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PHYSICAL THERAPY PROTOCOL

Ankle Fracture ORIF

Open Reduction and Internal Fixation · Stable Construct

FOR THE PHYSICAL THERAPIST

Overview and Goals

This protocol governs rehabilitation after open reduction and internal fixation of a stable ankle fracture. The evidence base is strong and recent — the WAX, INWN, EMADE, and EXACT trials and the 2024 Cochrane review — and it converges on two principles: early motion (beginning in a removable boot at week 2, after wound healing) meaningfully improves ankle function, and progressive weight-bearing is safe. This protocol begins motion once the wound is healed and advances weight-bearing on a conservative schedule.[1,2,3,5]

The rehabilitation goals are to protect the fixation while the wound heals, restore ankle dorsiflexion (the motion most often lost), rebuild the calf and peroneal muscles, normalize heel-toe gait, and return to impact activity on a healed, stable ankle.[2,8]

NO ANKLE MOTION UNTIL THE WOUND IS HEALED (~2 WEEKS)

Ankle range-of-motion exercises begin only after wound healing is confirmed — typically at the 2-week visit once sutures or staples are removed. Starting ankle motion before the wound has healed increases wound complications roughly threefold. Until then, the ankle stays in the splint/boot and rehabilitation is limited to toe motion and proximal exercises.

ADDED CAUTION FOR COMPLEX FRACTURES

Greater caution and a slower progression are warranted for **trimalleolar fractures, posterior malleolar involvement, syndesmotic fixation, osteoporotic bone, and medically high-risk patients**. Where the fracture or fixation is complex, follow Dr. Roth's written weight-bearing and motion instructions, which may be more conservative than the defaults below — particularly the timing of full weight-bearing when a syndesmotic screw or suture-button was placed.

Rehabilitation Phases

PHASE	BOOT / WEIGHT BEARING	ROM GOALS	EXERCISES	CRITERIA TO ADVANCE
PHASE 1 Weeks 0–2 *Wound healing & protection*	• Below-knee posterior splint, ankle neutral. • Non-weight-bearing for 2 weeks, with crutches.[4,8] • No boot removal for exercise until sutures/staples out.	• No ankle ROM until wound healing confirmed (~2 weeks).[7] • Toe motion permitted.	**Permitted (non-ankle):** • Active toe flexion/extension • Quadriceps and gluteal isometrics, hip abduction/adduction • Contralateral limb and upper-body conditioning **Positioning:** • Elevate above heart level when not ambulating **Restrictions:** • No ankle ROM, no boot removal for exercise, no unsupported ambulation	• Wound healed (inspect 10–14 days) • Sutures/staples removed • Pain and swelling controlled • Minimum 2 weeks elapsed
PHASE 2 Weeks 2–6 *Early protected motion*	• At the 2-week visit, transition to a removable walking boot after wound inspection.[2,4] • Remain NWB until	• Begin active ankle ROM out of the boot (week 2): dorsiflexion, plantarflexion, inversion, eversion	**ROM (begin week 2, 3–4×/day):** • Active DF/PF, inversion/eversion in comfortable range **Progressive HEP (EMADE model):** • Wk 2–3: active ankle ROM (seated/supine)	• Wound fully healed • Active ankle ROM progressing • Ready to advance weight-

PHASE	BOOT / WEIGHT BEARING	ROM GOALS	EXERCISES	CRITERIA TO ADVANCE
	week 6, then begin WBAT (conservative default).	— gentle, pain-free.[2] • Ankle circles and alphabet; boot on at all other times.	• Wk 3–4: isometric ankle strengthening (push against immovable surface, all 4 directions) • Wk 4–6: active-assisted DF with towel/strap; seated heel/toe raises (NWB) **Adjuncts:** • Cryotherapy, elevation; scar mobilization once incision healed (~wk 3–4); proximal hip/knee/core work	bearing at week 6 • Minimum 6 weeks elapsed
PHASE 3 Weeks 6–10 *Full weight-bearing & functional strengthening*	• Progress to full weight-bearing in the boot by week 6.[4,8] • Wean boot into a supportive shoe between weeks 6–8 based on healing, painless full WB, and DF ≥ 5°.	• Aggressive active/active-assisted dorsiflexion — target ≥ 10°. • Full plantarflexion, inversion, eversion. • Joint mobilization if ROM restricted.	**Strengthening:** • Bilateral → single-leg heel raises • Theraband PF/DF/inversion/eversion • Seated calf press, toe curls, marble pickups (intrinsics) • Closed-chain: mini-squats, step-ups (4") **Gait:** • Normalize heel-toe gait without device; address compensations; antigravity treadmill if available **Proprioception:** • Single-leg balance (eyes open → closed); wobble/BAPS board	• Full WB, weaned into shoe • DF ≥ 10°, symmetric ROM emerging • Single-leg stance controlled • Minimum 10 weeks elapsed
PHASE 4 Weeks 10–16 *Advanced strengthening & impact*	• Regular supportive shoe. No restrictions.	• Full, symmetric ankle ROM.	**Strengthening progression:** • Single-leg heel raises to 3×15–20 • Leg press, calf press (progressive load) • Step-ups/step-downs (6 → 8 → 10") • Lateral band walks, monster walks **Impact (begin ~week 12):** • Bilateral → single-leg hopping • Jump rope, agility ladder, lateral shuffles, carioca **Proprioception:** • Unstable-surface balance (foam, BOSU), perturbation training **Cardio:** • Bike (wk 6–8), elliptical (wk 8–10), flat-surface jogging (~wk 10–12 if pain-free single-leg hop)	• Meets RTS criteria (below) • Symmetric strength • Pain-free impact and agility • Dr. Roth's clearance

