



### Osteochondral Autograft Procedures: Rehabilitation Protocol\*

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This rehabilitation protocol was developed for patients who have had either an osteochondral autograft transfer (OAT) procedure or autologous chondrocyte implantation (ACI or Carticel). It is especially important to protect these patients against high weight bearing forces in the early postoperative period as these could dislodge graft tissues. Early knee motion is highly beneficial to enhance cartilage remodeling.

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:

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

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

- Control joint pain, swelling, hemarthrosis (minimal or none)
- Regain normal knee flexion and extension
- Regain a normal gait pattern and neuromuscular stability for ambulation
- Regain normal quadriceps, hamstring lower extremity muscle strength
- Regain normal proprioception, balance, and coordination for desired activities
- 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:

- Swelling of the knee joint or soft tissues
- Abnormal pain response
- Abnormal gait pattern with or without assistive device
- Insufficient flexion or extension
- Weakness (strength/control) of the lower extremity, especially the quads/hamstrings
- Insufficient lower extremity flexibility
- Return of pain to the compartment of the implant/transfer

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)

- Level I - jumping, hard pivoting, cutting sports (basketball, volleyball, football, gymnastics, soccer)
- Level II - running, twisting, turning (tennis, racquetball, handball, ice/field hockey, skiing, wrestling)
- Level III - light recreational sports (bicycling, swimming - no running, twisting, jumping)
- 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 <input type="checkbox"/> 8-10 hrs/day	0 <input type="checkbox"/> 0 hrs/day	0 <input type="checkbox"/> 0 hrs/day	0 <input type="checkbox"/> 0 times/day	0 <input type="checkbox"/> 0 times/day	0 <input type="checkbox"/> 0 times/day	0 <input type="checkbox"/> 0-5 lbs
1 <input type="checkbox"/> 6-7 hrs/day	2 <input type="checkbox"/> 1 hrs/day	2 <input type="checkbox"/> 1 hrs/day	1 <input type="checkbox"/> 1-5 times/day	2 <input type="checkbox"/> 1 flight 2 times/day	1 <input type="checkbox"/> 1-5 times/day	1 <input type="checkbox"/> 6-10 lbs
2 <input type="checkbox"/> 4-5 hrs/day	4 <input type="checkbox"/> 2-3 hrs/day	4 <input type="checkbox"/> 2-3 hrs/day	2 <input type="checkbox"/> 6-10 times/day	4 <input type="checkbox"/> 3 flights 2 times/day	2 <input type="checkbox"/> 6-10 times/day	2 <input type="checkbox"/> 11-20 lbs
3 <input type="checkbox"/> 2-3 hrs/day	6 <input type="checkbox"/> 4-5 hrs/day	6 <input type="checkbox"/> 4-5 hrs/day	3 <input type="checkbox"/> 11-15 times/day	6 <input type="checkbox"/> 10 flights/ ladders	3 <input type="checkbox"/> 11-15 times/day	3 <input type="checkbox"/> 21-25 lbs
4 <input type="checkbox"/> 1 hrs/day	8 <input type="checkbox"/> 6-7 hrs/day	8 <input type="checkbox"/> 6-7 hrs/day	4 <input type="checkbox"/> 16-20 times/day	8 <input type="checkbox"/> ladders with weight 2-3 days/week	4 <input type="checkbox"/> 16-20 times/day	4 <input type="checkbox"/> 26-30 lbs
5 <input type="checkbox"/> 0 hrs/day	10 <input type="checkbox"/> 8-10 hrs/day	10 <input type="checkbox"/> 8-10 hrs/day	5 <input type="checkbox"/> > 20 times/day	8 <input type="checkbox"/> ladders daily with weight	5 <input type="checkbox"/> > 20 times/day	5 <input type="checkbox"/> > 20 lbs

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

Occupation Rating

Total Points

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

## Physical Therapy Visit Timeline\*

Phase	Weeks Postoperative	Minimum # Visits	Maximum # Visits
1	1-2	2	4
2	3-4	2	4
3	5-6	1	2
4	7-8	1	2
5	9-12	1	2
6	13-26	2	3
7	27-52	2	4
Total		11	21

### \*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) has difficulty with ambulation, (5) has a limitation of knee motion or patellar mobility, or (6) develops other complications associated with surgery.

