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### Meniscus Repair Rehabilitation Protocol\*

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This rehabilitation protocol was developed for patients who have isolated meniscal repairs. Meniscal repairs located in the *peripheral or outer one-third vascular region* are progressed rapidly, with full weight bearing allowed by the 4th postoperative week and running by the 16th to 20th postoperative week (assuming muscle strength and other criteria are met). *Complex repairs* (in which a segment of the tear is located in the avascular region) are progressed more slowly, with full weight bearing delayed until the 7th postoperative week and running delayed until the 6th postoperative month. Additionally, a postoperative brace is used for complex repairs for the first 8 postoperative weeks to provide added protection.

The protocol is divided into 7 phases according to postoperative weeks (for instance, Phase I = Postoperative Weeks 1-2). Each phase has several categories including:

- v *General observation* of the patient's condition (weight bearing, pain, hemarthrosis, muscle control)
- v *Evaluation* of specific variables with *goals* identified for each
- v Treatment and exercise program, according to *frequency* and *duration*
- v *Rehabilitation goals* which must be achieved to enter into the next phase

The **overall goals** of the reconstruction and rehabilitation are to:

- v Control joint pain, swelling, hemarthrosis (minimal or none)
- v Regain normal knee flexion and extension
- v Regain a normal gait pattern and neuromuscular stability for ambulation
- v Regain normal quadriceps, hamstring lower extremity muscle strength
- v Regain normal proprioception, balance, and coordination for desired activities
- v Achieve optimal functional outcome based on orthopaedic and patient goals

The supervised rehabilitation program is supplemented with a *home self-management program* which the patient performs on a daily basis. The therapist must evaluate the patient thoroughly to implement the enclosed protocol and should see the patient in the clinic for therapeutic procedures and modality treatments which are required for rehabilitation. The majority of this protocol can be accomplished at home provided patient cooperation and follow through are present. The approximate number of rehabilitation visits required for each phase are provided. Additional supervision may be required if a complication develops.

**Important postoperative signs** to monitor include:

- v Swelling of the knee joint or soft tissues
- v Abnormal pain response
- v Abnormal gait pattern with or without assistive device
- v Insufficient flexion or extension motions, limited patellar mobility
- v Weakness (strength/control) of the lower extremity, especially the quad/hamstrings
- v Insufficient lower extremity flexibility
- v Tibiofemoral symptoms, indicative of a meniscal tear

The patient is placed into one of four **sports activity** and **occupational activity categories** based on the following scales. It is expected that patients who follow this protocol desire to return to sports activity levels I or II, or very heavy/heavy occupations.

### 1. Cincinnati Knee Rating System Sports Activity Scale

*(check one)*

0 Level I - jumping, hard pivoting, cutting sports (basketball, volleyball, football, gymnastics, soccer)

0 Level II - running, twisting, turning (tennis, racquetball, handball, ice/field hockey, skiing, wrestling)

0 Level III - light recreational sports (bicycling, swimming - no running, twisting, jumping)

0 Level IV - no sports, activities of daily living only

### 2. Cincinnati Knee Rating System Occupational Rating Scale

Factor 1 sitting	Factor 2 standing/ walking	Factor 3 walking on uneven ground	Factor 4 squatting	Factor 5 climbing	Factor 6 lifting/ carrying	Factor 7 pounds carried
0 0 8-10 hrs/day	0 0 0 hrs/day	0 0 0 hrs/day	0 0 0 times/day	0 0 0 times/day	0 0 0 times/day	0 0 0-5 lbs
1 0 6-7 hrs/day	2 0 1 hrs/day	2 0 1 hrs/day	1 0 1-5 times/day	2 0 1 flight 2 times/day	1 0 1-5 times/day	1 0 6-10 lbs
2 0 4-5 hrs/day	4 0 2-3 hrs/day	4 0 2-3 hrs/day	2 0 6-10 times/day	4 0 3 flights 2 times/day	2 0 6-10 times/day	2 0 11-20 lbs
3 0 2-3 hrs/day	6 0 4-5 hrs/day	6 0 4-5 hrs/day	3 0 11-15 times/day	6 0 10 flights/ ladders	3 0 11-15 times/day	3 0 21-25 lbs
4 0 1 hrs/day	8 0 6-7 hrs/day	8 0 6-7 hrs/day	4 0 16-20 times/day	8 0 ladders with weight 2-3 days/week	4 0 16-20 times/day	4 0 26-30 lbs
5 0 0 hrs/day	10 0 8-10 hrs/day	10 0 8-10 hrs/day	5 0 > 20 times/day	8 0 ladders daily with weight	5 0 > 20 times/day	5 0 > 20 lbs