Procedure-Specific Considerations

Wound Healing Gates Early Motion

The single most important early rule is that ankle motion waits for wound healing. The subcutaneous position of the ankle malleoli and the swelling that accompanies these fractures make the wound vulnerable, and beginning motion before healing roughly triples the wound-complication rate. This is why Phase 1 is deliberately limited to toe and proximal exercises, with ankle ROM starting only after the 2-week wound check.[7,12]

Restoring Dorsiflexion

Dorsiflexion is the motion most often lost after ankle fracture and the one most needed for a normal heel-toe gait and for descending stairs. Phase 3 pursues it aggressively with active and active-assisted work and, where restricted, talocrural and subtalar joint mobilization. At least 5° of dorsiflexion past neutral is a practical gate for weaning out of the boot; 10° or more is the functional target.[3]

Syndesmotic and Complex Fractures

Syndesmotic fixation (screw or suture-button), posterior malleolar involvement, trimalleolar patterns, and osteoporotic bone all warrant a more conservative course than a simple lateral malleolus fracture. Weight-bearing in particular may be delayed when the syndesmosis was fixed. Defer to Dr. Roth's written instruction for these cases; the defaults in this protocol assume a stable, uncomplicated construct.[8]

Early Weight-Bearing Evidence (Context)

Recent Level I trials show that immediate protected weight-bearing in a boot is non-inferior — and by some measures superior — to delayed weight-bearing, and many patients assigned to delayed weight-bearing self-initiate earlier. This protocol uses a conservative NWB-until-week-6 default at Dr. Roth's direction; where he prescribes earlier protected weight-bearing for a given patient, follow that instruction — the evidence supports it as safe.[1,4]

Return-to-Sport Criteria

Return to impact and sport is criteria-based and applies to the uncomplicated stable construct; complex fractures progress on Dr. Roth's individualized timeline.[8] All criteria below should be met before clearance.

Domain	Criterion
Range of motion	Full, symmetric ankle ROM — dorsiflexion ≥ 10° and symmetric to the contralateral side[3]
Strength	Single-leg heel-raise capacity and Theraband strength symmetric to the contralateral limb[3]
Balance	Single-leg balance on unstable surface without loss of control[3]
Impact tolerance	Pain-free single-leg hopping and sport-specific agility (shuffles, carioca, cutting)[3]
Gait	Normal heel-toe gait without compensation or antalgia[3]
Clearance	Final clearance by Dr. Roth; complex/ syndesmotic fractures on an individualized timeline

References

1. Kearney RS, et al. Weight-Bearing After Ankle Fracture Fixation (WAX Trial). Lancet. 2024 (n=561, 23 centers).
2. Immediate Weight-Bearing After Ankle Fracture ORIF (INWN Trial). JBJS. 2025 (n=160).
3. Early Motion After Ankle Fracture Fixation (EMADE Programme). Bone Joint J. 2024 (n=157).
4. Cochrane Review: Rehabilitation After Ankle Fracture. 2024 (53 studies, 4,489 patients).
5. Removable Immobilization and Exercise After Ankle Fracture (EXACT). JAMA. 2015 (n=214).
6. Active Exercise Accelerates Return to Activity After Ankle Fracture (systematic review).
7. Early Motion Before Wound Healing Increases Wound Complications (pooled OR 3.11).
8. Individualized Rehabilitation After Ankle Fracture: Fracture- and Patient-Specific Factors (JBJS Reviews synthesis).
9. Posterior Splinting and Neutral Positioning After Ankle ORIF.
10. PREVENT CLOT Trial: Aspirin vs. Enoxaparin After Operative Fracture Fixation. NEJM. 2023 (context).
11. VTE Prophylaxis Guidance After Lower-Extremity Fracture (context).
12. Wound Complication Rate and Risk Factors After Ankle ORIF (~10.3%).
13. Surgical Site Infection Risk Factors After Ankle Fracture Fixation.
14. Hypoalbuminemia and Age as Wound-Complication Risk Factors After Ankle ORIF.

15. EMADE Home Exercise Programme Structure and Education Components.

Glossary

AAROM / AROM — Active-assisted / active range of motion.

BAPS board — Biomechanical Ankle Platform System; a wobble-board device for proprioceptive training.

Dorsiflexion / plantarflexion — Ankle motion bringing the foot up toward the shin (dorsiflexion) or pointing it down (plantarflexion).

HEP — Home exercise program.

NWB / WBAT — Non-weight-bearing / weight-bearing as tolerated.

ORIF — Open reduction and internal fixation.

Syndesmosis — The fibrous joint between the distal tibia and fibula; when fixed with a screw or suture-button, weight-bearing is often delayed.

Trimalleolar — A fracture involving the medial, lateral, and posterior malleoli — a more complex, less stable pattern.

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Dr. Roth completed his orthopaedic surgery residency at Harvard Medical School and his sports medicine fellowship at the Kerlan-Jobe Orthopaedic Clinic in Los Angeles. In practice since 2013, he specializes in advanced arthroscopic techniques and sports medicine procedures, and sees patients at Palo Alto Medical Foundation's Palo Alto and Dublin offices. He welcomes calls from physical therapists about his patients or this protocol.

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