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 after major knee surgery carries the definite risk of a repeat injury or the potential of compounding the original injury. 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

- Gudas R, et al: A prospective randomized clinical study of mosaic osteochondral autologous transplantation versus microfracture for the treatment of osteochondral defects in the knee joint in young athletes. *Arthroscopy* 21: 1066-1075, 2005.
- Browne JE, et al: Clinical outcome of autologous chondrocyte implantation at 5 years in US subjects. *CORR* 436: 237-245, 2005.
- Fu FH, et al: Autologous chondrocyte implantation versus debridement for treatment of full-thickness chondral defects of the knee: an observational cohort study with 3-year follow-up. *AJSM* 33: 1658-1666, 2005.
- Mithofer K, et al: Functional outcome of knee articular cartilage repair in adolescent athletes. *AJSM* 33: 1147-1153, 2005.
- Mithofer K, et al: Articular cartilage repair in soccer players with autologous chondrocyte transplantation: functional outcome and return to competition. *AJSM* 33: 1639-1646, 2005.
- Knutsen G, et al: Autologous chondrocyte implantation compared with microfracture in the knee. A randomized trial. *JBJS* 86-A: 455-464, 2004.
- Hangody L, et al: Autologous osteochondral mosaicplasty for the treatment of full-thickness defects of weight-bearing joints: ten years of experimental and clinical experience. *JBJS* 85-A, Suppl 2:25-32, 2003.
- Horas U, et al: Autologous chondrocyte implantation and osteochondral cylinder transplantation in cartilage repair of the knee joint. A prospective, comparative trial. *JBJS* 85A: 185-192, 2003.
- Peterson L et al: Autologous chondrocyte transplantation: Biomechanics and long-term durability. *AJSM* 30: 2-12, 2002.
- Peterson L, et al: Two- to 9-year outcome after autologous chondrocyte transplantation of the knee. *CORR* 374: 212-234, 2000.
- LaPrade RF, Swiontkowski MF: New horizons in the treatment of osteoarthritis of the knee. *JAMA* March 10; 281(10): 876-878, 1999
- Kish G, et al: Osteochondral mosaicplasty for the treatment of focal chondral and osteochondral lesions of the knee and talus in the athlete. *Clinics Sports Med* 18: 45-66, 1999.
- Barber-Westin SD, Noyes FR, McCloskey JW: Rigorous statistical reliability, validity, and responsiveness testing of the Cincinnati Knee Rating System in 350 subjects with uninjured, injured, or anterior cruciate ligament-reconstructed knees. *AJSM* 27: 402-16, 1999.



Cincinnati SportsMedicine and Orthopaedic Center  
**Rehabilitation Protocol Summary for**  
**OAT, ACI**

	Postoperative Weeks					Postop Months			
	1-2	3-4	5-6	7-8	9-12	4	5	6	7-12
<b>Brace:</b> Bledsoe OA unloader	X	X	X	X	X			X	X
<b>Range of motion minimum goals:</b> 0°-110° 0°-135°	X	X							
<b>Weight bearing:</b> None Toe touch - 1/4 body weight 1/4 to 1/2 body weight Full	X	X	X	X					
<b>Patella mobilization</b>	X	X	X	X					
<b>Modalities:</b> Electrical muscle stimulation (EMS) Pain/edema management (cryotherapy)	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	X	X	X	X	X	X	X
<b>Balance/proprioceptive training:</b> Weight-shifting, mini-trampoline, BAPS, KAT, plyometrics					X	X	X	X	X
<b>Conditioning:</b> UBE 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), KAT = Kinesthetic Awareness Trainer (Breg, Inc., Vista, CA), UBE = upper body ergometer.

