Exploring Hand Therapy
Manual

Sports Injuries:
Off The Sidelines and
Into the Game
by George LaCour OTR/L, CHT

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Getting Off the Sideline and Into the Game: UE Sports Injuries

Description:

Have you ever had an athlete referred to your clinic and felt as though your treatment was inadequate? Have you ever felt that your treatment approach is stale? Getting Off the Sideline and Into the Game is a course that will introduce the rehab professional to the world of sports medicine and discuss how unique treatment of the athlete can be. This course offers instruction in assessment, special testing, the use of modalities, and a wide variety of therapeutic exercises and how to adapt each to meet the needs of each athlete. In addition, this course discusses athletic taping and the use of splints and braces during play and on the sideline. At the completion of this course the participant will feel more confident to "take the field" in sports rehab.

Objectives:

- The participant will understand the roles and responsibilities of members on the sports medicine team.
- The participant will learn how to approach assessment and treatment of the athlete.
- The participant will understand the mechanics of throwing and the effects imposed on the shoulder and elbow.
- The participant will understand how to assess injuries of the upper extremity through history and objective testing.
- The participant will learn provocative and stability testing for the shoulder, elbow, wrist, and hand.
- The participant will learn therapeutic exercises commonly used in sports medicine and how to adapt exercises to the athlete.
- The participant will learn specific taping techniques used to treat sports injuries.
- The participant will learn about braces and splints used in sports rehab and how to make sure they are acceptable for play.
- The participant will learn how to prevent injuries in the throwing athlete.

Outline:

I. The Starting Lineup
- **A. Physician**
  1. **Team Physician (Orthopedic / Specialists)**
  2. **Primary Care Physician / Pediatrician**
- **B. Certified Athletic Trainer (ATC)**
- **C. Physical / Occupational Therapist**
- **D. Coach**
- **E. Athlete / Parent**

II. Scouting Report: The Sports Medicine Dynamic
- **A. Understanding / accepting your role on the team**
- **B. Understanding the Competitive Athlete**
  - **a. Physical Concerns**
  - **b. Emotional / Psychological Concerns**

III. From the Game to the Sideline: 4 Challenges Facing the Therapist
1. **Getting the Athlete to Therapy**
2. **Getting a Detailed & Accurate History**
3. **Communicating with the Team**
4. **Developing an Effective Treatment Plan**

IV. The Playbook

A. Cervical Injuries
1. **Stinger / Burner**
2. **Thoracic Outlet Syndrome**

B. Shoulder Injuries
1. **Shoulder Assessment**
2. **Mechanics of Throwing**
3. **Therapeutic Exercises for the Shoulder**
4. **Rotator Cuff**
   a. **Impingement / Tendonitis**
   b. **Subacromial Decompression / Distal Clavicle Excision**
   c. **Tensile Overload**
   d. **Rotator Cuff Repair**
5. **Dislocations / Instability**
   a. **Anterior Dislocation**
   b. **Posterior Instability**
6. **Labral Injuries**
   a. **Labral Tears**
   b. **Open Bankart Capsulolabral Reconstruction**
   c. **Posterior Capsular Shift**
7. **Scapulothoracic Dyskinesia**
8. **AC Sprains / Separation**
9. **Bicipital Tendonitis**

C. Elbow Injuries
1. **Epicondylitis**
   a. **Lateral**
   b. **Medial**
2. **Dislocations / Instability**
3. **Little League Elbow**
4. **Olecranon Stress Fracture**
5. **Elbow UCL Injuries**
   a. **Conservative**
   b. **Post-operative**

D. Wrist Injuries
1. **Fractures**
   a. **Scaphoid**
   b. **Hamate**
   c. **Distal Radius**
2. **Wrist Sprain**
3. **Scapholunate Injuries**
   a. **Conservative**
   b. **Post-operative**
4. **Scaphoind Impingement**
5. **Lunotriquetral Injuries**
   a. **Conservative**
   b. **Post-operative**
6. **TFCC Injuries**
   a. **Conservative**
   b. **Post-operative**
7. **Extensor Carpil Ulnaris (ECU) Tendinopathy**

E. Hand Injuries
1. **Metacarpal Fracture**

2. **Tendon Injuries**
    a. **Jersey finger**
    b. **Mallet finger**
    c. **Central Slip Injuries**
3. **Sprains / Ligament Injuries**
    a. **Thumb UCL**
    b. **Finger PIP**
4. **Dislocations**
    a. **Dorsal**
    b. **Volar**

V. E.S.P.N.: Returning the Athlete to Competition

A. Equipment Assessment
B. Sport / Position
C. Physical/ Psychological Assessment
D. Need to Communication with Physician

VI. Clinical Pearls

Off the Sideline and Into the Game: UE Sports Injuries

George LaCour, OTR, CHT

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Course Overview

- **Who Makes Up the Sports Medicine Team?**
- **What is the Sports Medicine Dynamic?**
- **How Rehab of Injuries by Body Region**
- **Returning the Athlete to Competition**

2

Before we begin…

It is important to understand:

- Sports medicine rehab covers all ages and sports.
- Each athlete is unique based on their sport, position, and level of competition.
- Sports medicine is about keeping athletes competitive.
- Expectations are high and pressure is always present!

3

The Starting Lineup

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Team Physician

- Orthopedic surgeon or a specialist
- Order / interpret test results and providing injury diagnosis
- Performs surgeries or other procedures
- Establishes rehab guidelines and monitors status of recovery

5

Primary Physician

- When the orthopedic surgeon is not directly involved with a team, league, or organization
- Can be a family practice physician, internist, or pediatrician
- Often has an established relationship so they may be contacted initially by the athlete

6

Primary Physician

- Insurance carriers may require the athlete to see the primary physician during the process

7

Coaching Staff

- Responsible for players and performance of team
- Many times the first person notified of an injury by an athlete
- May be a source of support and pressure to the process.

8

Certified Athletic Trainer (ATC)

- Individuals educated in athletic injury prevention, assessment, and rehab
- May perform initial screening
- Can act as a liaison with the coach / staff
- Many times are limited in amount of rehab services provided due to space and/or equipment

9

Certified Athletic Trainer (ATC)

- Vital to the return to play process by providing preventive services and monitoring equipment

10

Physical / Occupational Therapist

- Provides specialized assessment of function (i.e. ROM, strength, sensation, edema, etc)
- Usually consulted if the injury requires more extensive assessment / therapy
- Most likely see patients following operative procedures

11

Physical / Occupational Therapist

- Provides resources for specialized taping / bracing / splinting
- Usually have a good rapport with the orthopedic physician

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The Athlete

- Often apprehensive to participate in therapy due to “loss of playing time”
- Most likely does not understand full extent of the injury
- May have unrealistic expectations for therapy

13

The Athlete

- Requires communication regarding the rehab process, limitations, prognosis, etc
- May have external factors motivating his/her recovery
- If under 18, the parent becomes involved in the rehab process

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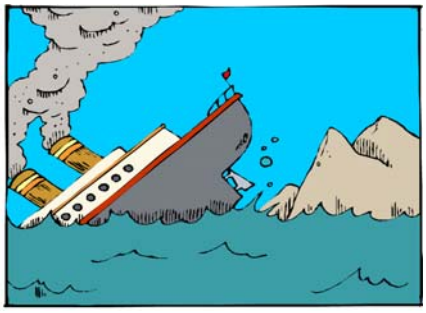
The Scouting Report



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The Sports Medicine Dynamic

1. The Role of the Therapist
2. Understanding the Competitive Athlete
3. Emotional / Psychological Issues of the Athlete

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What is different about Sports Medicine?

