

Noyes Knee Institute Rehabilitation Protocol for Total Knee Arthroplasty

	Postoperative weeks					
	1-2	3-4	5-6	7-8	9-12	13-26
<i>Brace: long-leg postoperative</i>						
High risk patients with concurrent patellar realignment or medial collateral ligament repair, or lack of quadriceps control, difficulty with balance/coordination	X	X				
<i>Range of motion minimum goals:</i>						
0°-90°	X					
0°-110°		X				
0°-120°			X			
0°-125°				X		
0°-130°					X	
<i>Weight-bearing:</i>						
Toe touch to 50% body weight	X					
100% body weight, wean from assistive devices		X				
<i>Patella mobilization</i>	X	X	X	X		
<i>Modalities:</i>						
Electrical muscle stimulation	X	X	X			
Pain/edema management (cryotherapy)	X	X	X	X	X	X
<i>Stretching:</i>						
Hamstring, gastrocnemius-soleus, gluteal	X	X	X	X	X	X
Iliotibial band, quadriceps					X	X
<i>Strengthening:</i>						
Ankle pumps (plantar flexion with resistance band wk 3)	X	X				
Quadriceps isometrics, straight leg raises	X	X	X	X	X	X
Knee extension quadriceps active-assisted	X					
Closed-chain: wall-sits		X	X	X	X	X
Closed-chain: toe/heel raises			X	X		
Closed-chain: lateral step-ups				X		
Knee flexion hamstring curls (0°-90°)		X	X	X	X	X
Knee extension quadriceps (90°-0°)		X	X	X	X	X
Hip abduction-adduction, multi-hip		X	X	X	X	X
Leg press (80°-10°)		X	X	X	X	X
Upper body weight training			X	X	X	X
Core training			X	X	X	X
<i>Balance/gait/proprioceptive training:</i>						
Weight-shifting, cup walking	X	X	X			
Balance board (two-legged), tandem stance		X	X			
Single-leg stance (ball catch wk 7), band walking (forward, lateral)			X	X	X	
Band walking (diagonal, monster walk), Star Excursion balance reaching					X	
<i>Conditioning:</i>						
Upper body conditioner		X	X	X	X	
Stationary bicycling (high seat, low resistance)		X	X	X	X	X
Aquatic program (water walking, depth at thigh or waist)			X	X	X	X
Stair machine (low resistance, low stroke)				X	X	X
Ski machine (short stride, level, low resistance)				X	X	X
Elliptical machine				X	X	X
Swimming (kicking)					X	X
Walking					X	X
<i>Fitness Center Training:</i>						
25 mins strengthening, 25 mins cardiovascular training, 10 mins flexibility; 2-3 x/week. Achieve AHA guidelines.* Watch for swelling, pain.						X

*American Heart Association guidelines: 30 min 5 x/wk moderate intensity (brisk walking, elevated heart rate); 20 min 3 x/wk vigorous intensity (exercise machine, bicycling).

Noyes Knee Institute criteria for return to recreational sports training after total knee arthroplasty

Criteria / test	Goal
Pain	None, ≥ 6 Cincinnati Knee Rating Pain scale
Swelling	None visible and ≥ 6 Cincinnati Knee Rating Pain scale
Patellar mobility	Good
Gait	Symmetrical
Muscle strength quadriceps, hamstrings	Manual test: 5/5 Isometric max torque on Biodex: < 30% deficit opposite side Isometric handheld dynamometer: < 20% deficit opposite side
Muscle strength hip abductors	Manual test: 5/5 Isometric handheld dynamometer: < 20% deficit opposite side
Single-leg squat test	No knee valgus, medial-lateral movement, or pelvic tilt
Stair climbing test	10 steps, up and down, can use rail: < 13 secs
6-minute walk test	Aged 60-69 yrs: male ≥ 521 meters (0.32 mile), female ≥ 497 meters (0.31 mile) Aged 70-79 yrs: male ≥ 478 meters (0.29 mile), female ≥ 440 meters (0.27 mile) Aged 80-89 yrs: male ≥ 356 meters (0.22 mile), female ≥ 345 m (0.21 mile)
Star Excursion balance test	Anterior, posterolateral, posteromedial directions (normalize each distance by patient's leg length): < 10% deficit opposite side
Fitness training	Can be performed with no pain or swelling
PT/MD	Cleared for initiation of recreational sport training