DFO/HTO  
Distal Femoral Osteotomy  
High Tibial Osteotomy

The Gundersen Sports Medicine Distal Femoral Osteotomy/ High Tibial Osteotomy 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. Please contact us at 1-800-362-9567 ext. 58600 if you have questions or concerns.

<table>
<thead>
<tr>
<th>Phase I: 0-8 weeks</th>
<th>Immediate post op maximum protection phase</th>
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</table>
| **Goals**          | • Protect anatomic repair  
                      • Minimize knee joint effusion  
                      • Gently increase ROM per guidelines, emphasis on extension  
                      • Encourage quadriceps function  
                      • Prevent negative effects of immobilization |

| ROM                | • wk 0-2: 0-90 deg  
                      • wk 2-8: Full PROM as tolerated |
| WB                 | • wk 0-8: NWB with brace locked into extension |

**Precautions**
Must follow the WB restrictions as mentioned above to protect the osteotomy site and prevent loss of fixation

| Modalities         | • Cryotherapy 15 minutes in duration 3x/day  
                      • IFC for pain/effusion if needed  
                      • NMES quadriceps if needed |

**Treatment Recommendations**
Guidelines for progression based on tolerance

- ROM: Wk 0-2: Gentle stretching to attain full extension and 90 degrees of flexion. Emphasis on full return of knee extension ASAP.  
  Manual stretching for extension  
  Patellar mobilizations  
  PROM / AAROM / AROM  
  Wk 2-8: progress range of motion to full as tolerated
- Scar tissue massage
- Therapeutic exercises. Exercise in a pain-free manner. Encourage quadriceps activation.  
  wks 1-8 Biofeedback QS, SLR  
  Short arc 0-30 quadriceps with biofeedback with no weight  
  Hip NWB: 4 way SLR, sidelye resisted ER  
  Core stability and upper body exercises if desired
- IFC for pain/effusion, NMES for quadriceps activation and control as needed
- Ice

PT visits may be decreased initially if:  
ROM 0-90 deg  
Adequate pain control  
No excessive swelling

Updated 11/2020
<table>
<thead>
<tr>
<th>Phase II: 8-12 weeks</th>
<th>Moderate protective phase</th>
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<tr>
<td><strong>Goals</strong></td>
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<tr>
<td>• Progress ROM as tolerated</td>
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<td>• Progress WB (per MD approval) and promote a normal heel-toe walking program</td>
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<tr>
<td>• Gradual progression of therapeutic exercises for strengthening, stretching, and balance</td>
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<td><strong>ROM</strong></td>
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<td>• wk 8+: progress to full ROM as tolerated. Goal of full ROM by 8-12 weeks</td>
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<tr>
<td><strong>WB</strong></td>
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<tr>
<td>• Wk 8-10: WBAT per MD based on xray. Brace unlocked for ambulation if good quadriceps control.</td>
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<td>• Utilize crutches as needed until patient demonstrates a normal heel-to-toe pattern.</td>
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<td><strong>Brace</strong></td>
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<tr>
<td>• Patient will use the post-op brace until wk 8-10. Replace with Bioskin Q-loc brace</td>
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<tr>
<td><strong>Modalities</strong></td>
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<tr>
<td>• Cryotherapy 15 minutes in duration 1-2x/day</td>
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<tr>
<td>• IFC for pain/effusion if needed</td>
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<tr>
<td>• NMES quadriceps if needed</td>
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<tr>
<td><strong>Precautions</strong></td>
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<tr>
<td>• No WB stretching into flexion until 8 wks</td>
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<td>• Avoid descending stairs reciprocally until adequate quadriceps control and lower extremity alignment</td>
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<tr>
<td><strong>Treatment Recommendations</strong></td>
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<tr>
<td>Guidelines for progression based on tolerance</td>
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<tr>
<td>• Active warm-up: Bike with resistance, Treadmill walking</td>
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<tr>
<td>• Stretching for full extension and flexion</td>
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<tr>
<td>PROM / AAROM / AROM</td>
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<tr>
<td>Patellar mobilizations if needed</td>
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<tr>
<td>Manual stretching for extension and flexion</td>
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<td>wk 10: WB knee flexion stretch on leg press with light resistance</td>
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<td>• Flexibility exercises for hamstring, gastrocsoleus, iliopsoas, quadriceps if indicated</td>
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<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). Incorporate total leg strengthening and balance / proprioception exercises.</td>
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<tr>
<td>Biofeedback QS SLR,</td>
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<td>CKC knee extension</td>
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<td>Hip 4 way SLR</td>
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<td>Hamstring OKC isotonics</td>
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<td>CKC exercises: leg press, wall squats, lateral step-overs, step-ups, bridges</td>
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<td>wk 10: leg press 2:1, partial double leg squats and partial deadlifts, double leg bridges, reverse lunges, beginning cord exercises</td>
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<td>wk 12: Resisted sidestep with T-band, leg press 1:1, balance exercises, single leg deadlift</td>
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<td>Gastrocsoleus strengthening</td>
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<td>Total leg strengthening</td>
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<td>Balance / Proprioception training: Double leg progress to single leg, static progressing to dynamic activities</td>
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<tr>
<td>CV conditioning / Core Stability</td>
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<td>• Ice</td>
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<td>• HEP</td>
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<tr>
<td>Phase III: 12+ wks</td>
<td>Advanced strengthening and Gradual Return to activity phase</td>
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| **Goals**         | • Progress muscle strength, endurance, and balance activities. Ideally 3x/week of exercises at a fitness center, step-down, or home program  
|                    | • Progress to higher level activities depending on functional demands and MD approval  
|                    | • Return back to vocational, recreational, and sport activities |
| **Brace**         | • Your MD may recommend continuing with the knee brace to be used until 12 months from your surgery for higher level activities |
| **Modalities**    | Cryotherapy 15 minutes 1x/day or after strenuous activity |
| **Treatment**     | Active warm-up: Bike, Elliptical Runner, Treadmill walking  
| **Recommendations**| Continue with stretching and flexibility exercises as needed  
|                    | Strengthening and endurance exercises: Advance as tolerated with emphasis on functional strengthening. Avoid medial collapse during strengthening and functional activities.  
|                    | Total leg strengthening  
|                    | Single leg strengthening  
|                    | Hip strengthening  
|                    | Heel raises  
|                    | Hamstring full ROM isotonics.  
|                    | Quadriceps isotonics in ROM without chondrosis, if needed  
|                    | CKC exercises: Leg press, multiple direction lunges, step-ups, squats, Gastroc soleus exercise  
|                    | Dynamic balance exercises  
|                    | CV conditioning and core stability  
| **Return to running** | Wk 24: (6 months): Return to running program if meets criteria – see next page  
| **Foot placement drills submax:: agility ladder / line jumps /submax anterior-lateral hop to stabilization** |  
| **Return to sport** | 6-8 months: Plyometric program – submax with gradual progression  
|                    | 9-12 months: Return to play if meets criteria – see next page |
Testing and Return to Running/Sports Recommendations