17

The Role of the Therapist

- Many times therapists are not consulted until much later in the injury rehab process.
- In certain circumstances rehab has to be accelerated to return the athlete to competition.

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The Role of the Therapist

- Various individuals are involved in the process and have to informed throughout the process.
- Many therapists have difficulty with their role in sports rehab because they are not in sole control of the outcome.

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Athletes are Unique Individuals

20

Understanding the Competitive Athlete

- Most patients who are athletes are in peak physical condition.
- Athletes are usually participating in a regular strength/conditioning program.

21

Understanding the Competitive Athlete

- Athletes must be able to return to play as soon as they are able.
- Cardiovascular training and core strengthening must not be neglected during the rehab process.

22

Emotional / Psychological Issues in the Athlete

- Athletes can be impatient during the rehab process resulting in non-compliance with exercises and movement precautions.
- Some athletes can become easily frustrated or even depressed.

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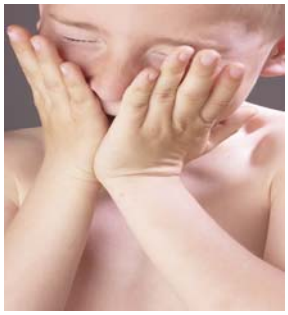
Their Emotions Can Test You



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Their Emotions Can Influence Rehab

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Emotional / Psychological Issues in the Athlete

- Athletes must understand the specifics of the injury and the rehab necessary to return to play.
- The therapist must emphasize the limits of therapy and the consequences if the limits are broken.

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From the Game to the Sideline

Let the Rehab Process Begin!

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4 Challenges Face the Therapist

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Challenge #1

Getting the Athlete to Therapy

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Chain of Assessment

- In the normal clinic setting, when a patient has an injury they go to their physician and are referred to therapy. Sports rehab is a bit more complicated.
- Many times the coach is the first notified of a particular injury on the sideline.

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Chain of Assessment

- Sometimes, the athlete may not come to therapy unless conservative treatment has failed or a surgical procedure has been performed.
- In some circumstances, the athlete does not come to therapy until he/she has been re-injured and their status is now more severe or chronic in nature.

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Challenge #2

Getting a Detailed & Accurate History

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Obtaining the History

- If the therapist was not present at the time of injury the mechanism of injury has to be described by the athlete.
- Therapist may consult the coach, trainer, and physician to discover the complete mechanism of injury.

33

Obtaining a History

- Getting an athlete to fully disclose all their symptoms can also be difficult.
- Consider the impact of physical findings in the context of the sport and position.

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Challenge #3

Communicating with the Team

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Communication

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Communicating with the Team

- Communicate assessment findings with the physician, athlete, trainer, and coaching staff.
- Use appropriate language when communicating with different team members.
- Correlate findings with physician to review findings against specific diagnostic tests (i.e. x-ray, CT, MRI, US, EMG/NCV, etc).

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Communicating with the Team

- Therapist should discuss medical course of treatment with physician to determine time frame of rehab, prognosis for return to play, and necessary precautions.

38

Challenge #4

Developing and Effective Plan

39

Developing an Effective Treatment Plan

- Rehab needs to be athlete-specific and diagnosis-specific.
- Analyze the physical demands of the sport and position.
- Conservative measures need to be aggressive as the time frame may be limited.

40

Developing an Effective Treatment Plan

- Therapists must analyze a sports-specific activity and break it down into rehab components.
- Exercises should be comprehensive including core strengthening and cardiovascular training.

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Developing an Effective Treatment Plan

- Progress rehab in sequences to incorporate the activity to be performed.
- Make tasks meaningful to the athlete.

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The Playbook

Common Sports Injuries
By Body Region

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Common Sports Injuries By Body Region

Items Covered:

- Mechanism of Injury
- Assessment tools
- Available Treatment options
- Rehab concerns

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Brachial Plexus Injuries

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Stingers / Burners

- Most common brachial plexus sports injury.
- Usually occurs when an athlete is in a collision involving the head, neck, or shoulder.
- Athlete usually grabs the arm or walks off the field holding or shaking it.

46

Stingers / Burners

- The athlete will report unilateral, radiating, sharp pain and burning in the arm.
- Paresthesias and anesthesias usually follow.
- Symptoms usually radiate from the supraclavicular region down the arm extending to the tips of the fingers.

47

Stingers / Burners

- Most symptoms resolve with minutes but some athletes will complain of continued pain or numbness for a few days.
- Motor weakness can appear the following day and involve the supraspinatus, infraspinatus, deltoid, biceps, and brachialis most often.

48

Stingers / Burners

- In some cases there is traction injury to the brachial plexus resulting in intractable pain and muscle weakness.
- The level of injury can be determined by presentation in the upper extremity.

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Stingers / Burners

- **Upper trunk (C5-6):** Pain is more proximal found in the face, cervical region, and the scapular region. There can be some distal symptoms in the median and ulnar distributions. Can have weakness in the deltoid, and elbow flexors.
- **Middle trunk (C7):** Pain and paresthesias in the posterior/lateral arm and posterior forearm which extends to the middle finger.
- **Lower trunk (C8-T1):** Pain, paresthesias, and weakness are more distal. Medial aspect of arm, forearm, and the ulnar side of the hand.

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Stingers / Burners

- Rehab is indicated if there is persistent weakness.
- Primary treatment focus is on strengthening.
- Return to play is determined by persistence of symptoms.

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Thoracic Outlet Syndromes

- Often misdiagnosed.
- Can be due to lack of stretching, poor posture, or direct contact.

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Rounded Shoulders

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Cervical & Thoracic Posture

54

Thoracic Outlet Syndrome

- Sports which require repetitive shoulder elevation and hyper-abduction or shoulder girdle depression such as tennis or pitching can aggravate this condition

55

Shoulder Elevation-Hyperabduction-Depression

56

Thoracic Outlet Syndrome

- Athletes who perform a great deal of weight training which focuses on the pectoralis muscles and deltoid can develop TOS.
- Athletes usually complain of radiating pain along the side or back of the neck and extends to the shoulder and medial arm.
- In more chronic or long standing cases, the patient may have weak grip and intrinsics.

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Thoracic Outlet Syndrome

- Assess posture
- Assess breathing patterns: diaphragmatic vs accessory.
- Perform strength testing including manual muscle testing, grip, and pinch of BUE's.

58

Thoracic Outlet Syndrome

- Scalenes, SCM, Pectorals, and Upper trapezius are usually tight and may exhibit hypertrophy.
- The middle/lower trapezius, and cervical extensors are usually lengthened and weak.
- Provocative tests used include: Adson's, Costoclavicular maneuver, and Hyperabduction test for vascular compression. EAST, Roos, and Modified Roos are used to test the brachial plexus.

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Watch Video

Thoracic Outlet Syndrome Assessment

60

Thoracic Outlet Syndrome

- Treatment should begin with symptom management and progress to treatment of specific tissue structures, ending with conditioning and strengthening of muscles for posture and ROM. Do not try to progress these patients too quickly.

61

Thoracic Outlet Syndrome

- Initially moist heat and TENS or IFC (80-150 MHz) are used for pain management. Limit use as patient can become dependent.
- Reduce aggravating factors: correct posture, positioning (sleep, driving, activity), avoid high energy aerobic activities.