\_\_\_\_\_ points x 2 = \_\_\_\_\_ total points

#### Occupation Rating

#### Total Points

0 Disabled	0
0 Very light	1-20
0 Light	21-40
0 Moderate	41-60
0 Heavy	61-80
0 Very heavy	> 80

## Physical Therapy Visit Timeline\*

Phase	Weeks Postoperative	Minimum # Visits	Maximum # Visits
1	1-2	2	3
2	3-4	2	3
3	5-6	1	2
4	7-8	1	2
5	9-12	1	2
6	13-26	2	2
7	27-52	2	2
Total		11	16

### \*Physician Notification

The physician will be notified if the patient (1) fails to meet the expected goals for each phase of the protocol, (2) has a persistent joint effusion, (3) develops a chronic pain syndrome, (4) complains of meniscal-related symptoms, (5) has difficulty with ambulation, or (6) has a limitation of knee motion or patellar mobility.

These problems could result in a modification of this protocol and necessitate further visits to the physical therapist.

**Discharge Criteria (If goals for sports and occupation place patient into different categories, use category with highest functional demand criteria. For symptoms, use Symptom Rating Form found on next page.)**

#### *Sports Activity Level I or Heavy/Very Heavy Occupational Rating\**

No pain, swelling, giving-way with level 10 on Symptom Rating Form

KT-2000 < 3 mm (I-N, 134 N, total A/P)

Biodex strength testing: quadriceps & hamstrings strength  $\geq$  85% of opposite limb

Function testing: 2 hop tests, limb symmetry  $\geq$  85%

#### *Sports Activity Level II or Moderate Occupational Rating\**

No pain, swelling, giving-way with level 8 on Symptom Rating Form

KT-2000 < 3 mm (I-N, 134 N, total A/P)

Biodex strength testing: quadriceps & hamstrings strength  $\geq$  80% of opposite limb

Function testing: 2 hop tests, limb symmetry  $\geq$  85%

#### *Sports Activity Level III or Light Occupational Rating*

No pain, swelling, giving-way with level 6 on Symptom Rating Form

KT-2000 3-5 mm (I-N, 134 N, total A/P)

Biodex strength testing: quadriceps & hamstrings strength  $\geq$  70% of opposite limb

Function testing: 2 hop tests, limb symmetry  $\geq$  75%

#### *Sports Activity Level IV (ADL) or Very light Occupational Rating*

No pain, swelling, giving-way with level 4 on Symptom Rating Form

KT-2000 3-5 mm (I-N, 134 N, total A/P)

Biodex strength testing: quadriceps & hamstrings strength < 70% of opposite limb

Function testing: 2 hop tests, limb symmetry < 75%

\*patients desiring to return to sports or strenuous work activities may require 4-6 more physical therapy visits during postoperative weeks 25-52 for advanced neuromuscular, strength, and activity-specific training to prevent reinjury.

# Cincinnati Knee Rating System Symptom Rating Form

Scale	Description
10	Normal knee, able to do strenuous work/sports with jumping, hard pivoting
8	Able to do moderate work/sports with running, turning and twisting; symptoms with strenuous work/sports
6	Able to do light work/sports with no running, twisting or jumping; symptoms with moderate work/sports
4	Able to do activities of daily living alone; symptoms with light work/sports
2	Moderate symptoms (frequent, limiting) with activities of daily living
0	Severe symptoms (constant, not relieved) with activities of daily living