Testing:

24 weeks (6 months)

- SL 60 deg Stork test
- Hip strength:
  - Abduction MMT
  - Hip Abduction Side plank test
- Biodex test:
  - No block
  - 2 speeds: 180 deg/sec (5 reps), 300 deg/sec (30 reps)
- Y balance test
- Anterior lateral hop to stabilization
- Trial of running

36 weeks (9 months):

- 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)
- Single Hop test: no arm swing
- Triple hop/Cross over hop test: arm swing
- Tuck Jump or Landing Assessment
- Agility Test: LEFT test components or time
- Jump test: no arm swing – submax for apprehension/technique
- Single Hop test: no arm swing – submax for apprehension/technique

Return to Running Criteria:

Return to Running Requirements:
- Time: at least 6 months post-op
- MD / PT clearance
- No knee joint effusion
- ROM: limb symmetry:
  - extension within 5 deg
  - flexion within 10 deg
- Biodex:
  - Limb symmetry of PT:
    - Quad: 75%
    - Hams: 80-90%
- Proper running form: Treadmill running (6-10 mph, 5 min) with equal audibly rhythmic foot strike
- Anterior lateral hop to stabilization drill completed with no apprehension and good movement control

Return to Running Recommendations:

Biodex:
- 180 deg/sec:
  - Quad PT/BW: Males: 65%
  - Females: 55%
  - H/Q ratio: 65%
- 300 deg/sec:
  - Quads Power: Limb symmetry: 75%
  - Hams Power: Limb symmetry: 75%
- SL 60 deg stork test:
  - Limb symmetry: 90%
- Hip Abduction Side Plank test:
  - Level II or greater
- Y balance: Limb symmetry: < 4cm
Testing and Return to Running/Sports Recommendations

Return to Play Criteria:

Return to Play Requirements:
Time: at least 9-12 months
MD/PT clearance
No knee joint effusion
ROM: limb symmetry:
   extension within 5 deg
   flexion within 10 deg
Biodex:
   Limb symmetry of PT:
     Quad: 90%
     Hams: 90%
Tuck Jump or Landing Assessment: no faulty movement patterns
Single Hop test: Limb symmetry: 90%,
Triple Hop test or Cross-Over Hop Test Limb symmetry: 90%
LEFT test or Agility Test with no compensation

Return to Play Recommendations:
Biodex:
   60 deg/sec:
     Quad PT/BW: Males: 100%
     Females: 80%
     Hams PT/BW: Males: 60%
     Females: 60%
     H/Q ratio: 60 deg/sec: 60%
     180 deg/sec: 70%
     300 deg/sec: 80%
300 deg/sec:
   Quads Power: Limb symmetry: 90%
   Hams Power: Limb symmetry: 90%

Hip Abduction Side Plank test:
   Level III or greater
Y balance: Limb symmetry: < 4cm