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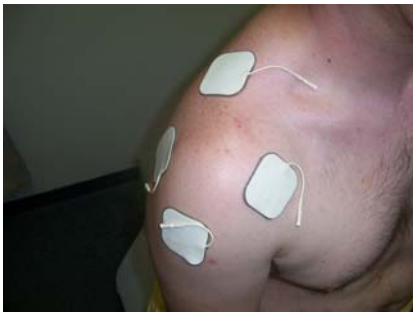
Electrode Placement for TENS / IFC



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Positioning - Driving

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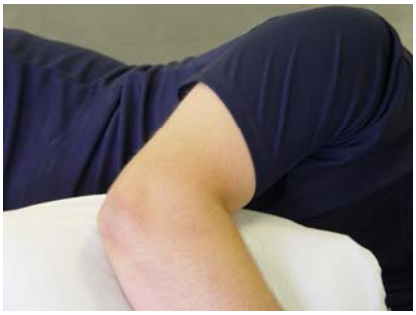
Positioning - Sleeping



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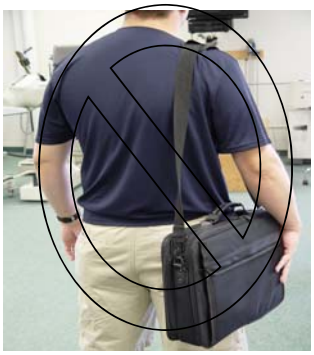
Positioning - Daily



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Thoracic Outlet Syndrome

- Exercises should include focus on cervical extensors, scapula adductors, and diaphragmatic breathing.
- Stretching exercises should focus on scalenes, pectorals, and upper trapezius.

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Trapezius Stretch

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Scalene Stretch

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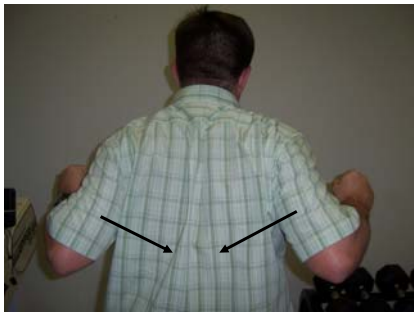
Scapula Adduction



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Pectoral Corner Stretch

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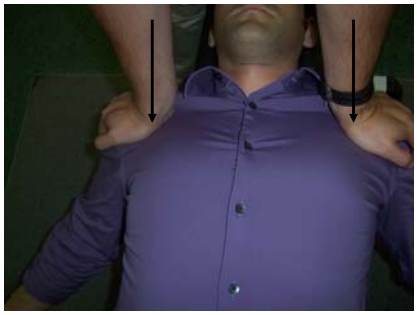
Pectoralis Minor Stretch



72

Foam Roll Stretch

73

Watch Video

Assessment & Treatment of Muscle Tightness with Thoracic Outlet Syndrome

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Shoulder Injuries

75

Shoulder Injuries

- Shoulder injuries are common in the athlete due to the amount of forces exerted on this mobile joint
- The shoulder relies on a complex interplay of muscles, joints, and soft tissue structures in order to function properly.

76

Shoulder Assessment

Includes:

- ROM / Strength testing
- Observation / Palpation
- Stability Testing
- Provocative Testing

77

Shoulder Assessment

- For the purpose of this course, we will watch a video demonstrating a basic assessment of the shoulder complex. This video will cover functional ROM, Muscle testing, Palpation, and Posture.
- We will cover stability testing and other provocative tests for each injury discussed.

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Watch Video

Basic Shoulder Assessment

79

Now You're an Expert!

Not Quite.

80

Mechanics of Throwing

- 5 Phases of throwing.

1. Wind-up
2. Cocking
3. Acceleration
4. Release & Deceleration
5. Follow-through

81

Next We Will Look at Each Phase of the Throwing Motion

82

Wind-up Phase

- Both hands usually remain on the ball.
- The trunk and hips rotate in sequence.
- Begins weight shift to the back foot.

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Wind-Up Phase - 1

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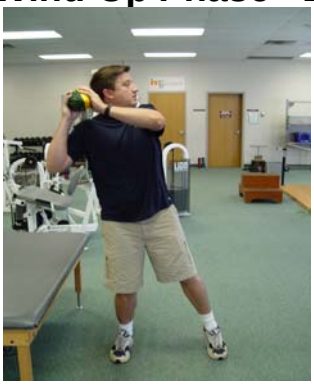
Wind-Up Phase - 2



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Cocking Phase

- Shoulder is abducted 90 degrees, ER at least 90 degrees, and horizontal abduction.
- As the arms separate, the forward leg stretches out.
- The elbows should be almost level with one another.

86

Cocking Phase

- As the foot makes contact, the trunk and hips rotate toward the target as the arm continues into ER.
- As the arm reaches maximum ER, the trunks, hips, and legs are accelerating forward to generate the acceleration force.

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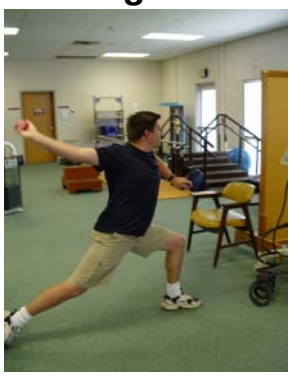
Cocking Phase - 1



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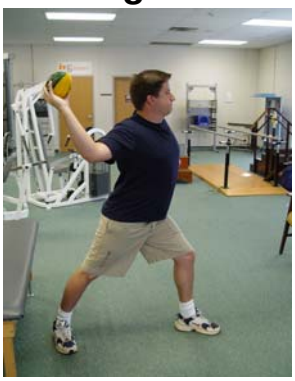
Cocking Phase - 2



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Acceleration Phase

- As the arm reaches maximum ER, the elbow extends.
- As the elbow extends, the shoulder begins IR.
- The acceleration phase ends with the release of the ball.

90

Acceleration Phase

- The position of the shoulder during release should be 90 degree abduction which is the strongest angle for the shoulder during throwing.
- During the acceleration phase, shoulder rotation has been calculated at 7,000 degrees / second

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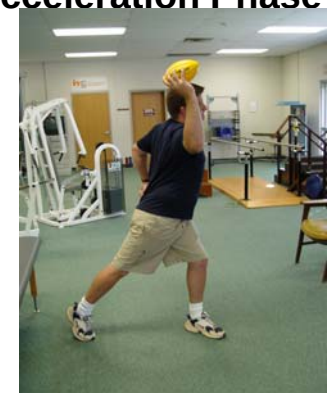
Acceleration Phase - 1

92

Acceleration Phase - 2



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Deceleration Phase

- ER must eccentrically decelerate the shoulder and elbow to prevent distraction of the joints.
- During this phase, distraction forces can equal 90% of the athlete's body weight!

94

Follow through

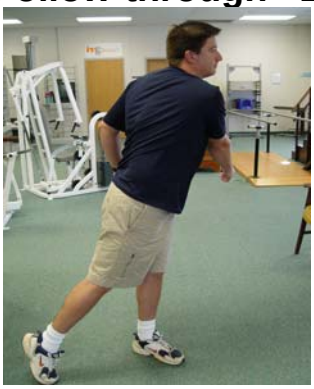
- Follow through is very important as it can minimize the risk of injury.
- Force used to accelerate must be dissipated by larger parts of the body and not just the shoulder.
- Encourage trunk flexion and rear leg knee extension to help.