## 1. PAIN (circle one)

10 — 8 — 6 — 4 — 2 — 0

## 2. SWELLING (circle one)

10 — 8 — 6 — 4 — 2 — 0

## 3. PARTIAL GIVING-WAY (circle one) (partial knee collapse, no fall to the ground)

10 — 8 — 6 — 4 — 2 — 0

## 4. FULL GIVING-WAY (circle one) (knee collapse occurs with actual falling to the ground)

10 — 8 — 6 — 4 — 2 — 0

## Return to Activities Warning

Return to strenuous activities - including impact loading, jogging, deep knee flexion, or pivoting - early postoperatively after meniscal repair carries a definite risk of a repeat meniscus tear. These risks cannot always be scientifically assessed. Patients are warned to return to athletic activities carefully and to avoid any activity in which symptoms of pain, swelling, or a feeling of instability are present.

## References

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- Buseck MS, Noyes FR: Arthroscopic evaluation of meniscal repairs after anterior cruciate ligament reconstruction and immediate motion. *Am J Sports Med* 19: 489-494, 1991.



## Cincinnati Sportsmedicine and Orthopaedic Center Rehabilitation Protocol Summary for Meniscus Repairs

	Postoperative Weeks					Postoperative Months			
	1-2	3-4	5-6	7-8	9-12	4	5	6	7-12
<b>Brace:</b> Bledsoe postoperative (complex)	X	X	X						
<b>Range of motion minimum goals:</b> 0°-90° 0°-120° 0°-135°	X	X	X						
<b>Weight bearing:</b> peripheral { Toe touch – 1/2 body weight 3/4 to full complex { Toe touch – 1/4 body weight 1/2 to 3/4 body weight Full	P  C	P  C	  C	   C					
<b>Patella mobilization</b>	X	X	X						
<b>Modalities:</b> Electrical muscle stimulation (EMS) Pain/edema management (cryotherapy)	X X	X X	X X	X X	X X	X X	X X	X X	X X
<b>Stretching:</b> Hamstring, gastroc-soleus, iliotibial band, quadriceps	X	X	X	X	X	X	X	X	X
<b>Strengthening:</b> 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  P	X  C	X  X	X  X	X  X	X  X	X  X	X  X
<b>Balance/proprioceptive training:</b> Weight-shifting, mini-trampoline, BAPS, BBS, plyometrics		P	C	X	X	X	X	X	X
<b>Conditioning:</b> UBC Bike (stationary) Aquatic program Swimming (kicking) Walking Stair climbing machine Ski machine		X	X	X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X
Running: straight						P	P	C	X
Cutting: lateral carioca, figure 8's							P	P	X
Full sports							P	P	X

X = all repairs, C = complex, avascular repairs, P = peripheral repairs  
BAPS = Biomechanical Ankle Platform System (Camp, Jackson, MI), BBS = Biodex Balance System (Shirley, NY), UBC = upper body cycle (Biodex, Shirley, NY).

**Cincinnati Sportsmedicine and Orthopaedic Center Rehab Protocol: Meniscus Repair**  
*Phase I. Weeks 1-2 (Visits: 2-3)*

<b>General Observation</b>	<ul style="list-style-type: none"> <li>v Toe-touch to 1/4 WB (complex); toe touch to 1/2 WB (peripheral) when:               <ul style="list-style-type: none"> <li>- Pain controlled</li> <li>- Hemarthrosis controlled</li> <li>- Voluntary quadriceps contraction &amp; full extension achieved</li> </ul> </li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>v Pain</li> <li>v Hemarthrosis</li> <li>v Patellar mobility</li> <li>v ROM minimum</li> <li>v Quadriceps contraction &amp; patella migration</li> <li>v Soft tissue contracture</li> </ul>	<p align="center"><b>Goals</b></p> <ul style="list-style-type: none"> <li>Controlled</li> <li>Mild</li> <li>Good</li> <li>0°-90°</li> <li>Good</li> <li>None</li> </ul>
<p><b>Frequency</b> 3-4 x/day 10 minutes</p> <p>3 x/day 15 minutes</p> <p>As required</p>	<p><b>Range of motion</b> ROM (passive, 0°-90°) Patella mobilization Ankle pumps (plantar flexion with resistance band) Hamstring, gastroc-soleus stretches</p> <p><b>Strengthening</b> Straight leg raises (flexion) Active quadriceps isometrics Knee extension (active-assisted)</p> <p><b>Modalities</b> Electrical muscle stimulation Cryotherapy</p>	<p align="center"><b>Duration</b></p> <p>5 reps x 30 secs</p> <p>3 sets x 10 reps 1 set x 10 reps 3 sets x 10 reps</p> <p>20 minutes 20 minutes</p>
<b>Goals</b>	<ul style="list-style-type: none"> <li>v ROM 0°-90°</li> <li>v Adequate quadriceps contraction</li> <li>v Control inflammation, effusion</li> </ul>	

