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**Anteromedialization & Tibial Tubercle Osteotomy (AMZ-TTO) with Patellar/Trochlear
 Autologous Chondrocyte Implantation (MACI) Protocol**

	Weight-bearing	Brace	Range of Motion	Exercises
Phase 1 0-2 weeks	Heel touch only	Locked in full extension at all times Off for hygiene and home exercise only	Gentle passive 0-45° CPM 0-30°	Calf pumps, quadriceps tightening sets and SLR in brace, modalities
Phase 2 2-8 weeks	2-6 weeks: Heel touch only 6-8 weeks: Advance 25% weekly and progress to full with normalized gait pattern	2-4 weeks: Unlocked 0-45° 4-6 weeks: Unlocked 0-90° Discontinue brace at 6 weeks	2-4 weeks: CPM 0-60° 4-6 weeks: CPM 0-90° Advance ROM as tolerated when non-weight-bearing	Progress non-weight-bearing Flexibility Begin floor-based core, hip and gluteal strengthening Advance quadriceps strengthening, patellar mobilization and SLR
Phase 3 8-12 weeks	Full	None	Full	Progress closed chain activities Advance hamstring exercises, proprioception & balance exercises Advance core work with hip, gluteal and core strengthening Begin Stationary Bike at 10 weeks

Phase 4 3-6 months	Full	None	Full	Progress Phase III exercises and functional activities: walking lunges, planks, bridges, Swiss ball, half-Bosu exercises Advance core work with hip, gluteal and core strengthening
Phase 5 6-12 months	Full	None	Full	Advance non-impact activity No running, jumping, pivoting, or sports participation unless cleared by MD
CPM – continuous passive motion machine; SLR – Straight-leg raise;				