**Cincinnati SportsMedicine and Orthopaedic Center Rehab Protocol: OAT, ACI**  
**Phase 1. Weeks 1-2 (Visits: 2-4)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>■ Non weight bearing</li> <li>■ Brace locked at 0°</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>■ Pain</li> <li>■ Hemarthrosis</li> <li>■ Patellar mobility</li> <li>■ ROM minimum</li> <li>■ Quadriceps contraction &amp; patella migration</li> <li>■ Soft tissue contracture</li> </ul>	<p align="center"><b>Goals</b></p> Controlled Mild Good 0°-60° Good None
<b>Frequency</b> 3-4 x/day 10 minutes  3 x/day 15 minutes  As required	<p><b>Range of motion</b></p> ROM (passive, 0°-60°) Patella mobilization Ankle pumps (plantar flexion with resistance band) Hamstring, gastroc-soleus stretches	<p align="center"><b>Duration</b></p> 5 reps x 30 secs  3 sets x 10 reps 1 set x 10 reps  20 minutes 20 minutes
<b>Goals</b>	<ul style="list-style-type: none"> <li>■ ROM 0°-60°</li> <li>■ Adequate quadriceps contraction</li> <li>■ Control inflammation, effusion</li> </ul>	

**Cincinnati SportsMedicine and Orthopaedic Center Rehab Protocol: OAT, ACI**  
**Phase 2. Weeks 3-4 (Visits: 2-4)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>■ Non weight bearing</li> <li>■ Brace locked at 0°</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>■ Pain</li> <li>■ Effusion</li> <li>■ Patellar mobility</li> <li>■ ROM minimum</li> <li>■ Quadriceps contraction &amp; patella migration</li> <li>■ Soft tissue contracture</li> </ul>	<p align="center"><b>Goals</b></p> Controlled Mild Good 0°-90° Good None
<p><b>Frequency</b></p> 3-4 x/day 10 minutes	<p><b>Range of motion</b></p> ROM (passive, 0°-90°) Patella mobilization Ankle pumps (plantar flexion with resistance band) Hamstring, gastroc-soleus stretches	<p align="center"><b>Duration</b></p> 5 reps x 30 secs
2-3 x/day 20 minutes	<p><b>Strengthening</b></p> Straight leg raises (flexion, extension, abduction, adduction) Isometric training: multi-angle (0°, 60°)	3 sets x 10 reps 1 set x 10 reps
2 x/day 10 minutes	<p><b>Aerobic conditioning</b></p> UBE	
As required	<p><b>Modalities</b></p> Electrical muscle stimulation Cryotherapy	20 minutes 20 minutes
<b>Goals</b>	<ul style="list-style-type: none"> <li>■ ROM 0°-90°</li> <li>■ Control inflammation, effusion</li> <li>■ Muscle control</li> </ul>	

**Cincinnati SportsMedicine and Orthopaedic Center Rehab Protocol: OAT, ACI**  
**Phase 3. Weeks 5-6 (Visits: 1-2)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>■ Partial (25%) weight bearing when:               <ul style="list-style-type: none"> <li>- Pain controlled without narcotics</li> <li>- ROM 0°-90°</li> </ul> </li> <li>- Hemarthrosis controlled</li> <li>- Muscle control throughout ROM</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>■ Pain</li> <li>■ Effusion</li> <li>■ Patellar mobility</li> <li>■ ROM</li> <li>■ Muscle control</li> <li>■ Inflammatory response</li> </ul>	<p align="center"><b>Goals</b></p> <p>Mild/No RSD          Minimal          Good          0°-110°          3/5          None</p>
<p><b>Frequency</b></p> <p>3 x/day 10 minutes</p> <p>2 x/day 20 minutes</p> <p>2 x/day 10 minutes</p> <p>As required</p>	<p><b>Range of motion</b></p> <p>ROM (passive, 0°-110°)          Patella mobilization          Hamstring, gastroc-soleus stretches</p> <p><b>Strengthening</b></p> <p>Straight leg raises (ankle weight, not to exceed 10% of body weight)          Isometric training: multi-angle (90°, 60°, 30°)</p> <p><b>Aerobic conditioning</b> (patellofemoral precautions)          UBE</p> <p><b>Modalities</b></p> <p>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          2 sets x 10 reps</p> <p>20 minutes          20 minutes</p>
<b>Goals</b>	<ul style="list-style-type: none"> <li>■ ROM 0°-110°</li> <li>■ Control inflammation, effusion</li> <li>■ Muscle control</li> <li>■ Early recognition complications (motion, RSD, patellofemoral)</li> <li>■ 25% weight bearing</li> </ul>	