**Cincinnati Sportsmedicine and Orthopaedic Center Rehab Protocol: Meniscus Repair**  
**Phase 2. Weeks 3-4 (Visits: 2-3)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>v 1/2 weight bearing (complex); full WB (peripheral) when: <ul style="list-style-type: none"> <li>- Pain controlled</li> <li>- Hemarthrosis controlled</li> </ul> </li> <li>- Voluntary quadriceps contraction achieved</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>v Pain</li> <li>v Effusion</li> <li>v Patellar mobility</li> <li>v ROM minimum</li> <li>v Quadriceps contraction &amp; patella migration</li> <li>v Soft tissue contracture</li> </ul>	<p align="center"><b>Goals</b></p> <ul style="list-style-type: none"> <li>Controlled</li> <li>Mild</li> <li>Good</li> <li>0°-120°</li> <li>Good</li> <li>None</li> </ul>
<p><b>Frequency</b></p> <ul style="list-style-type: none"> <li>3-4 x/day</li> <li>10 minutes</li>   <li>2-3 x/day</li> <li>20 minutes</li>   <li>2 x/day</li> <li>10 minutes</li>   <li>2 x/day</li> <li>10 minutes</li>   <li>As required</li> </ul>	<p><b>Range of motion</b></p> <ul style="list-style-type: none"> <li>ROM (passive, 0°-120°)</li> <li>Patella mobilization</li> <li>Ankle pumps (plantar flexion with resistance band)</li> <li>Hamstring, gastroc-soleus stretches</li> </ul> <p><b>Strengthening</b></p> <ul style="list-style-type: none"> <li>Straight leg raises (flexion, extension, adduction)</li> <li>Isometric training: multi-angle (0°, 60°)</li> <li>Knee extension (active-assisted, 90°-30°)</li> <li>Closed-chain (peripheral) <ul style="list-style-type: none"> <li>- Toe raises</li> <li>- Wall sits</li> </ul> </li> </ul> <p>Balance training (peripheral)</p> <ul style="list-style-type: none"> <li>Weight shift side/side and forward/back</li> <li>Cup walking</li> </ul> <p><b>Aerobic conditioning</b></p> <ul style="list-style-type: none"> <li>UBC</li> </ul> <p><b>Modalities</b></p> <ul style="list-style-type: none"> <li>Electrical muscle stimulation</li> <li>Cryotherapy</li> </ul>	<p align="center"><b>Duration</b></p> <ul style="list-style-type: none"> <li>5 reps x 30 secs</li>   <li>3 sets x 10 reps</li> <li>1 set x 10 reps</li> <li>3 sets x 10 reps</li>   <li>3 sets x 20 reps</li> <li>to fatigue x 3</li>   <li>5 sets x 10 reps</li>     <li>20 minutes</li> <li>20 minutes</li> </ul>
<b>Goals</b>	<ul style="list-style-type: none"> <li>v ROM 0°-120°</li> <li>v Control inflammation, effusion</li> <li>v Muscle control</li> <li>v Early recognition complications (motion, RSD, patellofemoral)</li> </ul>	

**Cincinnati Sportsmedicine and Orthopaedic Center Rehab Protocol: Meniscus Repair**  
**Phase 3. Weeks 5-6 (Visits: 1-2)**

