Foot, Ankle, and Lower Leg

Chapter 20
I find the greatest thing in this world, not so much where we stand, as in what direction we are moving.
Johann W. Goethe, poet

Importance of Foot, Ankle, and Lower Leg

- Base for body
- Injuries can affect effectiveness and efficiency of movement and propulsion of body
- Injuries to these areas very common in sports

Normal Foot Mechanics

- Heel strike occurs on posterior lateral heel with foot in supination; tibia in ER
- Foot pronates as weight is accepted and transferred to midfoot; tibia is IR
- Before heel off, foot supinates and weight is moved to anterior foot; tibia is ER

Purpose of Orthotics

- General: to make the abnormal foot’s function closer to normal, thereby reducing the stresses placed on the foot and leg

Types of Orthotics

- Semirigid and rigid: reposition forefoot or rearfoot for proper alignment, shear stress and shock reduction, stability, and support
- Soft: cushion foot to reduce stress or pressure

Shoe Wear and Foot Deformities

- Medial heel counter and heel collapse: excessive pronation
- Lateral heel counter moved laterally: rigid foot
- Blackened hallux toenail: toe box too shallow
- Hallux wears through upper: rigid first ray
Injury History and Shoe Need

- Achilles tendinitis: elevated heel with good heel-counter stability, straight board or combination last, forefoot flexibility, higher than normal elevation in wedge.
- Knee pain secondary to pronation: rearfoot control, firm heel counter, board last.
- Plantar fasciitis: same shoe as for excessive pronation.

Shoe Anatomy and Last

Soft Tissue Mobilization

- Superficial intrinsic foot muscles (deep pressure necessary to relieve trigger points)
- Deep intrinsic foot muscles (deep palpation required)
- Extrinsic muscles

Joint Mobilization

- Tibiofibular joint
- Talocrural joint
- Subtalar joint

Joint Mobilization

Capsular pattern:
- Talocrural joint - more limitation of plantar flexion than dorsiflexion
- Subtalar joint - inversion more limited than eversion

Flexibility Exercises

- Active flexibility exercises held 15 – 20 sec.
- Exercises repeated 4 – 5 times
- If limited flexibility do exercises more frequently throughout day
**Strengthening Exercises**
- Isometric exercises
- Tubing exercises
- Body weight resistance exercises
- Equipment resistance

**Proprioceptive Exercises**
- Very important after ankle sprains
- Key for kinesthesia and balance control
- Non-weight bearing, weight bearing
- Progression

**Functional Exercises**
- After ankle injury patient must be able to perform functional exercises (zig-zag runs, 90 degree turns to right and left) smoothly and efficiently before returning to full activity.

**General Ankle Sprain Principles**
- Most ankle sprains are weight-bearing as tolerated, except anterior tibiofibular ligament sprains (high ankle sprains, syndesmotic sprain). Give extra care, use crutches
- Control pain and inflammation first
- Begin AROM early
- Focus on inversion-eversion movement

**Chronic Ankle Sprains**
- Adhesions from scar tissue may limit joint or soft tissue mobility
- Chronic muscle weakness may have resulted
- Reduced kinesthetic awareness increases susceptibility
- Compensatory gait alterations may increase injury risk
- Additional time may be necessary to fully rehab

**Chronic Ankle Instability**
Peroneal Tendon Dislocation

- Often overlooked
- Ankle dorsiflexion with active peroneal contraction; inversion sprain
- Usually self-reduced
- If conservative management unsuccessful, may require surgery

Achilles Tendon Injuries

- Prolonged pronation increases Achilles stress
- Most susceptible site is 2-5 cm above distal insertion
- Scar tissue palpable more medial than lateral
- Must correct cause to reduce risk of tendinitis recurrence
- Surgical repair of Achilles rupture usually more successful than conservative care
Other Tendinitis
- Tibialis posterior and peroneal tendons most common sites
- Must identify and alleviate cause
- Include soft-tissue mobilization in program, along with cross friction massage

Shin Splints
- Medial tibial stress syndrome
- Usually stress-reaction inflammation of periosteal and musculotendinous fascial junctions.
- Cross friction massage usually very helpful along with stretching and strengthening

Plantar Fasciitis
- Most common foot injury in athletics
- Must correct underlying problem
- Stretch Achilles and calf (with ankle in subtalar neutral). Stretch plantar fascia and great toe flexors.