



Dr. Huff Modified Brostrom Repair Rehabilitation Protocol:

The intent of this protocol is to provide the clinician with a guideline of the post-operative rehabilitation course of a patient who has undergone an anatomical surgical procedure. It is by no means intended to be a substitute for one's clinical decision making regarding the progression of a patient's post-operative course based on their physical exam/findings, individual progress, and/or the presence of post-operative complications. If a clinician requires assistance in the progression of a post-operative patient they should consult with the referring Surgeon.

The following post-operative rehabilitation protocol is adapted from the one used at the Hospital for Special Surgery (HSS), where the modified Brostrom procedure is the preferred anatomical surgical procedure for the treatment of lateral ankle instability.

Progression to the next phase is based on Clinical Criteria and/or Time Frames as Appropriate.

I. IMMEDIATE POST-SURGICAL INSTRUCTIONS AND HOME EXERCISE PROGRAM WEEKS 0 – 6

A. GOALS

- i. Edema control/reduction
- ii. Protect healing tissue. Foot is placed in neutral in short leg cast (SLC)
- iii. Independent transfers and ambulation, non-weightbearing on involved lower extremity with use of optimal ambulatory assistive device

B. Physical Therapy interventions:

- i. Proximal LE, upper extremity (UE) and core muscle strengthening exercises
- ii. Aerobic upper body conditioning
- iii. Transfer and gait training with optimal assistive device, non-weight-bearing on surgical lower extremity (LE) until independent
- iv. Identify patient's goal for return to recreational and/or sport specific activities

C. Criteria for progression to Phase I:

- i. Decreased pain
- ii. Decreased edema
- iii. Independence with home exercise program (HEP)
- iv. Independence with transfers and ambulation NWB on involved lower extremity

II. PHASE I – WEEKS 6 – 8

A. GOALS

- i. Protect healing tissue. To protect the CFL from inversion and the ATFL from plantarflexion, the ankle is kept in a cast set in neutral for 6 weeks and then transitioned to a pneumatic walking boot
- ii. Progressive protected normalization of gait: After the initial 6 week immobilization period, progressive weight-bearing is initiated as tolerated, first with the involved ankle in a pneumatic walking boot and then transitioned to protected ankle weight bearing in a semi-rigid ankle stirrup orthotic
- iii. Edema control and patient education regarding skin/wound care and prevention of infections
- iv. Pain reduction
- v. Prevention of deconditioning
- vi. Prevention of scar adhesions and myofascial restriction

B. PRECAUTIONS

- i. No passive, active-assisted or active inversion exercises
- ii. No active assisted or passive stretching into plantarflexion
- iii. Avoid standing or walking for extended periods of time

C. Physical therapy interventions:

- i. Progressive weight-bearing as tolerated, with use of walking boot and appropriate assistive device. Progress towards discontinuing boot and normalizing gait with commercially available semi-rigid pneumatic orthotic and assistive ambulatory device as needed
- ii. Edema control with use of modalities such as interferential current, cryotherapy
- iii. Joint mobilizations as identified by surgeon, adhering to identified precautions and avoiding the tensioning of the CFL and ATFL
- iv. Stretches of gastrocnemius and soleus muscles
- v. Cross training, including aquatics and upper body ergometer. For safety reasons, patient should ambulate to the pool with orthotic and assistive ambulatory device as needed
- vi. Submaximal isometrics (all planes except inversion)
- vii. Proprioception with activities involving bilateral stance
- viii. Soft tissue mobilization as indicated

D. Criteria for progression to Phase II:

- i. Normalized gait without pain, with involved ankle protected in semi-rigid ankle stirrup, with or without appropriate assistive ambulatory device
- ii. Pain-free eversion against gravity

III. PHASE II – WEEKS 8 – 12

A. GOALS

- i. Restoring full ROM, by 12 weeks, at the latest
- ii. No edema post-activity
- iii. Normalized, pain-free gait on stairs and inconsistent surfaces, with or without ankle stirrup orthotic. Orthotic during gait may still be indicated in this phase in the event of persisting pain, edema and muscle weakness to promote normal gait mechanics and increased weight-bearing without assistive ambulatory device
- iv. 5/5 strength all ankle muscle groups

B. PRECAUTIONS

- i. Gentle AROM inversion as of week 9
- ii. Patient education regarding caution with pacing and progression of weight-bearing activities
- iii. To protect the ankle during progression of activities, patient should wear ankle stirrup orthotic (refer to gait goal above)
- iv. No plyometrics until week 11

