 x/day (select one activity per session)		15 mins.	15 mins.	15 mins.	15 mins.					
13 weeks and beyond 3 x/week (select one activity per session)		20-30 mins.	20-30 mins.	20-30 mins.	20-30 mins.	20-30 mins.	20-30 mins.			
27 weeks and beyond 3 x/week (select one activity per session)										
12 months or later, with precautions								Jog 1/4 mile Walk 1/8 mile Backward run 20 yards	Lateral, carioca, figure 8's, 20 yards	Plyometrics box hops, level, double-leg 15 secs., 4-6 sets Sports Specific Drills 4-6 sets

Mins., minutes

^Begin running program when no more than 30% deficit elicited on isokinetic testing; begin cutting program when no more than 20% deficit elicited on isokinetic testing.