COMMON MECHANICAL injuries to the ankle that result from sports-related activities include lateral ankle-ligament sprains and associated pathologies such as osteochondral fractures of the talus, distal fractures of the tibia, peroneal brevis tendon tears, and superficial peroneal nerve injury.1 The therapeutic management of these injuries is critical to the long-term success of efforts to optimize ankle function. Beginning immediately after swelling is reduced and ankle range of motion and strength are reestablished, incorporation of functional activities is imperative to the athlete's safe return to sport participation.2-4 Improper care or delay in treatment might cause additional pain, swelling, and damage to healthy tissues.

Treatment Methods

The available research regarding functional rehabilitation after ankle injury shows that there is considerable variation in methods of treatment.5-7 van Os et al.7 performed a systematic literature review on treatment of acute lateral ankle sprains from 1966 to 2004 and compared the effectiveness of conventional treatment complemented by supervised rehabilitation training with that of conventional treatment alone. The retrieved data failed to demonstrate a superior treatment approach, although there is some support for supervised exercise. Whatever the approach used, the ankle-rehabilitation program must be individualized and progressively structured to meet the physical activity requirements of the athlete's sport.

Several authors have reported that initial treatment consisting of short-term immobilization and early weight bearing is critical for the prompt return to preinjury status after ankle sprain.5,8 We have observed that patients with severe ankle sprains benefit from a short period of cast immobilization after acute lateral-ligament sprain. Patients who meet the following criteria are placed in weight-bearing casts:
• Inability to place any weight on the injured extremity because of pain
• Significant ankle swelling such that in the judgment of the physician the patient would derive greater benefit from cast immobilization than early ankle range-of-motion and modality treatment
• Significant ecchymosis around the ankle as a consequence of the injury

Beginning on the initial treatment day, the athlete is prescribed a 48-hr course of ketoprotolac (10 mg by mouth every 6 hr), given crutches, and instructed to bear weight as tolerated in the cast. After 3–5 days, the athlete’s status is reevaluated. In most cases, the cast is then removed and replaced by a functional ankle brace, and conventional treatment is initiated. In our experience, this regimen has been highly effective in diminishing swelling and pain and allows for a rapid return to functional activities (unpublished observations).

### Therapeutic Interventions

Therapeutic modalities and exercise as components of ankle rehabilitation are intended to promote healing and joint function. The progression of activity during

### Common Components of Functional Ankle Rehabilitation

#### Initial Treatment

- Immobilization: boots, strapping; functional ankle brace; casting
- Early non-weight-bearing exercise
  - Active range of motion, ankle alphabet
  - Strength exercises: seated toe curls, four-plane elastic-tubing exercises
- Early weight-bearing exercise
  - Partial- to full-weight-bearing position: BAPS-board training with increasing levels of range-of-motion difficulty
  - Pool therapy, stationary cycling

#### Strengthening

- Open and closed kinetic chain exercises
  - Therabands, free weights, manual resistance, isokinetic machines
  - Heel raises, toe raises, calf presses, tubing lunge steps
  - ProFitter or slide board, StairMaster

#### Balance and Proprioception

- Performed on variety of surfaces
  - Firm; foam; tilt board; wobble board, half disc; uneven walkway; minitrampoline; BAPS board
- Static to dynamic progressions: stork stand progressing to stork stand with complex activity

- Different conditions to increase intensity and duration
  - Bilateral to unilateral balance training
  - Removing visual input
  - Providing external perturbation (Theraband or manual)
  - Concentrating on an alternative task (catching or throwing a ball)

#### Activity-Specific Drills

- Walking, jogging, running, and cutting
  - Surface type: floor; treadmill; agility ladder, trial of low-amplitude rebounder running
- Unloading techniques: gravity-reduced running with assistance of unloading device or flotation device in water
- Plyometric progressions: forward and lateral hopping; single, double, or triple hops; for distance, speed, and coordination
- Jumps: two-foot landing progressing to one-foot landing, forward and backward
- Functional running patterns
  - Pattern running: clockwise and counterclockwise circles, figures-of-eight, zigzag runs with rapid changes in direction, 90° cuts to the left and to the right
  - Backward running
  - Lateral stepping movements (over bolster; over bolster with ball toss)