C. Physical therapy interventions:

i. Week 9:

1. Sitting: Ankle AROM exercises into all planes of motion -straight plane movements and combined movements with alphabet, circles, BAPS or rocker board and foam roller
2. Standing: BAPS board
3. Gait training on level and inconsistent surfaces
4. Continue edema control
5. Continue ROM exercises
6. Mobilizations as indicated
7. Stretches of gastrocnemius, soleus and tibialis posterior
8. Soft tissue mobilizations as indicated
9. Proprioception activities involving unilateral stance; eyes open, eyes closed, external perturbations, foam block, rocker board, ball toss, reaching, Star Balance Excursion Test
10. Strengthening: foot intrinsics, progressive resisted ankle exercises in all planes of motion with elastic tubing , core stabilization, bilateral heel raises

ii. Week 10:

1. Progress strengthening of all major muscle groups supporting the ankle with use of closed and open kinetic chain exercises, unilateral eccentric heel raises, rhythmic stabilization; use of StairMaster and Elliptical, treadmill, and VersaClimber for muscle endurance

iii. *Week 11:

1. Plyometrics with bilateral and unilateral jumps
*Plyometrics Progression during Phase II
 - a. Horizontal leg press jumps
 - b. Bilateral jumps:
 - i. Up to a 4" box then to a 6" box
 - ii. Vertical jumps in place
 - iii. Jumps up to and down from first a 4" box then to a 6" box
 - iv. Vertical jumps in series
 - v. Depth jumps up and down from 8" to 12" boxes
 - c. Lateral jumping bilaterally over a line
 - i. Up and over a 4" box
 - ii. Jumps in series in multiple planes: four quadrant box jumps
 - d. Unilateral jumps may be initiated with the same progression pattern as outlined above with bilateral jumps

If there is any discomfort with the initial plyometric exercises, delay them until the patient is able to perform at least 10 repetitions pain-free. Edelman and Noonan³ suggest beginning with 10 repetitions of one plyometric activity, then progressing towards up to 3 of the plyometric activities, for a maximum of 2 sets of 10 repetitions. They also recommend not overloading a patient with high repetitions of plyometrics and a full strengthening program on the same day. Their practice is to start the treatment session with an active warm up followed by the plyometrics program.

- D. Criteria for progression to the Phase III:
 - i. Full active and passive ROM
 - ii. No residual edema or pain after activity
 - iii. Normalized gait without assistive device on level surfaces, stairs and inconsistent surfaces, with orthotic or assistive device

IV. PHASE III – WEEKS 12 – 16

A. PRECAUTIONS

- i. Continue use of brace (lace-up, sport brace or standard stirrup) during sports for 6 months, for increased stability and proprioception
- ii. Patient to be independent with activity progression and/or modification in general, and especially in the event of onset of pain or swelling

B. Physical therapy interventions:

- i. Initiate jogging with progression to running
- ii. Strengthening: testing: dynamometry, isokinetic, functional
 - 1. Increased workload, resistance and intensity in progressive resisted exercises
- iii. Endurance: jumping rope (bilateral, alternating and unilateral skips)
- iv. Proprioception: see Phase II and add sport-specific drills
- v. Plyometrics: see progression outlined in phase II
- vi. Return to sports functional progression and testing

The multiple hop test has been proven to be a reliable test for measuring the dynamic postural control in patients with chronic lateral instability (CAI). Some authors have found that reports of subjective instability in CAI were more reliable for determining functional ability than most of the functional tests. However, the tests are still used as benchmarks for functional progression. They should be combined with subjective feedback regarding pain and apprehension and tailored to the patient's specific needs.

***Return to Sport Functional Progression and Clinical Testing:**

- Retro jog
- Side shuffles
- Carioca
- Bilateral bounding (A-P then lateral)
- Run
- Unilateral quadrant jumps
- Jog-sprint-jog
- Sprint-jog

- Sprint-stop
- Figure eights
- Unilateral bounding (A-P then lateral)
- 45° cuts
- Single-leg hop test for time and distance
- Multiple Hop Test
- 90° cuts
- Shuttle run test

Sport-specific activities:

- Single skill activities, progressed to multitasking skills and changes of direction
- Add defensive player or coach to drills
- Practice drills with team
- Scrimmage with team
- Return to play

Criteria for discharge from skilled therapy:

- Running to sprinting
- Multiplane activities
- Regain full cardiovascular and muscular endurance
- Strength $\geq 85\%$ limb symmetry through functional testing
- No apprehension with high level activity, and with direction changes
- Return to full sport and high level activities