The Gundersen Sports Medicine Meniscus Repair Rehabilitation Program is an evidence-based and soft tissue healing dependent program allowing patients to progress to vocational and sports-related activities as quickly and safely as possible. **WB will be restricted for 6 weeks to avoid overstressing the healing tissue.** Individual variations will occur depending on surgical technique and the patient’s response to treatment. **This program is outlined for mid body and posterior horn repairs of the meniscus** (for anterior horn repairs limit excessive extension initially).

If an **ACL Reconstruction and Meniscus Repair** are performed, limit ROM 0-90 for 2 weeks and then progress to full passively. No weightbearing flexion for 6 weeks. No squatting >90 for 4 months. Otherwise follow ACL protocol. Return to play will be 9-12 months.

Please contact us at 1-800-362-9567 ext. 58600 if you have questions or concerns.

<table>
<thead>
<tr>
<th>Phase I: 0-6 weeks</th>
<th>Immediate post op maximum protection phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goals</strong></td>
<td>• Protect anatomic repair</td>
</tr>
<tr>
<td></td>
<td>• Minimize knee joint effusion</td>
</tr>
<tr>
<td></td>
<td>• Gently increase ROM, emphasis on extension</td>
</tr>
<tr>
<td></td>
<td>• Encourage quadriceps function</td>
</tr>
<tr>
<td></td>
<td>• Prevent negative effects of immobilization</td>
</tr>
<tr>
<td><strong>ROM / Brace</strong></td>
<td>• Wk 0-2: 0-90 deg</td>
</tr>
<tr>
<td></td>
<td>• After 2 wk, progress ROM as tolerated in NWB position with goal of full by 6-10 weeks but ideally ASAP. Knee flexion motion with WB should be discouraged until after 6 weeks.</td>
</tr>
<tr>
<td></td>
<td>• Patient will use the post-op brace until wk 7-8.</td>
</tr>
<tr>
<td><strong>WB</strong></td>
<td>• wk 0-6: NWB with brace locked into extension</td>
</tr>
<tr>
<td><strong>Precautions / Guidelines</strong></td>
<td>• Must follow the WB restrictions as mentioned above to protect the healing meniscus.</td>
</tr>
<tr>
<td></td>
<td>• Encourage AROM in NWB to promote healing, prevent atrophy of soft tissue and bone, and prevent a decrease in collagen content in the healing meniscus which occurs with immobilization. Early AROM does not affect the tensile properties of the meniscus.</td>
</tr>
<tr>
<td></td>
<td>• Emphasis on regaining extension ROM ASAP as this is the most stable position for the meniscus and will decrease stress to the PF joint during ambulation.</td>
</tr>
<tr>
<td></td>
<td>• No isolated resistance to knee flexion for 6 weeks secondary to the semimembranosus attachment to the medial meniscus / popliteus to the lateral meniscus.</td>
</tr>
<tr>
<td></td>
<td>• Avoid twisting and pivoting motions for 10-12 weeks to minimize shear forces.</td>
</tr>
<tr>
<td></td>
<td>• Avoid deep squatting (&gt;90 deg) until 4-6 months</td>
</tr>
<tr>
<td><strong>Modalities</strong></td>
<td>• Cryotherapy 15 minutes in duration 3x/day</td>
</tr>
<tr>
<td></td>
<td>• IFC for pain/effusion if needed</td>
</tr>
<tr>
<td></td>
<td>• NMES quadriceps if needed</td>
</tr>
</tbody>
</table>
**Meniscus healing phases: (Based on canine study)**

- **wk 2:** Fibrin clot
- **wk 5:** Meniscal regeneration
- **wk 10:** Complete vascular healing
- **wk 24 (6 months):** Complete scar remodeling

### Treatment Recommendations

**Guidelines for progression based on tolerance**

Visits may be decreased if ROM progressing well, SLR w/out a lag, no excessive swelling or pain

