

Athletic Shoulder I

-Rehabilitation of the Injured Athletes-

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Athletes' shoulder

- Muscular overuse and decreased muscular efficiency
- Poor dynamic stability
- Instability and laxity
- Stiffness and tightness

Disablement

- Physical impairment : the loss of or abnormality in anatomic or physiologic structure or function at the level of the organ
- Functional limitation : limitation that is imposed on performance at the level of the whole organism or person
- Disability : a limitation in performance

Treatment options

- Regain flexibility and range of motion by stretching
- Recover the muscular efficiency through strengthening exercise or surgery
- Re-establish stability by dynamic muscular compensation
- Restore stability through the surgery

Objectives of functional rehabilitation

- Flexibility and strength
- Activities to enhance agility, proprioception and neuromuscular control
- Endurance

Achievement of functional rehabilitation

- Maximum performance
- Minimal risk of reinjury

Three steps of functional rehabilitation

- Restoration of the range of motion, flexibility and strength
 : Reflex stabilization and coordinated motor patterns
- Restoration of sport-specific skills and movement patterns
- Readiness to return to desired sport activity

Basic principles for functional rehabilitation

- Rehabilitate the shoulder in functional planes of motion
- The key to the shoulder is the rotator cuff
- More to the shoulder than the rotator cuff and more to the shoulder complex than merely the shoulder joint

Rehabilitation program

- Motion exercise
- Strengthening exercise (isolated movement pattern)
- Proprioceptive neuromuscular facilitation (combined movement pattern)
- Neuromuscular control exercise
- Plyometric muscular training

Early controlled ROM

- The initial phases of treatment
- Prerequisite to any aggressive strengthening program
- Proffer :
 - Prevent glenohumeral contracture
 - Prevent the need for excessive passive stretching
 - Reduce the chance of excessively stressing
 - Stimulate certain mechanoreceptors : reduce pain perception
 - Have a positive effect on collagen alignment and articular cartilage
 - Avoid loss of dynamic stability of the glenohumeral joint
- Principle
 - Maintain the extreme motion arc
 - With pain free or painless range
 - At varying motion planes and positions.

Strengthening exercise

- The second phases of treatment
- Precondition : pain free motion at the extreme motion arc
- Proffer :
 - Obtain an optimal length-tension and muscle force of deltoid and rotator cuff musculature
 - Maintain a dynamic stability of the glenohumeral joint
 - Restore normal coordinated scapulothoracic motion
 - Avoid subacromial impingement
- Principle
 - Performed in or anterior to the scapular plane
 - Beyond the shoulder level

- With pain free
- At variable motion planes and positions
- Performed initially in a position of limited stress to the shoulder
- Gradually progress to a more stressful position
- Include eccentric strengthening exercise
- Patterns
 - Open/closed chain exercise
 - Isolated/diagonal exercise
 - Assistance/dumbbell/tubing/machine exercise

Closed kinematic chain activity

- Movement of the proximal segments with a fixed the distal limb
- Create an axial load and co-contraction of the scapular muscles
- Provide compressive force to the joint
- Enhance the joint stability
- Decrease the tensile stresses to the capsule
- Stimulate mechanoreceptors to facilitate proprioception

Open kinematic chain activity

- Movement of the distal segment with a fixed proximal segment
- Provide an exact natural and functional free weight exercise
- Provide a controlled environment of varied positions
- Reproduce resistance throughout a proprioceptive
neuromuscular facilitation diagonal pattern
- Enhance position awareness
- Identify pathologic weak links and observe abnormal patterns
of substitution

Four basic diagonal patterns

- Flexion/abduction/external rotation
- Extension/adduction/internal rotation
- Flexion/adduction/external rotation
- Extension/abduction/internal rotation

Proprioceptive neuromuscular facilitation (PNF) exercise

- Proprioception : the awareness of the glenohumeral or scapulothoracic joint posture, movements, and positional changes
- Advantages :
 - Increase the awareness of specific movement patterns
 - Reinforce weak patterns through irradiation from strong patterns of motion
 - Facilitate a desired functional movement pattern
- D2 flexion/extension pattern and specific drills

Neuromuscular control exercise

- Control the ability to make a postural change on proprioceptive input
- Advantageous to increase performance : efferent output
- Commonly used for the scapulothoracic movement

Plyometric exercise

- Plyometrics :
 - A quick powerful movement involving a prestretching of muscle, activating the stretch-shortening cycle : eccentric-concentric coupling
- A form of exercise that uses the elastic and reactive properties of a muscle to generate a maximal force production

- Stimulate proprioceptors to facilitate an increase in muscle recruitment over a minimal amount of time
- Improve the time frame between the eccentric and concentric contractions
- Serve to train the neuromuscular system
- Help to improve physiologic muscle performance
- Three phases :
 - Phase 1 - Eccentric phase - setting phase - preloading period
 - Phase 2 - Amortization phase - time between eccentric and creative phase
 - Phase 3 - Concentric phase - facilitated contraction
- Upper extremity plyometrics
 - Warm-up exercises
 - Throwing movements
 - Trunk extension/flexion movements
 - Medicine ball wall exercises

SUMMARY

- Rehabilitation should be based on an understanding pathology and abnormal arthrokinematics and biomechanics.
- Rehabilitation should be kept in mind to play a vital role in the successful outcome after shoulder injuries or surgeries.
- Program should emphasize treating the cause and not just the symptoms.
- Maintenance of the normal scapulohumeral and scapulothoracic rhythm and optimal strength should be re-established with rehabilitation.
- Program modification and appropriate progression must be performed on an individual basis.