95

Follow-through - 1

96

Follow-through - 2



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Therapeutic Exercises

- Therapeutic exercises are an essential component of sports medicine rehab.
- Exercises correct posture, stretch tight structures, increase joint ROM, increase muscle strength, increase joint stability, increase balance, and increase cardiovascular capacity.

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Therapeutic Exercises Used in Shoulder Rehab

1. Pendulums
2. AAROM
3. Closed Chain
4. Rotator Cuff
5. Deltoid
6. Scapula Stabilization
7. Plyometrics
8. PNF
9. Rhythmic Stabilization

99

Therapeutic Exercises

- **We will illustrate the different types of exercises as we discuss various shoulder injuries encountered in sports rehab.**
- **In doing so, we will illustrate how to perform the exercises and their importance to the rehab process.**

100

Rotator Cuff Impingement / Tendonitis

- Occurs most often in throwing sports and overhead racquet sports.
- Usually occurs as a result of faulty mechanics or shoulder instability.
- Can occur secondary to blunt trauma or external force (fall, tackle, hit with helmet, etc)

101

Rotator Cuff Impingement / Tendonitis

- 2 Types of Impingement: Primary vs. Secondary Impingement
- Primary: Structural
- Secondary: Failure of dynamic stabilizers

102

Rotator Cuff Impingement / Tendonitis

- Night pain and an inability to sleep on the affected side.
- Pain may be diffuse or localized to the C5 dermatome, anterolateral acromion, or coracoacromial ligament.
- Therapists need to inspect for atrophy, asymmetry. In addition, palpation about the shoulder should be performed assessing the SC, AC, GH, and ST joints.

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Rotator Cuff Impingement / Tendonitis

- Shoulder stability should be assessed in addition to muscle testing.
- Assess muscle strength, especially ER.
- The following tests are commonly used for assessment of the rotator cuff: Neer, Hawkins, Empty Can, and Yocum's.

104

Watch Video

Shoulder Impingement / Tendonitis Provocative Tests

105

Rotator Cuff Impingement / Tendonitis

- Analyze and modified.
- Stretching is performed to tight capsular structures in addition to the teres.
- Strengthening should focus on the rotator cuff in addition to the scapula stabilizers.

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Posterior Capsular Stretch

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Anterior Capsular Stretch

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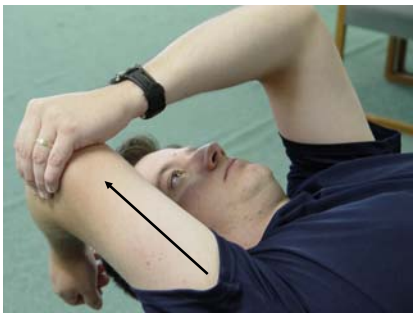
Inferior Capsular Stretch



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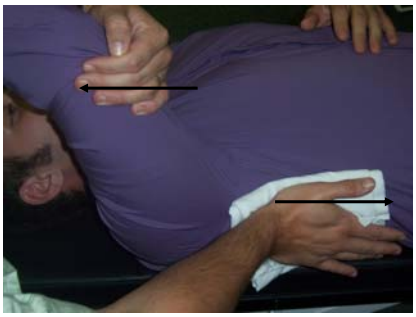
Teres Stretch



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Rotator Cuff Impingement / Tendonitis

- Open-chain strengthening for the rotator cuff using bands or tubing are effective as they provide both eccentric and concentric strengthening.
- If the athlete is in the acute phase, perform exercises below shoulder level to prevent additional impingement stress on the cuff.
- As pain subsides, progress exercises to shoulder level and overhead.

111

Latissimus Pulldown

112

Rhomboid Rowing

113

Serratus Punch - Tubing

114

Watch Video

Scapula Stabilization Exercises

115

Rotator Cuff Impingement / Tendonitis

- If conservative measures fail, the physician will most likely perform a Subacromial Decompression, Distal Clavicle Excision, or a Combination.

116

Subacromial Decompression / Distal Clavicle Excision

Phase 1: 0-4 weeks

- Begin with pendulums
- PROM ***(Avoid Abduction/ER until 6 weeks)***
- Capsular stretches: anterior, posterior, inferior

117

Pendulums – Front to Back

118

Pendulums – Side to Side

119

Pendulums - Circles

120

Subacromial Decompression / Distal Clavicle Excision

- AAROM exercises (Cane; Pulleys, table glides, wall glides) for flexion, extension, IR, and ER
- Progress AROM as tolerated

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Canes Exercise - Flexion

122

Cane Exercise - Extension

123

Cane Exercise - ER

124

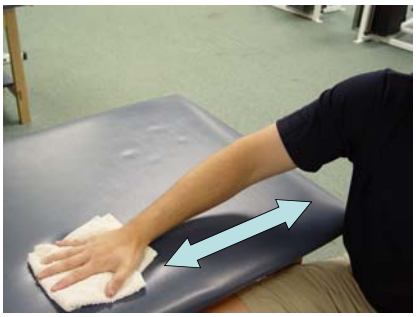
Cane Exercise - IR

125

Pulleys

126

Table Glides



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SAD / DCE Phase 1

- Use ice during week 1 to decrease inflammation.
- Week 2 use heat before therapy, ice at end.
- HVGS (100 pps) x 20-30 minutes A/P shoulder to decrease inflammation, muscle guarding etc.

128

SAD / DCE Phase 2

Phase 2 (4-8 weeks)

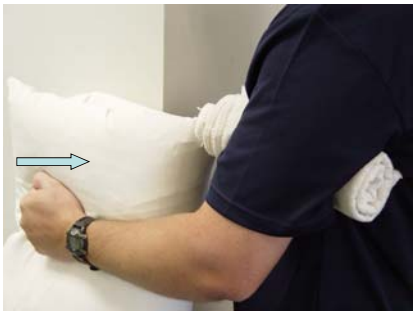
- Increase AROM in all directions
- **Gentle stretching at end ranges**
- Joint mobilization A/P; Inferior glides
- **Begin with closed chain rotator cuff isometrics (IR; ER; Abduction)**

129

Isometric ER

130

Isometric IR



131

Isometric Abduction

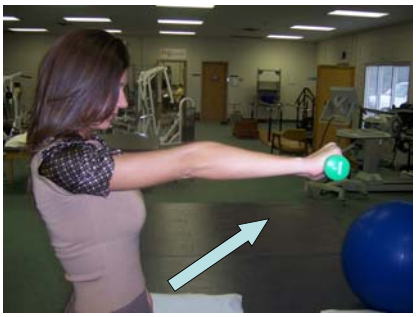
132

SAD / DCE Phase 2

- Progress to open chain tubing exercises for ER; IR; Abduction; Flexion; Extension
- Progress to isotonic dumbbell exercises performing same motions as above.
- Scapula stabilization for Rhomboids; Trapezius; Serratus; Latissiumus
- **Do not perform more than 3 sets of 15 reps**

