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## MICROFRACTURE FEMORAL CONDYLE

	Time Frame (Weeks)	Guidelines	Goals
<b>PHASE I</b>	0 to 2	<p><b>CRUTCHES:</b> NWB x 6 weeks  <b>CPM:</b> 8 hours/day x 6 weeks</p> <p><b>EXERCISE PROGRESSION</b></p> <ul style="list-style-type: none"> <li>Gait training</li> <li>Extension - heel props for full extension</li> <li>Flexion - off table or wall slides</li> <li>Quadriceps setting using NMES as needed</li> <li>Multi-plane straight leg raises</li> </ul> <p><b>RECOMMENDED LOADING</b></p> <ul style="list-style-type: none"> <li>Short but frequent bouts of ROM, quad activation 3+x/day</li> </ul>	<ul style="list-style-type: none"> <li>Reduce inflammation</li> <li>Normalize patella mobility with manual mobilizations</li> <li>Full extension, passive and active</li> <li>Good quadriceps activation</li> <li>No extension lag straight leg raise</li> <li>90°-100° of knee flexion, progressing to full as tolerated.</li> </ul>
	2 to 6	<p><b>EXERCISE PROGRESSION</b></p> <ul style="list-style-type: none"> <li>Extension – heel props or add prone hangs (as needed)</li> <li>Flexion – wall or heel slides</li> <li>Ball bridge and/or isometric hamstring activation</li> </ul> <p><b>CARDIOVASCULAR EXERCISE</b></p> <ul style="list-style-type: none"> <li>Stationary biking</li> <li>Short walks using both crutches</li> <li>Pool program once incisions are completely healed</li> </ul> <p><b>RECOMMENDED LOADING</b></p> <ul style="list-style-type: none"> <li>Short but frequent bouts of ROM, quad activation 3x/day</li> </ul>	<ul style="list-style-type: none"> <li>Reduce inflammation</li> <li>Full knee extension/hyperextension</li> <li>Good quadriceps control with no extension lag</li> <li>100° – 120° of knee flexion, progress as tolerated</li> </ul>
<b>PHASE II</b>	6 to 8	<p><b>EXERCISE PROGRESSION</b></p> <ul style="list-style-type: none"> <li>Extension – continue heel props, prone hangs as needed</li> <li>Flexion – continue with end range heel slides</li> <li>Bilateral squat progression – <u>limited and pain-free</u> range</li> <li>Step-up progression – <u>limited and pain-free</u> range</li> <li>Hamstring activation with bridge on floor, ball or box</li> <li>Proprioception drills</li> </ul> <p><b>CARDIOVASCULAR EXERCISE</b></p> <ul style="list-style-type: none"> <li>Stationary biking</li> <li>Treadmill/outdoor walking, focus on proper gait mechanics</li> <li>Swimming, deep water program</li> </ul> <p><b>RECOMMENDED LOADING</b></p> <ul style="list-style-type: none"> <li>ROM: 2-3x/day</li> <li>Strength: 1x/day open chain; 3x/week closed chain</li> <li>Cardiovascular: 20-30 minutes/day low/moderate intensity</li> </ul>	<ul style="list-style-type: none"> <li>Progress off crutches – usually over a 1-2 week period</li> <li>Full knee extension/hyperextension</li> <li>Knee flexion, full as tolerated</li> <li>Normalize gait mechanics</li> <li>Normalize patellofemoral joint and scar mobility</li> </ul>
	8 to 12	<p><b>EXERCISE PROGRESSION</b></p> <ul style="list-style-type: none"> <li>Controlled movement series - warm-up</li> <li>Leg press, hamstrings curls (light resistance)</li> </ul> <p><b>CARDIOVASCULAR EXERCISE</b></p> <ul style="list-style-type: none"> <li>Increase intensity/duration</li> <li>Stationary biking</li> <li>Treadmill/outdoor walking proper gait mechanics – slow progression based on previous load tolerance</li> </ul> <p><b>RECOMMENDED LOADING</b></p> <ul style="list-style-type: none"> <li>ROM: 2-3x/day</li> <li>Strength: 1x/day open chain; 3x/week closed chain</li> <li>Cardio: 30+ minutes/day low/moderate intensity 5x/week</li> </ul>	<ul style="list-style-type: none"> <li>Reduce inflammation</li> <li>Full ROM</li> <li>Normal gait</li> </ul>