<table>
<thead>
<tr>
<th>Phase I: 0-6 weeks</th>
<th>Maximum protection phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active warm-up</td>
<td></td>
</tr>
</tbody>
</table>
| ROM: Gentle stretching to attain full extension and gradual return of flexion. Progress as tolerated. Emphasis on full return of knee extension ASAP. Low-load long duration stretching for extension with heat if needed (1st TERT= Total End Range Time)
| Manual stretching for extension with overpressure or recurvatum Patellar mobilizations PROM / AAROM / AROM |
| Scar tissue massage / tissue effleurage to decrease sensitivity |
| Flexibility exercises for hamstring, gastroc-soleus |
| Consider Personalized Blood Flow Restriction to decrease muscle atrophy |
| wks 1-6 Biofeedback QS, SLR |
| Short arc 0-30 quadriceps with biofeedback |
| Gastroc soleus strengthening NWB |
| Hip strengthening NWB: 4 way SLR, sidelye resisted ER |
| Hip circles for posterior chain extensibility |
| Core stability exercises if desired ASLR kettlebell for core activation, ASLR core with rotation, Hollow holds, hollow holds with rotation, dead bugs with lat activation, TGU to elbow |
| IFC for pain/effusion, NMES for quadriceps activation and control as needed |
| Ice (in stretch for extension if needed) 2nd TERT |
| HEP for 3rd TERT |
### Phase II: 6-12 weeks

#### Moderate protective phase

**Goals**
- Minimize knee joint effusion
- Progress ROM as tolerated
- Progress WB and promote a normal heel-toe walking program
- Gradual progression of therapeutic exercises for stretching, neuro-muscular control, strengthening, and balance

**ROM / WB / Brace**
- wks 7-8 D/C brace
- Progress ROM as tolerated with goal of full ROM by 8-10 weeks
- WBAT with brace unlocked for ambulation if good quadriceps control. Utilize crutches as needed until patient demonstrates a normal heel-to-toe pattern.

**Modalities**
- Cryotherapy 15 minutes in duration 1-2x/day
- IFC for pain/effusion / NMES quadriceps if needed

**Precautions / Guidelines**
- No WB stretching into flexion until 8 wks
- Proximal control (core and hip) to prevent medial collapse/knee valgus
- Correct asymmetrical loading patterns: off-set stance, uni-lateral load, RNT, 2:1 to single leg progression
- Avoid twisting and pivoting motions for 10-12 wks to minimize shear forces
- **Avoid deep squatting (> 90 degrees) until 4-6 months**

**Treatment Recommendations**

<table>
<thead>
<tr>
<th>Guidelines for progression based on tolerance</th>
<th>Treatment Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active warm-up: Bike w/ resistance, Treadmill walking, wk 9-10: ER</td>
<td>Patellar mobilizations if needed</td>
</tr>
<tr>
<td>Stretching for full extension and flexion</td>
<td>wk 8: WB knee flexion stretch on leg press with light resistance</td>
</tr>
<tr>
<td>Flexibility: hamstring, gastoc-soleus, iliopsoas, quadriceps if indicated</td>
<td>Therapeutic exercises: Exercise in a pain-free manner. Gradual progression with avoiding medial collapse during strengthening and functional activities (focus on hip abductor and external rotator strengthening and N-M control). Incorporate total leg strengthening and balance / proprioception exercises.</td>
</tr>
<tr>
<td>Therapeutic exercises: Exercise in a pain-free manner. Gradual progression with avoiding medial collapse during strengthening and functional activities (focus on hip abductor and external rotator strengthening and N-M control). Incorporate total leg strengthening and balance / proprioception exercises.</td>
<td>Core strengthening exercises.</td>
</tr>
<tr>
<td>CKC knee extension</td>
<td>CKC exercises: Progress from 0-60 deg to 0-90 deg: leg press, wall squats, lateral step-overs, sit to stands, step-ups/step-downs, bridges, lateral hip hinge with medial reach, lateral hip hinge with lateral press, bridging with lat activation</td>
</tr>
<tr>
<td>Hip strengthening</td>
<td>wk 7: leg press 2:1, partial BW squats and partial lunges with UE support as needed</td>
</tr>
<tr>
<td>Quadriceps OKC isotonics short arc with progression to full ROM</td>
<td>wk 8: Resisted sidestep with T-band, leg press 1:1, partial dead lifts,</td>
</tr>
<tr>
<td>Hamstring OKC isotonics 0-90 deg in seated position with light resistance (15 reps/set initially). Progress to prone at wk 9, progress to physioball wk 12.</td>
<td>wk 9: Progress to full lunges, squats to 90 deg, posterior max lunge, squat and release, prone hamstring curls</td>
</tr>
<tr>
<td>Total leg strengthening</td>
<td>wk 10: Isokinetic quadriceps / hamstrings VSRP 150-300 deg/sec submax to max, progressing to 90 deg/sec</td>
</tr>
<tr>
<td>Balance / Proprioception training: Double leg progress to single leg, static progressing to dynamic activities</td>
<td>Balance / Proprioception training: Double leg progress to single leg, static progressing to dynamic activities</td>
</tr>
<tr>
<td>Core Strengthening: Pallof press, dead bug chop/lift</td>
<td>Core Strengthening: Pallof press, dead bug chop/lift</td>
</tr>
</tbody>
</table>
**Phase III: 12+ wks**