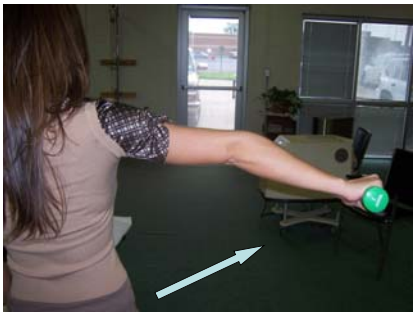
133

Anterior Deltoid



134

Middle Deltoid

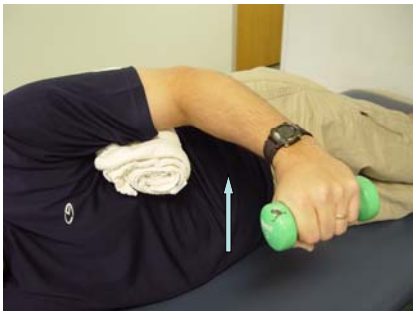


135

Posterior Deltoid

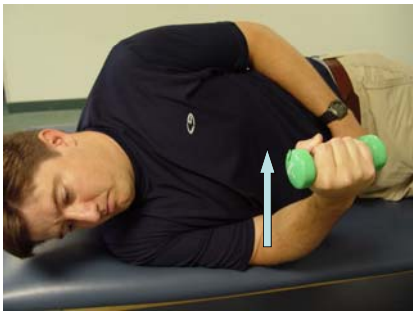
136

ER - Dumbbell



137

IR Dumbbell



138

SAD / DCE Phase 3

Phase 3 (8-12 weeks)

- Continue to advance rotator cuff and scapula strengthening.
- **Plyometrics (Discuss)**

139

SAD / DCE Phase 4

- **Begin interval program for return to sports** (See Appendix)

140

Rotator Cuff Tensile Overload

- Occurs due to tensile failure of rotator cuff from repetitive stress on the cuff musculature.
- May coexist with GH instability making it difficult to identify. Most commonly is posterior instability.
- Will complain of constant pain at rest, during activity, and at night.

141

Rotator Cuff Tensile Overload

- Tests commonly performed: Apprehension; Relocation; Empty Can; Fulcrum; Hornblower's sign; Posterior Drawer; Drop Arm and Lift-off test.
- Manual muscle testing should be performed to identify areas of weakness or imbalance.

142

Watch Video

Rotator Cuff
Integrity and Stability Tests

143

Rotator Cuff Tensile Overload – Conservative

Initial Phase:

- Modalities: moist heat/ice; ultrasound (pulsed); LASER
- PROM to address any areas of tightness.
- AAROM: Pulleys and Cane exercises for Flexion; Extension; Abduction (<90); ER; IR.
- **Exercises should avoid 90 degrees abduction & 90 degrees ER**

144

Pulleys

145

Cane Exercise - Flexion

146

Cane Exercise - Extension

147

Cane Exercise - ER

148

Cane Exercise - IR

149

Rotator Cuff Tensile Overload – Conservative

- Perform scapula stabilization: Swiss ball; Scapula Pinch

150

Scapula Depression – Swiss Ball

151

Scapula Adduction

152

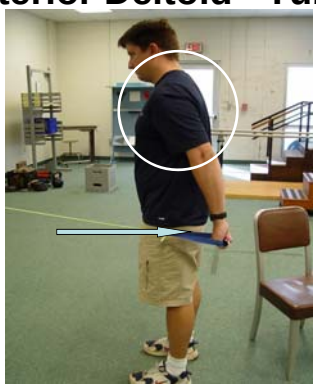
Rotator Cuff Tensile Overload – Conservative

Progressive stage:

- Begin rotator cuff and scapula strengthening. Start with isometrics and progress to eccentric exercises (tubing).
- **Exercises should emphasize posterior deltoid, infraspinatus, and teres minor.**
- **Strive for muscle balance.**
- Include trunk flexibility and strengthening.

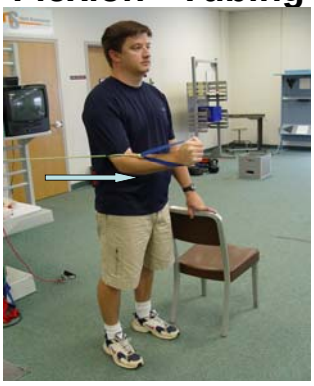
153

Posterior Deltoid - Tubing



154

Flexion - Tubing



155

ER - Tubing

156

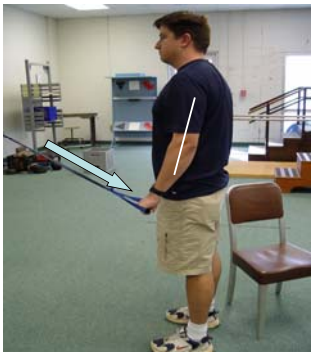
IR - Tubing

157

Abduction - Tubing

158

Lat Pulls



159

Seated Row

160

Serratus Punch - Tubing

161

Chair Push-up

162

Rotator Cuff Repair

- Type 1 (Small tear <1cm): Sling 7-10 days; Full ROM within 4-6 weeks
- Type 2 (Medium – Large 2-4cm): Sling 2-3 weeks; Full ROM within 8-10 weeks
- Type 3 (Large – Massive >5cm): Abduction pillow 1-2 weeks; Sling 2-3 weeks; Full ROM within 10-14 weeks

163

Type 1 Mini-Open Rotator Cuff Repair

Week 1:

- Sling
- Pendulums
- PROM: Flexion to tolerance; ER/IR in scapular plane. **(No abduction)**
- AAROM (Cane exercises): ER/IR in scapular plane
- Submax (Pain-free isometrics): Flexion; Abduction; ER; IR; Biceps (All w/ elbow at 90)
- Ice and HVGS (100 pps; - polarity) for pain

164

Type 1 Mini-Open Rotator Cuff Repair

Day 7-10:

- D/C sling
- Continue pendulums; PROM. Continue cane exercises and add flexion
- Continue with isometrics and modalities

Days 11-14:

- Continue PROM and AAROM.
- **Rhythmic stabilization for ER/IR, flexion, and extension.**

165

Watch Video

Rhythmic Stabilization for Rotator Cuff Repair

166

Type 1 Mini-Open Rotator Cuff Repair

- Tubing exercises for ER/IR with arm by side
- Initiate prone rowing
- Initiate active flexion and abduction

Weeks 3-4:

- Continue all exercises
- **Initiate ER strengthening with dumbbell**
- Initiate bicep curls

167

Prone Rowing

168

ER - Dumbbell

169

Biceps Curl - Tubing

170

Type 1 Mini-Open Rotator Cuff Repair

Week 5:

- **Patient should have full AROM**.
- Continue AAROM and stretching exercises for end range
- Strengthening should include: Tubing for ER; IR with dumbbell; Prone rowing; Prone HA; Scaption; Abduction; and Biceps curls

Week 12:

- Continue to progress strengthening exercises
- Self-capsular stretches

171

ER - Tubing

172

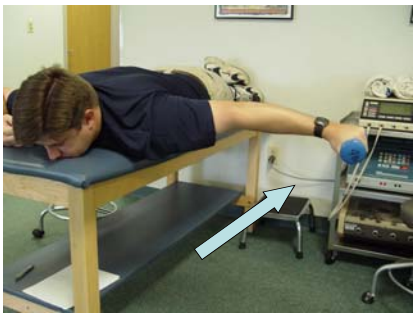
IR - Dumbbell

173

Prone Rowing

174

Prone Horizontal Abduction



175

Supraspinatus - Dumbbell

176

Anterior Shoulder Dislocation

- Anterior dislocation usually occurs when force is applied to the shoulder in an abducted and externally rotated position.