	Time Frame (Weeks)	Guidelines	Goals
<b>PHASE III</b>	12 to 24	<p><b>MOVEMENT PREP</b></p> <ul style="list-style-type: none"> <li>• Foam roller</li> <li>• Controlled movement series</li> </ul> <p><b>EXERCISE PROGRESSION</b></p> <ul style="list-style-type: none"> <li>• Weighted squat progression</li> <li>• Single leg closed chain progression. Pain and swelling must dictate advancement.</li> <li>• Lateral band walk</li> <li>• Integrate core program with LE program</li> </ul> <p><b>CARDIOVASCULAR EXERCISE</b></p> <ul style="list-style-type: none"> <li>• Stationary biking</li> <li>• Outdoor biking</li> <li>• Treadmill/outdoor walking, proper gait mechanics</li> <li>• Arc trainer or elliptical</li> </ul> <p><b>ACTIVITY PROGRESSION</b></p> <ul style="list-style-type: none"> <li>• Outdoor biking</li> <li>• Higher intensity interval work with CV program</li> </ul> <p><b>RECOMMENDED LOADING</b></p> <ul style="list-style-type: none"> <li>• ROM: 1-2x/day</li> <li>• Strength: 3x/week with closed chain loading</li> <li>• Cardiovascular: 20-45 minutes 5x/week, moderate intensity</li> </ul>	<ul style="list-style-type: none"> <li>• Control inflammation with increasing loads</li> <li>• Full knee flexion and extension with terminal stretch</li> <li>• Progressive strengthening</li> <li>• Increase muscular endurance</li> </ul>
<b>PHASE IV</b>	6 to 9 MONTHS	<p><b>EXERCISE PROGRESSION</b></p> <ul style="list-style-type: none"> <li>• Increase loads from phase III</li> <li>• Movement prep of foam roller, controlled movement series</li> </ul> <p><b>NON-IMPACT CARDIOVASCULAR EXERCISE</b></p> <ul style="list-style-type: none"> <li>• Stationary bike</li> <li>• Arc trainer or elliptical</li> <li>• swimming</li> </ul> <p><b>RUNNING PROGRESSION</b></p> <ul style="list-style-type: none"> <li>• Basic ladder series – approximately <b>6 MONTHS</b></li> <li>• Skipping – <b>6 MONTHS</b></li> <li>• Walk/jog interval – <b>6-9 MONTHS</b></li> <li>• Linear acceleration/deceleration – <b>6-9 MONTHS</b></li> <li>• Sprinting – <b>6-9 MONTHS</b></li> <li>• Change of direction and lateral agility – <b>6-9 MONTHS</b></li> </ul> <p><b>JUMPING PROGRESSION (GRADUAL 6-12 MONTHS)</b></p> <ul style="list-style-type: none"> <li>• Low amplitude bilateral single response jumps</li> <li>• Bilateral multiple response jumps</li> <li>• Unilateral single response jumps</li> <li>• Unilateral multiple response jumps</li> </ul> <p><b>SPORT SPECIFIC ACTIVITY PROGRESSION</b></p> <ul style="list-style-type: none"> <li>• Non-contact and non-reactive field/court progression – <b>6-12 MONTHS</b></li> </ul> <p><b>SPORTS TEST AND RETURN TO ACTIVITY</b></p> <ul style="list-style-type: none"> <li>• Follow-up examination with physician</li> <li>• Sports test for return to competition: <b>9-12 MONTHS</b></li> </ul> <p><b>RECOMMENDED LOADING</b></p> <ul style="list-style-type: none"> <li>• ROM: global stretching</li> <li>• Strength: 2-3x/week with increasing resistance</li> <li>• Cardiovascular: 20-45 minutes 5x/week. Alternate impact and non-impact days using sound recovery principles.</li> </ul>	<ul style="list-style-type: none"> <li>• Control inflammation with increasing loads</li> <li>• Progressive strengthening</li> <li>• Increase muscular strength, power and endurance</li> </ul>