

## **Athletic Rehab Concepts for Community Populations**

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There are many different types of athletes, ranging from the young pediatric client, to the weekend warrior, to the college or professional athlete. As rehab professionals, we may see the client immediately after injury, during post-surgical rehabilitation, or for return to sport or fitness activities.

### Factors for Consideration When Developing Athletic Rehab Program

Health factors to consider in athletic rehab include: type, size and location of injury, stage of healing, edema, vascular supply, external forces, movement, age, disease, infection, medications, nutrition and smoking status. The health professional must also consider if the athlete wishes to return to their sport. Sport factors to consider when making a rehab program include: skill level of athlete (age group, elite level, weekend warrior, etc.), is sport year round, is the athlete in season, and does the athlete play more than one sport. If the athlete suffers from chronic inflammation from a previous injury, they might also be suffering from muscle weakness, bone-mal-alignment, or other environmental or training factors.

### Components of Athletic Rehab Program

All athletic rehab programs should include components of balance and proprioception, coordination, flexibility, endurance, speed and quickness and finally strength. Balance components can be progressed depending on sport requirements from wide to narrow-stance, double leg to single leg, and into a variety of surfaces and functional positions. Coordination includes sequencing of local and global muscles, breath control, and maintaining balance maintain stability with motion. Flexibility helps provide a stable base to allow normal range of motion (ROM) and muscle elongation. Endurance involves both postural endurance (maintaining alignment over a prolonged time) and aerobic conditioning. Speed can be increased for resistance training, however can be increased or decreased based on sport requirements. Strength is defined as the ability to exert or resist force, however it is also an

objective measure as to how much stress the muscles, tendons and ligaments can absorb with activities. Strength can be increased by increasing repetitions, increasing resistance amount, varying speed, but also by relaxing and moving in an efficient manor with sport-activities.

### Indication for Aquatic Exercise

The aquatic environment can be beneficial for athletic rehab at all places along the rehab continuum. The buoyancy of the water can allow normalized functional mobility earlier, especially in patients with weight-bearing restrictions following surgery. Buoyancy can also assist with ROM and support the trunk for posture retraining, core stability and neuromuscular retraining. The hydrostatic pressure can assist with edema reduction, leading to improved ROM. Warm water exercise can assist with decreasing joint stiffness and allow increase ease of motion. The resistance created by the viscosity of water assists with strengthening. Deep water conditioning activities can assist with maintenance of aerobic conditioning while still limited in running and plyometric training on land. The aquatic environment is often used to initiate return to sports activities, when the patient is not yet appropriate to start the same activities on land. Athletes can also perform cross-training in the aquatic environment to prevent injuries including core stabilization, balance/proprioception, plyometrics and deep water conditioning.

### Upper Extremity Injuries

The most commonly seen upper extremity injuries are shoulder impingement, rotator cuff injury/surgical repair and shoulder instability.

- Shoulder impingement is often associated with poor posture and pain with overhead motions. The most common causes of symptoms are scapular dyskinesis (motion and strength), decreased thoracic spine mobility, stiff posterior capsule of glenohumeral joint or energy loss in the kinetic chain. The most important component of treatment is to normalize motion and functional control of the scapula.

- The rotator cuff is composed of 4 tendons that cover the shoulder joint that work together to rotate the arm and keep the shoulder joint stable. Tears of the rotator cuff can be traumatic (from a fall or collision) or from repetitive movements. Surgical repair can require 12-24 months of rehab before return to sport. Brady et al. found significant improvement in shoulder ROM and functional index scores in subjects that performed land *and* water based exercise following rotator cuff repair.
- Shoulder instability is very common, especially in sports where trauma or falls may occur (football, baseball, etc.) The focus of rehab is neuromuscular control to prevent shoulder pain and decrease likelihood of future dislocation.

### Lower Extremity Injuries

Some common lower extremity injuries seen in the general population include hamstring strain, ankle sprains and knee injuries such as anterior cruciate ligament (ACL) tear/surgical repair.

- Hamstring injuries often occur in sports with sudden stops/starts (football, soccer, tennis). Rehabilitation can be 6 weeks up to several months. Goals of rehab are to improve ROM, restore muscle strength (especially hip extensors) and return to previous activities.
- Ankle sprains can occur with any sport, but often in sports where the foot lands awkwardly following a jump (basketball, volleyball, football, etc.) The severity of the sprain (Grades 1-3) determines the length of rehab and return to play. If ankle becomes unstable with repeated sprains, the athlete may have chronic pain, weakness, and reduced balance/proprioception, leading to compensatory changes in gait. Geigle et al. wrote a case study comparing land exercise only versus land plus water exercise. Both groups showed decreased ankle swelling. Single leg stance improved significantly in land and aquatics group when subjects' eyes were open.
- ACL tears occur in approximately 150,000 people per year. Although ACL injuries that occur with contact sports, like football, are more well known, 70% of ACL injuries occur in non-contact situations. Rehab can begin before surgical intervention and can work towards reducing swelling, inflammation and pain,

restore normal ROM, normalize gait and prevent muscle atrophy (Wilk, et al.) Rehab time post-surgery can be effected by the type of graft used and if any other injuries occurred during ACL tear. Goals after surgery include to normalization of quadriceps control to improve knee extension, achieve full ROM and progress strengthening and progress to sport-specific training (Wilk, et al.) Biscarini and Cerulli found the knee extensions performed with light resistance in water did not increase the stress on the ACL, thus making it safe to rehab in the aquatic environment. Tovin, et al. compared land to aquatic therapy and found no difference in PROM or quad performance. The aquatic group had less swelling and reported greater functional improvements.

The top priority of any athlete, no matter what their age, is to get back to their regular sport or fitness activities. Aquatic exercise can help initiate sport-related activities earlier in rehab than on land, in the hopes of a quicker return to sport. Aquatic exercise can also assist with cross-training for injury prevention or during recovery from injury.

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