

Rehabilitation and Reconditioning



Rehabilitation and Reconditioning

- Principles
 - Healing tissues must not be overstressed.
 - The athlete must fulfill specific criteria to progress from one phase to another during the rehabilitative process.
 - The rehabilitation program must be based on current clinical and scientific research.
 - The program must be adaptable to each individual and his or her specific requirements and goals.

Sports Medicine Team

- Team Physician: A person that provides medical care to an organization, school, or team.
- Athletic Trainer: A person typically responsible for the day-to-day physical health of the athlete; certified by the National Athletic Trainers' Association Board of Certification as a *Certified Athletic Trainer (ATC)*.

Sports Medicine Team

- **Strength and Conditioning Professional:** Ideally, this person should be certified by the National Strength and Conditioning Association (NSCA) Certification Commission as a *Certified Strength and Conditioning Specialist (CSCS)* to ensure that he or she has the knowledge and background to contribute to the rehabilitation process.
- **Exercise Physiologist:** A person who has a formal background in the study of the exercise sciences and uses his or her expertise to assist with the design of a conditioning program that carefully considers the body's metabolic response to exercise and the ways in which that reaction aids the healing process.

Sports Medicine Team

- **Nutritionist:** a person who has a background in sport nutrition may provide guidelines regarding proper food choices to optimize tissue recovery. Ideally, the nutritionist has been formally trained in food and nutrition sciences and is a *Registered Dietitian (RD)* recognized by the American Dietetic Association.
- **Psychologist or Psychiatrist:** A licensed professional with a background in sport may provide strategies that help the injured athlete better cope with the mental stress accompanying an injury.

Sports Medicine Team

- Strength and conditioning professionals must understand the following:
 - The diagnosis of the injury
 - Indications—forms of treatment required
 - Contraindications—activity or practice prohibited due to the injury
- Must also inform the rest of the sports medicine team about the exercises performed by the athlete and the athlete's response to the exercise.

Types of Injury

- Macrotrauma is a specific, sudden episode of overload injury to a tissue, resulting in disrupted tissue integrity.
- Microtrauma results from repeated, abnormal stresses applied to a tissue by continuous training or training with too little recovery time. Each injury requires specific rehabilitation strategies to allow return to function.

Tissue Healing

- Inflammation Phase
 - Inflammation is the body's initial reaction to injury and is necessary for normal healing to occur.
 - Pain, Swelling, Redness
 - Decreased Collagen Synthesis
 - Increased Number of Inflammatory Cells

Tissue Healing

- Repair Phase
 - Once the inflammatory phase has ended, tissue repair begins; this phase allows the replacement of tissues that are no longer viable following injury.
 - This phase of tissue healing begins as early as two days after injury and may last up to two months.
 - Collagen Fiber Production
 - Decreased Collagen Fiber Organization
 - Decreased Number of Inflammatory Cells

Tissue Healing

- Remodeling Phase
 - The weakened tissue produced during the repair phase is strengthened during the remodeling phase of healing.
 - Tissue remodeling can last up to two to four months after injury.
 - Proper Collagen Fiber Alignment
 - Increased Tissue Strength

Strategies

- Choose a level of loading that neither overloads nor underloads healing tissue.
- Healing tissue must never be overstressed.
- But, controlled therapeutic stress is needed to optimize collagen matrix formation.
- The athlete must meet specific objectives (established by the physician, athletic trainer, physical therapist, or a combination of these) to progress from one phase of healing to the next.

Soft Tissue Injury Response

- Pain is often used as a guide for tissue health.
- Pain levels often decrease well before tissue healing is complete, which may lead athletes to believe they can return to competition before the body is actually ready.

Strategies

- Inflammation Phase
 - Treatment Goal
 - Preventing disruption of new tissue
 - Exercise Strategies
 - General aerobic and anaerobic training and resistance training of uninjured extremities, with priority given to maximal protection of the injured area

Strategies

- Repair Phase
 - Treatment Goal
 - Prevent excessive muscle atrophy and joint deterioration in the injured area; maintain muscular and cardiovascular function in uninjured areas
 - Exercise Strategies (after consultation with team physician, athletic trainer, or physical therapist)
 - Submaximal isometric exercise
 - Isokinetic exercise
 - Specific exercises to improve neuromuscular control

Strategies

- Remodeling Phase
 - Treatment Goal
 - Optimize tissue function by continuing and progressing the activities performed during the repair phase and adding more advanced, sport-specific exercises
 - Exercise Strategies
 - Transition from general exercises to sport-specific exercises
 - Specificity of movement speed an important variable
 - Velocity-specific strengthening exercises (velocities must progress to those used in the athlete's sport)

Closed Kinetic Chain

- An exercise in which the terminal joint meets with considerable resistance that prohibits or restrains its free motion; that is, the distal joint segment is stationary.
 - Squat
 - Push-up

Open Kinetic Chain

- An exercise that uses a combination of successively arranged joints in which the terminal joint is free to move; open kinetic chain exercises allow for greater concentration on an isolated joint or muscle.
 - Leg Extension
 - Biceps Curl

 - Sprinting offers an example of open and closed kinetic chain movements occurring together.

Strategies

- Resistance Training
 - Several programs have been developed to assist with the design of resistance training programs for injured athletes, including the De Lorme and Oxford programs and Knight's DAPRE program.
 - DAPRE allows more manipulation of intensity and volume.
 - The demands of the athlete's sport determine the training goal, which should dictate the design of the resistance training program during the remodeling phase.

DAPRE

- Daily adjustable progressive resistive exercise (DAPRE) system
 - First set requires 10 repetitions of 50% of the estimated 1RM.
 - Second set requires six repetitions of 75% of the estimated 1RM.
 - Third set requires the maximum number of repetitions of 100% of the estimated 1RM.
 - The number of repetitions performed during the third set determines the adjustment to be made in resistance for the fourth set.

Strategies

- **Aerobic and Anaerobic Training**
 - Although research has yet to determine an optimal aerobic training program for use in the rehabilitation setting, the program should mimic specific sport and metabolic demands.