<b>General Observation</b>	v 3/4 WB (complex); full WB (peripheral) when: - Pain controlled without narcotics - Hemarthrosis controlled - ROM 0°-135° - Muscle control throughout ROM	
<b>Evaluation</b>	v Pain v Effusion v Patellar mobility v ROM v Muscle control v Inflammatory response	<b>Goals</b> Mild/No RSD Minimal Good 0°-135° 3/5 None
<b>Frequency</b> 3 x/day 10 minutes  2 x/day 20 minutes  3 x/day 5 minutes  2 x/day 10 minutes  As required	<b>Range of motion</b> ROM (passive, 0°-135°) Patella mobilization Hamstring, gastroc-soleus stretches  <b>Strengthening</b> Straight leg raises (ankle weight, not to exceed 10% of body weight) Isometric training: multi-angle (90°, 60°, 30°) Hamstring curls (active, 0°-90°, peripheral) Knee extension (active, 90°-30°) Closed-chain (all repairs) - Heel raise/toe raise - Wall sits Multi-hip machine (flexion, extension, abduction, adduction) Leg press (70°-10°)  <b>Balance training</b> Weight shift side/side and forward/back Balance board/2 legged Cup walking  <b>Aerobic conditioning</b> (patellofemoral precautions) UBC  <b>Modalities</b> Electrical muscle stimulation Cryotherapy	<b>Duration</b>  5 reps x 30 secs  3 sets x 10 reps 2 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 20 reps to fatigue x 3 3 sets x 10 reps 3 sets x 10 reps  5 sets x 10 reps  20 minutes 20 minutes
<b>Goals</b>	v ROM 0°-135° v Control inflammation, effusion v Muscle control v Early recognition complications (motion loss, RSD, patellofemoral changes)	



**Cincinnati Sportsmedicine and Orthopaedic Center Rehab Protocol: Meniscus Repair**  
**Phase 4. Weeks 7-8 (Visits: 1-2)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>v Full weight bearing with 1 crutch (complex) when:</li> <li>- Pain controlled without narcotics - Hemarthrosis controlled</li> <li>- ROM 0°-135° - Voluntary quad contraction achieved</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>v Pain</li> <li>v Effusion</li> <li>v Patellar mobility</li> <li>v ROM</li> <li>v Muscle control</li> <li>v Inflammatory response</li> </ul>	<p align="center"><b>Goals</b></p> <p>Mild/No RSD  Minimal  Good  0°-135°  4/5  None</p>
<b>Frequency</b>		<b>Duration</b>
2 x/day 10 minutes	<p><b>Range of motion</b>  ROM (0°-135°)  Hamstring, gastroc-soleus stretches</p>	5 reps x 30 secs
2 x/day 20 minutes	<p><b>Strengthening</b>  Straight leg raises (flexion, extension, abduction, adduction)  Straight leg raises, rubber tubing  Hamstring curls (active, 0°-90°, all repairs)  Knee extension (active, 90°-30°)  Leg press (70°-10°)  Closed-chain  - Wall sits  - Mini-squats (rubber tubing, 0°-30°)  Multi-hip machine (flexion, extension, abduction, adduction)</p>	3 sets x 10 reps 3 sets x 30 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 20 reps to fatigue x 3 3 sets x 10 reps
3 x/day 5 minutes	<p><b>Balance training</b>  Balance board/2 legged  Single leg stance  Cup walking</p>	
1-2 x/day 15 minutes	<p><b>Aerobic conditioning</b>  UBC  Stationary bicycling</p>	
As required	<p><b>Modalities</b>  Cryotherapy</p>	20 minutes
<b>Goals</b>	<ul style="list-style-type: none"> <li>v Full weight bearing, normal gait</li> <li>v Control inflammation, effusion</li> <li>v Muscle control</li> <li>v ROM 0°-135°</li> </ul>	