177

90/90/90 Position

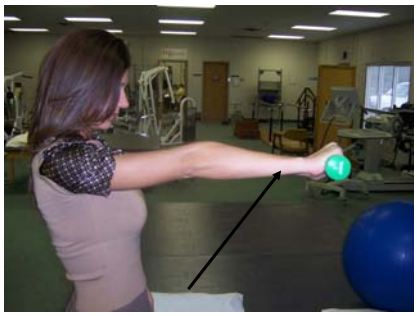
178

Anterior Shoulder Dislocation

- Immobilization is used initially. Length immobilization depends on age with athletes <25 years old typically immobilized up to 3-4 weeks before aggressive rehab is initiated.
- Therapy for a severely unstable shoulder should begin with pendulums and progress to an active strengthening program for RC, deltoid, and biceps. Avoid the position of 90/90/90 as this will be uncomfortable to the athlete and elicit undue stress on the soft tissue structures.

179

Anterior Deltoid

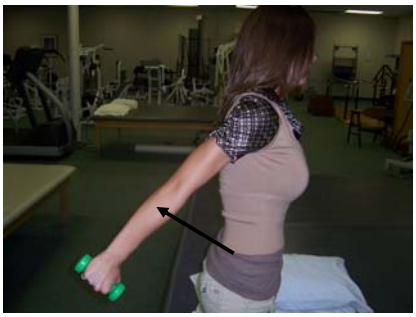


180

Middle Deltoid

181

Posterior Deltoid



182

Biceps Curls

183

Anterior Shoulder Dislocation

Modalities can be used during initial phases:

1. Moist heat: To increase tissue elasticity and decrease guarding.
2. Ultrasound (100%) to decrease pain and promote healing
3. LASER to decrease pain and promote healing

184

Posterior Shoulder Dislocation / Instability

- Most typical position which aggravates symptoms is that with the arm forward flexed, adducted, and internally rotated.

185

Posterior Dislocation Position

186

Posterior Shoulder Instability

- Posterior instability usually occurs as a result of highly repetitive forces which exert increased work load on the periscapular muscles. This usually happens in the follow-through phase of various sports.
- Most common are the follow-through of throwers, take-away phase of tennis backhand, tennis serve, and certain weight training exercises.

187

Posterior Shoulder Instability

- Due to the required work load on the periscapular muscles, they fatigue over time shifting the dynamic restraint of humeral head stabilization to other structures.
- Complain of pain primarily but may report a clicking, catching, or crepitus. Pain may be localized to the posterior shoulder, over the biceps tendon, or around the tip of the acromion.

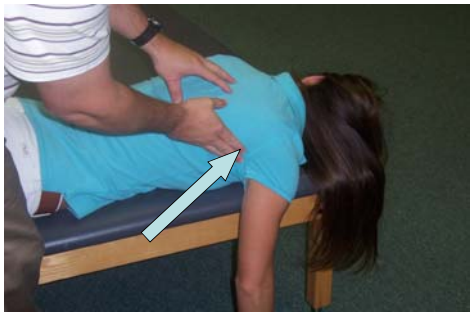
188

Posterior Shoulder Instability

- Report increased pain when the arm is placed in forward flexion, adduction, and internal rotation.
- Athletes often report multiple episodes of pain/discomfort which resolve but return..
- Palpation may demonstrate tenderness over the posterior GH joint line.
- ROM of the affected arm often demonstrates excessive shoulder ER with loss of IR.

189

Palpation Position of Posterior Shoulder



190

Posterior Shoulder Dislocation / Instability

- Posterior drawer, Posterior Apprehension, Load/shift, and Sulcus sign are commonly performed tests.

191

Watch Video

Posterior Instability Tests

192

Posterior Shoulder Dislocation / Instability

- Focus for rehab is on strengthening the rotator cuff and posterior deltoid.

193

Posterior Deltoid - Isolated

194

Prone Extension

195

Posterior Shoulder Instability

- Scapula stabilization exercises are used.

196

Scapula Depression – Swiss Ball

197

Scapula Stabilization (Scaption) - Wall

198

Scapula Adduction

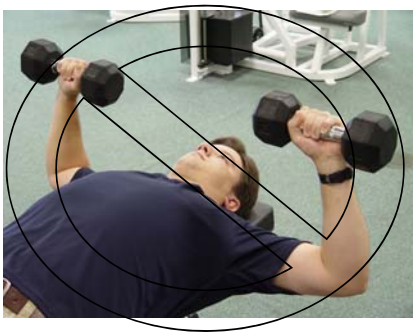
199

Posterior Shoulder Instability

- Exercises which place the shoulder in a position of stress (flexion, adduction, internal rotation) like bench press, incline press, decline press, military press, push-ups, UBE should be avoided.

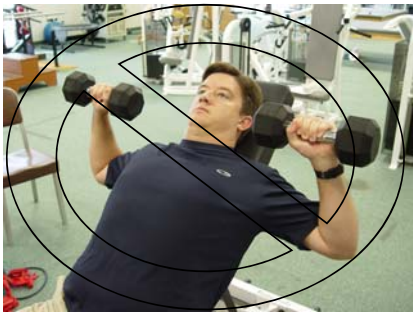
200

Bench Press



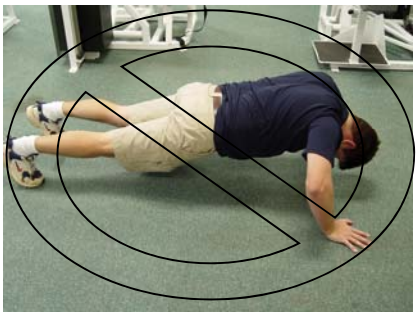
201

Incline Press



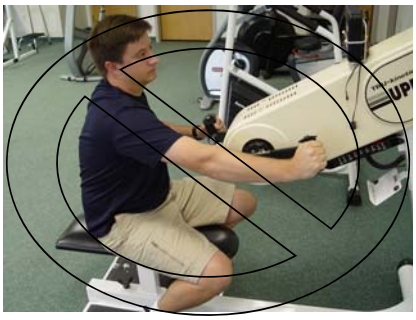
202

Push-up



203

UBE



204

Posterior Shoulder Instability

- Modalities can be used during initial phases:

1. Moist heat: To increase tissue elasticity and decrease guarding.
2. Ultrasound (100%) to decrease pain and promote healing
3. LASER to decrease pain and promote healing

205

Shoulder Instability

- The goal of conservative rehab is to decrease symptoms and to provide some increase in dynamic stability.
- Most athletes with posterior instability need operative stabilization but this has been shown to limit the athlete's performance following surgery.

206

Labral Tears

- Movements that produce shoulder abduction, extension, and external rotation place the labrum and capsule in a position of stress.
- In order to effectively treat the shoulder, the affected portion of the labrum must be identified.

207

Labral Tears

- Posterior labral injuries usually result from a repetitive sheer stress applied by the humeral head with the arm in a position of forward flexion with the elbows locked into extension.
- Superior labral injuries result from either traction or compression.

208

Labral Tears

- The 2 most common complaints with labral injuries are pain and instability.
- Patients with superior and posterior labral injuries usually have pain as chief complaint.
- Patients with anterior labral injuries usually complain of instability.

209

Labral Injuries

- Pain is usually localized to the anterior or posterior joint line and is tender with deep palpation.
- Superior labral injuries can be difficult to diagnose as it can present with similar symptoms as impingement.
- Anterior labral injuries usually have instability or a feeling of "looseness" in the anterior shoulder.