**Goals**
- Progress muscle strength and N-M control, endurance, balance activities. Ideally 3x/wk exercises at a fitness center, step-down, or home program
- Progress to higher level activity depending on demands and MD/PT approval
- Initiate a return to running program at 4 months if passes criteria and has no compensations with running pattern.
- Initiate working on landing mechanics and agility drills at 4-5 months if passes criteria
- **Return back to vocational, recreational, and sport activities at 6-9 months if passes criteria. Sports progression may take 2-4 weeks for full clearance back to full competition**

**Brace**
Your MD may recommend a knee sleeve or functional brace to be used until 12 months from your surgery for higher level activities

**Modalities**
- Cryotherapy 15 minutes 1x/day or after strenuous activity

**Precautions/ Guidelines**
- Correct asymmetrical loading patterns: off-set stance, uni-lateral load
- Address fear avoidance behaviors with graded exercise progression, cuing, positive reinforcement, referral if necessary
- No deep squatting until 4-6 months

**Treatment Recommendations**
- Active warm-up: Bike, Elliptical Runner, Treadmill walking,
- Continue with stretching and flexibility exercises as needed

| Total leg strengthening: hip/quadriceps/hamstring |
| Hip strengthening – neuromuscular control to prevent knee valgus |
| Core strengthening – prevent frontal plane trunk lean during landing |
| Single leg strengthening |
| CKC exercises: lunge progression, squat progression, step-up/downs |
| Hamstring full ROM isotonics. Add in physioball HS curls |
| Quadriceps isotonics in ROM without chondrosis |
| Isokinetic quads/hams 0-full flexion if minimal chondrosis |
| Balance exercises: Single leg, progress to dynamic and reactive |

**Return to Running Benchmarks:**
- 4 months
- Passes testing criteria - See next page

**Return to Landing Drills Benchmarks:**
- 4 months
- Passes testing criteria - See next page

**During Landing drills:**
**Focus on:**
1. Soft landing with knee flexion > 30 deg
2. no medial collapse/knee valgus
3. no hip IR/ pelvic drop
4. Dynamic postural control

**Wk 12-14:** if adequate strength scores (quads 75%, hamstrings 75%), add in sub-max foot placement drills, anterior lateral hop to stabilization, skaters to prepare for **return to running at 4 months**

**4 months:** Continue with strengthening and dynamic balance. Start running program. Progress to the following exercises if clinically appropriate

- Landing drills: Low amplitude sub-max drills:
  - Shallow jump landings, double to single line jumps, hopping progress to higher level if meets criteria (see sidebar)
- Agility drills: Low amplitude sub-max drills:
  - Skipping F/B, jogging F/B, skaters, carioca, agility ladder.

**5 months to 6 months:** Continue with strength and control drills related to sports specific movements. Progress with:

- Landing drills/ jump hopping drills
- Agility drills: progress to higher level with speed and complexity: agility ladder drills, cutting/pivoting (changing directions), changing speeds, anticipated to un-anticipated

**6 months+:** possible clearance for return to sport, depending on testing see next page for testing algorithm
Meniscus Repair Rehabilitation Program
Testing and Return to Running/Sports Recommendations

**Testing:**

12 weeks (3 months)
- SL 60 deg Stork test

Hip strength:
- Abduction MMT or dynamometry
- Hip Abduction Side plank test

Biodex test:
- No block
- 2 speeds: 180 deg/sec (5 reps) 300 deg/sec (30 reps)

Y balance test
- Deep squat WB symmetry: 2D video or force plate
- FOTO

16 weeks (4 months) – RETURN to RUNNING –
See benchmarks
- Repeat previous tests not passed
- Anterior lateral hop to stabilization
- Trial of running.
- Landing assessment
- Jump test: no arm swing – submax for apprehension/technique
- Single Hop test: no arm swing- submax for apprehension/technique

**Return to Landing Drills Benchmarks:**
1. Time: at least 4 months
2. MD/PT clearance
3. No knee joint effusion
4. Quadriceps and hamstrings: 80-90% = sub-max landing drills
5. Quadriceps and hamstrings: 90% = max landing drills