**Cincinnati Sportsmedicine and Orthopaedic Center Rehab Protocol: Meniscus Repair**  
**Phase 5. Weeks 9-12 (Visits: 1-2)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>v Full weight bearing (complex) when: <ul style="list-style-type: none"> <li>- Pain, effusion controlled</li> <li>- Muscle control throughout ROM</li> </ul> </li> <li>v ROM 0°-135°</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>v Pain</li> <li>v Manual muscle test <ul style="list-style-type: none"> <li>Hamstrings, quadriceps, hip abductors/adductors/flexors/extensors</li> </ul> </li> <li>v Swelling</li> <li>v Isometric test (peripheral, % difference quads &amp; hams)</li> <li>v Patellar mobility</li> <li>v Crepitus</li> <li>v Gait</li> </ul>	<p align="center"><b>Goals</b></p> <ul style="list-style-type: none"> <li>Minimal/No RSD 4/5</li> <li>Minimal 30</li> <li>Good</li> <li>None/slight</li> <li>Symmetrical</li> </ul>
<p><b>Frequency</b></p> <ul style="list-style-type: none"> <li>2 x/day 10 minutes</li> <li>2 x/day 20 minutes</li> <li>3 x/day 5 minutes</li> <li>1 x/day 15-20 minutes</li> <li>As required</li> </ul>	<p><b>Range of motion</b></p> <ul style="list-style-type: none"> <li>Hamstring, gastroc-soleus, quad, ITB stretches</li> </ul> <p><b>Strengthening</b></p> <ul style="list-style-type: none"> <li>Straight leg raises</li> <li>Straight leg raises, rubber tubing</li> <li>Hamstring curls (active, 0°-90°)</li> <li>Knee extension (active, 90°-30°)</li> <li>Leg press (70°-10°)</li> <li>Closed-chain <ul style="list-style-type: none"> <li>- Wall sits</li> <li>- Mini-squats (rubber tubing, 0°-40°)</li> <li>- Lateral step-ups (2-4" block)</li> </ul> </li> <li>Multi-hip machine (flexion, extension, abduction, adduction)</li> </ul> <p><b>Balance training</b></p> <ul style="list-style-type: none"> <li>Balance board/2 legged</li> <li>Single leg stance</li> </ul> <p><b>Aerobic conditioning</b> (patellofemoral precautions)</p> <ul style="list-style-type: none"> <li>Stationary bicycling</li> <li>Water walking</li> <li>Swimming (straight leg kicking)</li> <li>Walking</li> <li>Stair machine (low resistance, low stroke)</li> <li>Ski machine (short stride, level, low resistance)</li> </ul> <p><b>Modalities</b></p> <ul style="list-style-type: none"> <li>Cryotherapy</li> </ul>	<p align="center"><b>Duration</b></p> <ul style="list-style-type: none"> <li>5 reps x 30 secs</li> <li>3 sets x 10 reps</li> <li>3 sets x 30 reps</li> <li>3 sets x 10 reps</li> <li>3 sets x 10 reps</li> <li>3 sets x 10 reps</li> <li>3 sets x 20 reps to fatigue x 3</li> <li>3 sets x 10 reps</li> <li>3 sets x 10 reps</li> <li>20 minutes</li> </ul>
<b>Goals</b>	<ul style="list-style-type: none"> <li>v Increase strength and endurance</li> <li>v ROM 0°-135°</li> </ul>	