210

Labral Injuries

- With all labral injuries, joint stability should be assessed.
- The following tests are commonly used to assess GH joint stability: Load/shift; Apprehension/Relocation; Sulcus sign; Crank test; O'brien's test, Anterior slide, Compression/rotation test; Biceps load; New pain provocation (SLAP) test, and Clunk test.
- In addition to stability, active and passive ROM should be performed with an appreciation for the movement at the GH, AC, and ST joints.

211

Watch Video

Labral Pathology Tests

212

Labral Injuries

- Conservative rehab usually lasts a **minimum of 6 weeks** therapy for RC and periscapular strengthening in addition to anti-inflammatory meds.
- If the athlete is involved in a contact sport (offensive lineman, fullback, etc) activity modification is needed.

213

Labral Injuries

- Anterior labral injuries can often be managed with conservative treatment with RC and periscapular strengthening. ER/IR strengthening is essential.

214

ER - Tubing

215

IR - Tubing

216

Labral Injuries

- For surgical treatment of labral injuries, there are procedure specific protocols which include (but not limited to) Anterior Capsular Shift, SLAP repair, Bankart repair.
- See the Appendix for detailed protocols

217

Open Bankart Capsulolabral Reconstruction

Weeks 0-2

- PROM & AAROM (Cane): Flexion and extension to tolerance; ER/IR in scapular plane
- Submax isometrics
- **Rhythmic stabilization**
- Use ice and HVGS (80-100 pps) negative polarity as needed.

218

Rhythmic Stabilization – Ext/Flex

219

Open Bankart Capsulolabral Reconstruction

Weeks 3-4

- Progress ROM to 120-140 degrees flexion; ER to 35-45 degrees; IR to 45-60 degrees
- Initiate tubing for IR/ER at 4 weeks. Dumbbells for deltoid, supraspinatus, biceps, and scapula stabilizers
- **Initiate posterior capsular stretching**

220

Supraspinatus - Dumbbell

221

Posterior Capsular Stretch

222

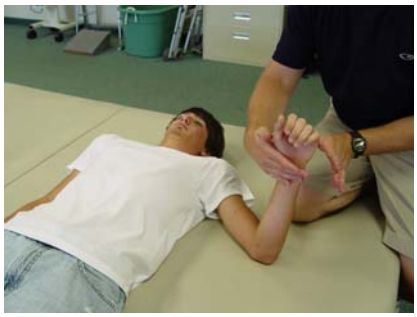
Open Bankart Capsulolabral Reconstruction

Weeks 5-6

- Progress flexion to 160; ER/IR at 90 degrees abduction (IR to 75 degrees; ER to 75 degrees) extension to 35 degrees.
- Progress all strengthening
- **Rhythmic stabilization now with PNF diagonals**

223

Rhythmic Stabilization – ER/IR



224

Rhythmic Stabilization – D2 Ext/Flex

225

Open Bankart Capsulolabral Reconstruction

Weeks 6-10

- Continue to progress strengthening. Be sure to include the Throwers 10 program.

226

Thrower's 10 Program

227

D2 Extension

228

D2 Flexion

229

Anterior Deltoid

230

Middle Deltoid

231

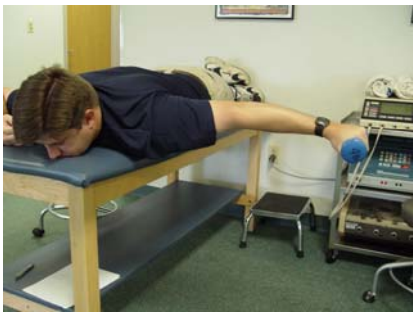
Posterior Deltoid

232

Supraspinatus - Dumbbell

233

Prone Horizontal Abduction



234

Prone Extension

235

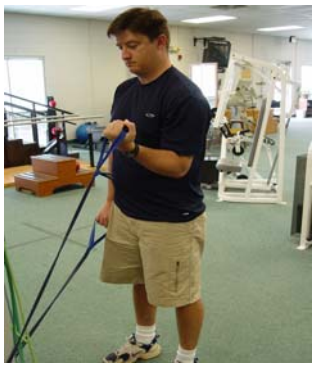
IR – 90 degrees Abd

236

ER – 90 degrees Abd

237

Biceps Curl - Tubing

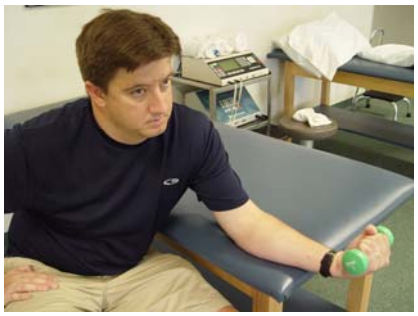


238

French Curl

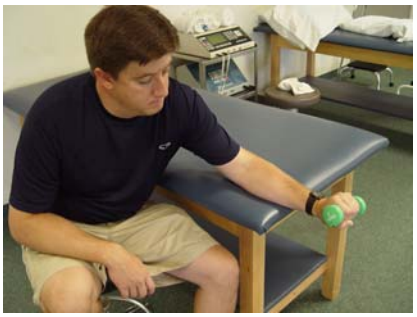
239

Wrist Flexion - Dumbbell



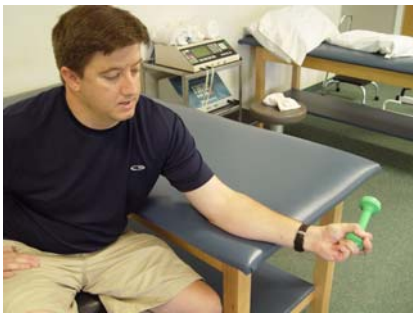
240

Wrist Extension - Dumbbell



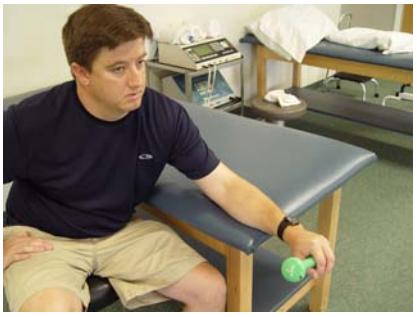
241

Pronation - Dumbbell



242

Supination - Dumbbell



243

Push-up

244

Chair Push-up

245

Prone Rowing

246

Open Bankart / Capsulolabral Recontruction

Weeks 10-14

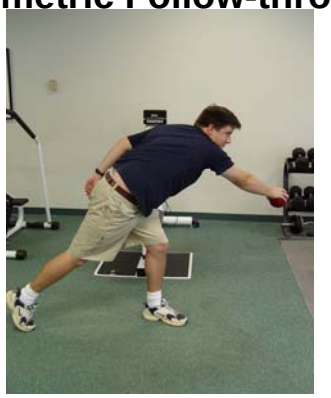
- Initiate plyometrics

Weeks 14-20

- **Initiate interval throwing program with physician approval** (See Appendix)

247

Plyometric Follow-through



248

Plyometric Supine Toss/Catch

249

Posterior Capsular Shift

Weeks 0-6

- Brace worn at all times except for exercise and bathing
- PROM progressing to AAROM
- Submax isometric for flexion, extension, abduction, and ER. **Not IR**.

Weeks 4-6

- AAROM exercises (Cane and pulley)
- Flexion to tolerance. Abduction to 90 degrees.

250

Posterior Capsular Shift

- Begin active abduction to 90 degrees
- **Begin active ER from neutral to 90 degrees**.