**Cincinnati SportsMedicine and Orthopaedic Center Rehab Protocol: OAT, ACI**  
**Phase 4. Weeks 7-8 (Visits: 1-2)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>■ Partial (25-50%) weight bearing when:               <ul style="list-style-type: none"> <li>- Pain controlled</li> <li>- Hemarthrosis controlled</li> <li>- ROM 0°-110°</li> <li>- Voluntary quad contraction achieved</li> </ul> </li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>■ Pain</li> <li>■ Effusion</li> <li>■ Patellar mobility</li> <li>■ ROM</li> <li>■ Muscle control</li> <li>■ Inflammatory response</li> </ul>	<p align="center"><b>Goals</b></p> <p>Mild/No RSD          Minimal          Good          0°-120°          4/5          None</p>
<p><b>Frequency</b></p> <p>2 x/day 10 minutes</p> <p>2 x/day 20 minutes</p> <p>3 x/day 5 minutes</p> <p>1-2 x/day 15 minutes</p> <p>As required</p>	<p><b>Range of motion</b> ROM (0°-120°) Hamstring, gastroc-soleus stretches</p> <p><b>Strengthening</b> Straight leg raises (flexion, extension, abduction, adduction) Straight leg raises, rubber tubing Isometric training – multi-angle (90°, 60°, 30°) Closed-chain  <ul style="list-style-type: none"> <li>- Wall sits (exclude in patellofemoral patients)</li> <li>- Mini-squats (rubber tubing, 0°-30°)</li> </ul> </p> <p><b>Balance training</b> Cup walking</p> <p><b>Aerobic conditioning</b> UBE Water walking</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 10 reps 3 sets x 30 reps 3 sets x 10 reps</p> <p>to fatigue x 3 3 sets x 20 reps</p> <p>20 minutes</p>
<b>Goals</b>	<ul style="list-style-type: none"> <li>■ 50-75% weight bearing</li> <li>■ Muscle control</li> <li>■ Control inflammation, effusion</li> <li>■ ROM 0°-120°</li> </ul>	



**Cincinnati SportsMedicine and Orthopaedic Center Rehab Protocol: OAT, ACI**  
**Phase 6. Weeks 13-26 (Visits: 2-3)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>■ No effusion, painless ROM, joint stability</li> <li>■ Performs activities of daily living, can walk 20 minutes without pain</li> <li>■ ROM 0°-135°</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>■ Pain</li> <li>■ Manual muscle test</li> <li>■ Swelling</li> <li>■ Patellar mobility</li> <li>■ Crepitus</li> <li>■ Gait</li> </ul>	<p align="center"><b>Goals</b></p> <p>Minimal/No RSD 4/5 Minimal Good None/slight Symmetrical</p>
<p><b>Frequency</b> 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>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 (active, 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>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>20 minutes</p>
<b>Goals</b>	<ul style="list-style-type: none"> <li>■ Increase strength and endurance</li> </ul>	

**Cincinnati SportsMedicine and Orthopaedic Center Rehab Protocol: OAT, ACI**

**Phase 7. Weeks 27-52 (Visits: 2-3)**

<b>General Observation</b>	<ul style="list-style-type: none"> <li>■ No effusion, painless ROM, joint stability</li> <li>■ Performs ADL, can walk 20 minutes without pain</li> </ul>	<ul style="list-style-type: none"> <li>■ ROM 0°-135°</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>■ Pain</li> <li>■ Manual muscle test</li> <li>■ Swelling</li> <li>■ Patellar mobility</li> <li>■ Crepitus</li> <li>■ Gait</li> <li>■ Isometric test (peripheral, % difference quads &amp; hams)</li> </ul>	<p align="center"><b>Goals</b></p> <p>Minima/No RSD 4/5 Minimal Good None/slight Symmetrical 20-30</p>
<p><b>Frequency</b></p> <p>2 x/day 10 minutes</p> <p>1 x/day 20-30 minutes</p> <p>1-3 x/day 5 minutes</p> <p>3 x/week 20-30 minutes</p> <p>3 x/week 15-20 minutes</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 (active, 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> (in unloader brace, 6 mos., straight) Jog Walk Backward run</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</p> <p>20 minutes</p>
<b>Goals</b>	<ul style="list-style-type: none"> <li>■ Increase function</li> <li>■ Maintain strength, endurance</li> </ul>	