**Cincinnati Sportsmedicine and Orthopaedic Center Rehab Protocol: Meniscus Repair**  
**Phase 6. Weeks 13-26 (Visits: 2)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>v No effusion, painless ROM, joint stability</li> <li>v Performs ACL, can walk 20 minutes without pain</li> <li>v ROM 0°-135°</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>v Pain</li> <li>v Isometric test (6 mos. complex, % difference quads &amp; hams)</li> <li>v Swelling</li> <li>v Patellar mobility</li> <li>v Crepitus</li> <li>v Gait</li> </ul>	<p align="center"><b>Goals</b></p> <p>Minimal/No RSD  10-15 (P), 30 (C)  Minimal  Good  None/slight  Symmetrical</p>
<p><b>Frequency</b></p> <p>2 x/day 10 minutes</p> <p>2 x/day 20 minutes</p> <p>1-3 x/day 5 minutes</p> <p>3 x/week 20 minutes</p> <p>3 x/week 15-20 minutes</p> <p>3 x/week</p> <p>3 x/week</p> <p>As required</p>	<p><b>Range of motion</b> Hamstring, gastroc-soleus, quad, ITB stretches</p> <p><b>Strengthening</b>  Straight leg raises, rubber tubing (high speed)  Hamstring curls with resistance (0°-90°)  Knee extension with resistance (90°-30°)  Leg press (70°-10°)  Multi-hip machine (flexion, extension, abduction, adduction)  Closed-chain: Mini-squats (rubber tubing, 0°-40°)</p> <p><b>Balance training</b>  Balance board/2 legged  Single leg stance</p> <p><b>Aerobic conditioning</b> (patellofemoral precautions)  Stationary bicycling  Water walking  Swimming (kicking)  Walking  Stair machine (low resistance, low stroke)  Ski machine (short stride, level, low resistance)</p> <p><b>Running program</b> (16-20 wks peripheral, straight, 30% deficit isometric test)  Jog  Walk  Backward run</p> <p><b>Cutting program</b> – lateral, carioca, figure 8's</p> <p><b>Functional training</b>  Plyometric training: box hops, level, double-leg  Sport specific drills (10-15% deficit isokinetic test)</p> <p><b>Modalities</b>  Cryotherapy</p>	<p align="center"><b>Duration</b></p> <p>5 reps x 30 secs</p> <p>3 sets x 30 reps  3 sets x 10 reps  3 sets x 10 reps  3 sets x 10 reps  3 sets x 10 reps  3 sets x 20 reps</p> <p>1/4 mile  1/8 mile  20 yards  20 yards</p> <p>15 secs, 4-6 sets</p> <p>20 minutes</p>
<b>Goals</b>	v Increase strength and endurance	

**Cincinnati Sportsmedicine and Orthopaedic Center Rehab Protocol: Meniscus Repair**  
**Phase 7. Weeks 27-52 (Visits: 2)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>v No effusion, painless ROM, joint stability</li> <li>v Performs ADL, can walk 20 minutes without pain</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>v Isokinetic test (isometric + torque 300°/sec, % diff quads &amp; hams)</li> <li>v Swelling</li> <li>v Patellar mobility</li> <li>v Crepitus</li> <li>v Single-leg function tests (9 mos: hop distance, timed hop, % inv/uninv)</li> </ul>	<p align="center"><b>Goals</b></p> <p>10-15 None Good None/slight 85</p>
<b>Frequency</b>		<b>Duration</b>
2 x/day 10 minutes	<p><b>Range of motion</b> Hamstring, gastroc-soleus, quad, ITB stretches</p>	5 reps x 30 secs
1 x/day 20-30 minutes	<p><b>Strengthening</b> Straight leg raises, rubber tubing (high speed) Hamstring curls with resistance (0°-90°) Knee extension with resistance (90°-30°) Leg press (70°-10°) Multi-hip machine (flexion, extension, abduction, adduction) Closed-chain: Mini-squats (rubber tubing, 0°-40°)</p>	<p>3 sets x 30 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 20 reps</p>
1-3 x/day 5 minutes	<p><b>Balance training</b> Balance board/2 legged Single leg stance</p>	
3 x/week 20-30 minutes	<p><b>Aerobic conditioning</b> (patellofemoral precautions) Stationary bicycling Water walking Swimming (kicking) Walking Stair machine (low resistance, low stroke) Ski machine (short stride, level, low resistance)</p>	
3 x/week 15-20 minutes	<p><b>Running program</b> (straight, 30% deficit isokinetic test) Jog Walk Backward run</p>	<p>1/4 mile 1/8 mile 20 yards</p>
3 x/week	<p><b>Cutting program</b> (20 wks peripheral, 20% deficit isokinetic test) Lateral, carioca, figure 8's</p>	20 yards
3 x/week	<p><b>Functional training</b> (20 wks peripheral) Plyometric training: box hops, level, double-leg Sport specific drills (10-15% deficit isokinetic test)</p>	<p>15 secs, 4-6 sets</p>
As required	<p><b>Modalities</b> Cryotherapy</p>	20 minutes
<b>Goals</b>	<ul style="list-style-type: none"> <li>v Increase function</li> <li>v Maintain strength, endurance</li> <li>v Return to previous activity level</li> </ul>	