Chapter 11: Understanding the Basics of Injury Rehabilitation
Therapeutic Exercise Versus Conditioning Exercise

• Therapeutic Exercise
  – Exercise used as part of a rehabilitation program

• Conditioning Exercise
  – Activities that are used to minimize injury and maximize performance
Philosophy of Athletic Injury Rehabilitation

- Majority of injuries do not involve long-term rehabilitation programs

- Long term rehab requires supervision of highly trained professionals
  - Coach should rely on athletic trainer to design, implement, and supervise rehabilitation
• Swelling and pain control should be provided immediately
  – Coach can be involved initially in application of first aid

• Goal of athlete
  – Return to activity as quickly and as safely as possible

• Must be prudent in decisions regarding aggressiveness of treatment and rehabilitation
  – A mistake in judgment could hinder the athlete’s return
Basic Components and Goals of a Rehabilitation Program

• Must address several basic components

• Short term goals
  – Provide correct and immediate first aid to control swelling
  – Control pain
  – Restore full ROM
  – Restore core stability
  – Restore and increase strength, endurance and power
  – Re-establish neuromuscular control and balance
  – Maintain levels of cardiorespiratory fitness
Providing Correct First Aid and Controlling Swelling

• Initial first aid is critical

• Should be directed towards swelling control

• Utilize the PRICE principle
  – Each factor is critical in limiting swelling
Controlling Pain

• Pain dependent on the severity of the injury, athlete’s response, perception of pain and the circumstances

• PRICE and additional modalities can be used to help modulate pain

• Pain can interfere w/ rehab and therefore must be addressed throughout the rehab process
Restoring Range of Motion

• Injury to a joint will always be associated w/ some loss of motion
  – Due to contracture of connective tissue or resistance to stretch of musculotendinous unit

• Athlete will need to engage in dynamic, static or PNF stretching activities to improve flexibility
Restore Core Stability

• Involves strengthening the lumbopelvic region and is critical for dynamic functional strength and movement

• Without proximal core stability, distal extremity function becomes compromised
  – Core strength & power must be emphasized early in the strength training program
Restoring Muscular Strength, Endurance, and Power

- Essential factor necessary when restoring function of a body part to pre-injury status

- Variety of techniques can be utilized
  - Isometrics
  - Progressive resistance
  - Isokinetics
  - Plyometrics

- Emphasize work through a full ROM
• Isometrics
  – Performed in early part of rehab following period of immobilization
  – Used when resistance through full range could make injury worse
  – Increase static strength, work to decrease/limit atrophy, create a muscle pump to decrease swelling

• Progressive Resistance Exercise (PRE)
  – Can be performed using a variety of equipment
  – Utilizes isotonic contractions to generate force while muscle changes length
  – Concentric and eccentric strengthening exercises should be utilized
• Isokinetic Exercise
  – Incorporated in later stage of rehabilitation process
  – Uses fixed speeds w/ accommodating resistance to provide maximal resistance throughout ROM
  – Speed of movement can be altered
  – Commonly used as part of the criteria for return to functional activity

• Plyometric Exercise
  – Incorporated into later stages of program
  – Use quick stretch of muscle to facilitate subsequent concentric contraction
  – Useful in production of dynamic movements
    • Associated with muscular power
    • Generation of force rapidly – key to successful performance in many activities
Re-establishing Neuromuscular Control

- Neuromuscular control is mind’s attempt to teach the body conscious control of a specific movement

- Relies on CNS to interpret and integrate sensory and movement information and then control muscles and joints to produce coordinated movement

- Re-establishing neuromuscular control requires repetition of same movement until it becomes automatic
  - Progression from simple to difficult task

- Functional exercises are critical for re-establishing control
Regaining Balance

- Ability to balance and maintain postural stability is essential to reacquiring athletic skills
- Program should incorporate functional exercises that involve balance training
- Failure to include balance training may predispose the athlete to re-injury
• When balance is challenged the response is reflexive and automatic

• The primary mechanism for controlling balance occurs in the joints of the lower extremity

• Lack of balance or postural stability → lack proprioceptive and kinesthetic information or muscular strength → limits ability to generate response to disequilibrium

• A rehabilitation plan must incorporate functional activities that incorporate balance and proprioceptive training
Maintaining Cardiorespiratory Fitness

• Single most neglected component of rehabilitation

• When injury occurs athlete is forced to miss training time resulting in decreased cardiorespiratory endurance

• Alternative activities must be substituted that allow athlete to maintain fitness
  – Put into rehabilitation program as early as possible in rehabilitation program
Functional Progressions

• Progressive activities designed to prepare the individual for return to sport/activity
• Sport-specific skills are broken into components
  – Athlete works to reacquire skills over time
• Incorporate into treatment as early as possible
  – Athlete’s physical tolerance must be monitored
• If pain and swelling do not arise, the activity can be advanced
• Assists injured athlete in achieving normal, pain-free ROM, strength and neuromuscular control
Functional Testing

– Uses functional progression drills for the purpose of assessing the athlete’s ability to perform a specific activity
– Entails a single maximal effort to gauge how close the athlete is to full return
– Pre-season baseline testing for comparison post injury

– Variety of tests
  • Shuttle runs - Vertical jumps
  • Agility runs - Balance
  • Figure 8s - Hopping for distance
  • Cariocca tests - Co-contraction test
Using Therapeutic Modalities

• Incorporated into rehabilitation program as adjuncts to exercise
  – Cryotherapy and thermotherapy
  – Ultrasound and electrical stimulation
  – Massage and traction

• Require special instruction and supervised clinical experience
Ice Packs (Bags)

- Used for minimizing swelling and providing analgesia following injury

- Ice may be flaked or crushed and will be encapsulated in wet towel or plastic bag
  - Both are easily moldable to body

- Elastic wrap generally utilized to secure pack in place for 20 minutes

- Compression and elevation are also used in conjunction with ice
Hot Packs

• Used post-acute (after swelling stops)
  – Increase blood flow
  – Facilitate reabsorption of injury by-products

• Useful as analgesic and for relaxation effects

• Be careful not to use too soon in healing process
  – Cold should be used for first 72 hours post-injury
Moist heat packs (hydrocollator packs)
- Silicate gel in cotton pads
- Maintained in thermostatically controlled hot water (160°F)
- Retain water and relatively constant heat for 20-30 minutes
- Requires the use of 6 layers of toweling to avoid burning patient
- Athlete should not lie on top of pack
Criteria for Return to Full Activity

• Rehab plan must determine what is meant by complete recovery
  – Athlete is fully reconditioned
  – Regained full ROM, strength, neuromuscular control, cardiovascular fitness and sports specific functional skills
  – Athlete is mentally prepared

• The decision to return to play should be a group decision (sports medicine team)
  – Team physician is ultimately responsible

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