

Distal Femoral Osteotomy

Physical Therapy Protocol · Opening- or Closing-Wedge DFO (Valgus Malalignment Correction)



Based on the Ohio State University Wexner Medical Center High Tibial/Distal Femur Osteotomy clinical practice guideline (2023), the OrthoIndy distal femoral osteotomy physical therapy protocol, and the University of Virginia HTO/DFO post-operative protocol.

AT A GLANCE

TIMELINE	8-12 months; femoral osteotomy healing is typically slower than tibial - weight bearing is protected longer
WEIGHT BEARING	TTWB for ~6 weeks, then staged progression (25%-50%-75%) to full weight bearing by weeks 8-9 as radiographic healing allows
KEY MILESTONES	ROM 0-90° week 1, 0-120° by week 3, full ROM by ~week 4; strength symmetry ≥80% before impact
RETURN TO ACTIVITY	Low-impact sport 4-6 months; jogging 6-8 months; high-impact/pivoting sport 8-12 months with ≥90% LSI and clearance

KEY PRECAUTIONS

- Weight-bearing advancement is contingent on radiographic evidence of osteotomy consolidation - confirm allowances with the surgeon at each follow-up.
- Perform hip abduction/adduction work in the brace during early phases to avoid varus/valgus stress across the osteotomy.
- Brace locked for sleep the first 2-4 weeks and for ambulation until quadriceps control returns (SLR without lag).
- Monitor for DVT (calf swelling >3 cm, pitting edema) and report loss of extension, mechanical block, or hardware-related pain to the surgeon.

PHASED REHABILITATION

PHASE 1 – IMMEDIATE PROTECTION		Weeks 0-6
GOALS	- Protect the healing osteotomy (TTWB, brace per surgeon) - Restore ROM: 0-90° week 1, 0-120° by week 3, full by ~week 4 - Re-establish quadriceps activation; control pain and effusion	
INTERVENTIONS	- Toe-touch weight bearing with bilateral crutches; hinged brace opened as ROM allows, locked for sleep 2-4 weeks - PROM/AAROM: heel slides, wall slides, seated flexion; prone hangs/heel props for full extension - Quad sets, 4-way SLR (abduction/adduction performed in brace to avoid frontal-plane stress), ankle pumps - Patellar mobilizations; NMES to quadriceps for activation deficits - Hamstring and gluteal isometrics; avoid aggressive active hamstring work the first 2 weeks - Recumbent bike for ROM only once ~110° flexion achieved; cryotherapy/elevation; DVT surveillance	
CRITERIA TO ADVANCE	- Full passive extension and flexion $\geq 120^\circ$ - SLR without extension lag; strong quadriceps isometric - Minimal pain and effusion ($\leq 1+$) - Surgeon confirmation of interval healing to begin weight-bearing progression	

PHASE 2 – STAGED WEIGHT BEARING & EARLY STRENGTHENING		Weeks 6-12
GOALS	- Progress weight bearing 25% (week 6), 50% (week 7), 75% (week 8), full by week 9 with normalized gait - Restore full symmetrical ROM and baseline lower-extremity strength	
INTERVENTIONS	- Graduated weight-bearing progression with crutches; gait training and crutch wean as osteotomy healing and quad control allow - Standing terminal knee extension; multi-angle quadriceps isometrics - Bridges, mini-squats, wall sits, heel raises, partial-body-weight leg press - OKC hamstring curls and OKC knee extension in protected arc (90-30°) per OSU timeline - Blood flow restriction training with physician clearance to augment quadriceps work at low loads - Stationary cycling with progressive resistance; aquatic gait/pool program once incisions healed	
CRITERIA TO ADVANCE	- Full weight bearing with normalized, device-free gait - Full, painless active ROM; effusion $< 1+$ - Tolerates closed-chain loading without increased pain or reactive swelling	

PHASE 3 – PROGRESSIVE STRENGTHENING & NEUROMUSCULAR CONTROL		Weeks 12-20
GOALS	- Advance functional strength and muscular endurance - Progress balance and single-leg control - Quadriceps/hamstring symmetry $\geq 80\%$ on strength testing	
INTERVENTIONS	- Squat and leg-press progression with increasing depth as tolerated; step-ups and lateral step-downs - Single-leg sit-to-stand, split squats, Romanian deadlift progression - Resisted OKC quadriceps through full ROM (weeks 12-14 onward) - Balance/perturbation training progressing to dynamic surfaces - Elliptical, swimming, and cycling for aerobic conditioning - Isometric or isokinetic strength testing at ~3-4 months to guide progression	
CRITERIA TO ADVANCE	- Strength symmetry $\geq 80\%$ (quadriceps and hamstrings) - Proper mechanics with single-leg loading, no frontal-plane collapse - No reactive effusion with progressive loading	

PHASE 4 – RETURN TO ACTIVITY & SPORT		Months 5-12
GOALS	- Graded return: low-impact sport 4-6 months, jogging 6-8 months, high-impact sport 8-12 months - Strength and hop-test symmetry $\geq 90\%$ before running and sport clearance	
INTERVENTIONS	- Low-impact activities first: golf, swimming, cycling, elliptical (months 4-6) - Walk-jog progression at 6+ months once isokinetic symmetry $\geq 80\%$ and hopping in place is pain-free - Plyometric progression bilateral to single-leg; agility drills at graded effort (shuffles, carioca, figure-8s) - Sport-specific training for return to tennis, basketball, or other high-impact sport at 8-12 months - Isokinetic and hop testing at 6 and 9 months; continue maintenance strengthening	
CRITERIA TO ADVANCE	- Isokinetic quadriceps/hamstring LSI $\geq 90\%$ - Hop test battery LSI $\geq 90\%$ with sound landing mechanics - No effusion or osteotomy-site symptoms with impact - Physician clearance based on radiographic union	

GUIDING PRINCIPLES

This protocol follows criterion-based progression over rigid time-based advancement; phased rehabilitation balancing tissue healing with controlled stress application; objective milestones (ROM, strength LSI, functional testing) to guide phase transitions; individualization based on surgical findings, tissue quality, and patient factors; and ongoing surgeon–therapist communication throughout recovery.

REFERENCES

1. Ohio State University Wexner Medical Center Sports Medicine. High Tibial/Distal Femur Osteotomy Clinical Practice Guideline. 2023. https://medicine.osu.edu/-/media/files/medicine/departments/sports-medicine/medical-professionals/knee-ankle-and-foot/high-tibial_distal-femur-osteotomy_2023.pdf
2. OrthoIndy. Distal Femoral Osteotomy Physical Therapy Protocol. <https://www.orthoindy.com/wp-content/uploads/Distal-Femoral-Osteotomy.pdf>
3. University of Virginia Orthopaedic Surgery, Sports Medicine. Post-Operative Rehabilitation Protocol: HTO/DFO. 2021. <https://med.virginia.edu/orthopaedic-surgery/wp-content/uploads/sites/242/2021/06/HTO-DFO-Protocol-1.pdf>

For clinical use by licensed physical therapists treating patients of Robert Pettit, MD. This document is a rehabilitation guideline, not a substitute for clinical judgment. Progression must be individualized based on intraoperative findings, tissue quality, and patient response. Scan the QR code for the current version of this protocol.