*Minimize the following 4 variables with landing drills:*
1. Stiff landing (<30 deg knee flexion)
2. Knee valgus
3. Hip IR / pelvic drop
4. Decreased dynamic balance

**Return to Running Benchmarks:**
1. Time: at least 4 months post-op
2. MD / PT clearance
3. No knee joint effusion
4. ROM: limb symmetry: extension within 5 deg flexion within 10 deg
5. Biodex:
   - Limb symmetry of PT:
     - Quad: 75%
     - Hams: 75%
6. Anterior lateral hop to stabilization drill completed with no apprehension and good movement control
7. Proper running form: treadmill running (sub-max at self selected speed)

**Recommendations:**
1. Biodex:
   - Quad PT/BW:
     - Males: 75%, 50% at 180,300deg/sec
     - Females: 65%, 35% at 180,300deg/sec
   - H/Q ratio: 65%, 90% at 180,300deg/sec
   - Total work at 300 deg/sec:
     - Quad: limb symmetry 75%
     - Hams: limb symmetry 75%
2. SL 60 deg stork test:
   - Limb symmetry: 90%
3. Hip Abduction Side Plank test:
   - Level II or greater
4. Squat WB symmetry with near equal WB
5. Y balance: Limb symmetry: < 4cm
Meniscus Repair Rehabilitation Program

Testing and Return to Running/Sports Recommendations

**24 weeks (6 months)**
Repeat previous tests not passed
Biodex test: Full ROM with no ext block
   3 speed test: 60 deg/sec (5 reps),
   180 deg/sec (5 reps),
   300 deg/sec (30 reps)
Landing assessment:
Jump test: no arm swing
Single Hop test: no arm swing
Triple hop/Cross over hop test: arm swing
Agility test: LEFT test components or time

**9 months / 1 year / 2 years**
Knee ROM
Biodex test: Full ROM with no ext block
   3 speed test: 60/180/300 deg/sec (5/5/30 reps)
Hip MMT or hand held dynamometry
   Abduction Side Plank test
Landing Assessment
Single Hop test
Triple Hop test/Cross Over Hop: arm swing
Agility test: LEFT test components or time

**Return to running and return to play depends on:**
Timeframe from surgery
Test performance
MD and PT approval
Return to Play Benchmarks:

1. Time: at least 6-9 months
2. MD/ PT clearance
3. No knee joint effusion
4. ROM: limb symmetry: extension within 5 deg, flexion within 10 deg
5. Biodex: Limb symmetry of PT 90% quad and hams
6. Landing Assessment: no faulty movement patterns
7. Single Hop test: Limb symmetry: 90%,
8. Triple Hop test or Cross-Over Hop Test Limb symmetry: 90%
9. Agility Testing with no compensation

Recommendations:

1. Biodex:
   i. *Quad PT/BW: (+/-5%)
      1. Males: 95%, 75%, 50% at 60, 180, 300 deg/sec
      2. Females: 85%, 65%, 35% at 60,180,300 deg/sec
   ii. H/Q ratio: (+/- 5%)  
      1. 65%, 75%, 90% at 60, 180, 300 deg/sec
   iii. Hams PT/BW: (+/- 5%)
      1. Males: 60%, 35%, 25% at 60, 180, 300 deg/sec
      2. Females: 60%, 35%, 25% at 60, 180, 300 deg/sec
   iv. Total work: 300 deg/sec
      1. Quads: Limb symmetry:90%
      2. Hams: Limb symmetry: 90%
2. Hip HHD 90% ABD/ER/extension
3. Y balance: Limb symmetry: < 4cm
4. Jump test:
   i. Males: 90%-100% height
   ii. Females: 80%-90% height
5. Single hop test:
   i. Males: 80-90% height
   ii. Females: 70-80% height

Return-to-Sports Progression:
(2-4 wk, depends on tolerance)

Step 1:
1-on-1 drills (non-contact) sport specific
Step 2:
1-on-1 drills (contact) full speed sport specific
Step 3:
Team scrimmage (non-contact)
Step 4:
Team scrimmage no restrictions
Step 5:
Game activities with restricted playing time
Step 6:
Game activities with no restrictions
Meniscus Repair Program References


Barber FA, Harding NR: Meniscal Repair Rehabilitation. AAOS Instructional Course Lectures, 2000; 49, 207-209.