Weeks 6-9

- Cane exercises to tolerance
- Pulleys
- Tubing for ER/IR
- Dumbbells for deltoid; rhomboids; biceps; triceps; shoulder shrugs; serratus

251

Rhomboid Rowing - Dumbbell

252

Supine Serratus Punch

253

Shoulder Shrugs

254

Posterior Capsular Shift

Weeks 10-12

- AAROM IR in the 90/90 position
- **Initiate supraspinatus with dumbbells**
- Tubing exercises for rhomboids; latissimus; biceps; and triceps
- Progressive push-ups (Wall / Table / Floor)
- Progress exercises accordingly

Weeks 28-32

- Initiate interval training program

255

Triceps - Tubing

256

Scapulothoracic Dyskinesia

- The position of the scapula is crucial and slight modifications of position can lead to significant shoulder pathology.
- Lack of scapula stabilization and/or elevation can contribute to muscle imbalance which in turn leads to subacromial impingement.

257

Scapulothoracic Dyskinesia

- Cervical and thoracic posture needs to be evaluated.
- The scapula needs to be evaluated for winging, rotation, and elevation.
- Observation and muscle testing should also be done.

258

Shoulder Flexion – Normal Posture

259

Shoulder Flexion – Poor Posture

260

Scapulothoracic Dyskinesia

- Trapezius weakness will present with a protracted inferior border and elevated acromion.
- Serratus anterior weakness will present with a superior medial border of the scapula and a depressed acromion.

261

Watch Video

Scapula Assessment

262

Scapulothoracic Dyskinesia

- Once the problem is identified rehab should focus on correction at the source.
- If weakness or imbalance is the cause, exercises should target the affected areas.

263

Scapulothoracic Dyskinesia

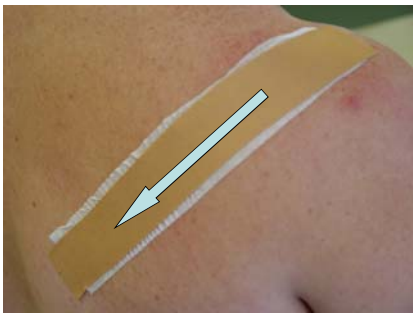
- Scapula rehab should progress through the following sequence: scapula stability, closed chain exercises, and open chain exercises.
- Taping may be used to re-educate.

264

Leukotape & Hypafix

265

Scapula Taping



266

Scapulothoracic Dyskinesia

- Closed chain exercises usually involve hand placement on a ball or wall with elevation, depression, protraction, and retraction performed.
- Open chain exercises involve rowing, tubing exercises, PNF diagonals, push-ups, and plyometrics.

267

Scapula Setting - Ball

268

Scapula Stabilization - Wall

269

Watch Video

Scapula Stabilization Exercises

270

AC Joint Separation / Sprain

- Usually occurs due to a fall or hit directly on the point of the shoulder.
- Can also occur due to mechanical overload of the shoulder girdle.

271

AC Joint Separation / Sprain

- Complains of localized tenderness at the AC joint.
- Reports pain with elevation >75 degrees, loading of the shoulder girdle, and horizontal adduction.
- May observe a step-off deformity at the AC joint.

272

AC Joint Separation / Sprain

- Use ice initially. Incorporate moist heat after 48 hours or when exercises are initiated.
- Ultrasound (Pulsed) and Iontophoresis
- Laser
- Remove stress. Avoid resisted activities to the shoulder girdle, lifting, and overhead activity..

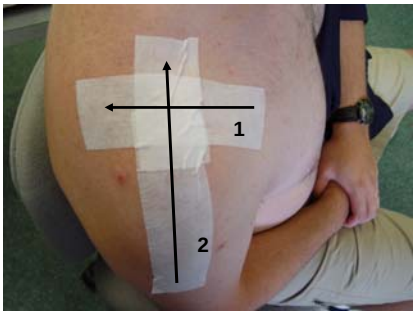
273

AC Joint Separation / Sprain

- Taping can be used to support the AC and allow for activity.

274

AC Joint Taping 1



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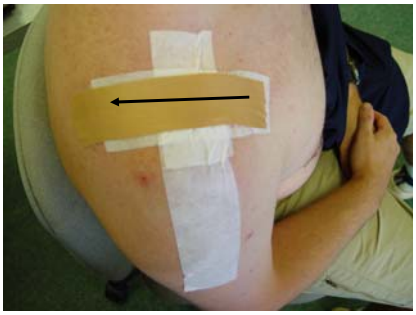
AC Joint Taping 2



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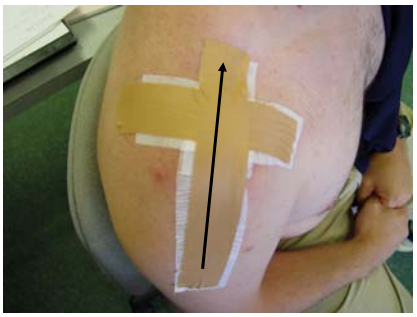
AC Joint Taping 3



277

AC Joint Separation / Sprain

- In Type I injuries, sling as needed to reduce pain. AROM is initiated within 1-2 days. Return to play occurs when athlete has full, pain-free motion and good strength. Typically 1-2 weeks following injury.
- Type II injuries require ice, ultrasound (pulsed), iontophoresis, and use of sling for 2-3 days. AROM exercises are initiated within a week and progress as athlete tolerates. Use taping or external support during rehab and return to play. May return to competition when AROM is pain-free and strength is normal. Up to 6 weeks.

278

AC Joint Separation / Sprain

- Type III injuries require ice, ultrasound (pulsed), and iontphoresis, and external support. Patients are essentially pain-free in 2-3 weeks and can resume sports once ROM and strength are regained, usually 6-8 weeks. These patient most likely will require some type of external support.
- For athletes who will likely experience contact to this area (football), a round cut-out cushion may be added to their equipment to provide some shock absorption during play.

279

Biceps (Long Head) Tendonitis

- Occurs often in the throwing athlete and racquet sports but can also occur during weight training.
- Complains of pain in the anterior deltoid or biceps, especially with shoulder rotation.
- Tenderness localized to bicipital groove.

280

Watch Video

Biceps Tendon Pathology Tests

281

Biceps (Long Head) Tendonitis

- Treatment includes: heat/ice, ultrasound (100%), phonophoresis, iontophoresis, Laser, and rest initially.
- Modalities should be directed at the bicipital groove with the shoulder in extension and neutral rotation.

282

Biceps (Long Head) Tendonitis

- During the initial phase, perform P/AAROM to prevent adhesive capsulitis.
- Once pain persists, begin slow AROM.
- Begin throwing program once pain is eliminated. (See Appendix)

283

Quick Review

284

During the deceleration phase of throwing, how much of a distraction force is applied to the GH joint?

285

90% of the throwers body weight

286

What is the position of symptom provocation for a patient with posterior instability?

287

Shoulder flexion to 90 degrees; internal rotation, and elbow extended

288

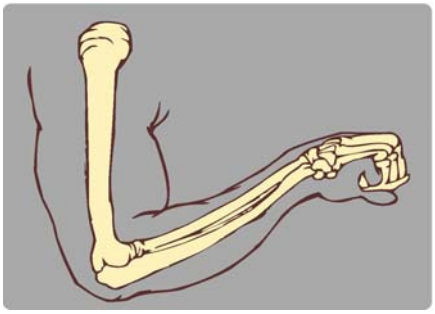
The Hornblower's Sign tests the integrity of which 2 rotator cuff muscles?

289

Infraspinatus & Teres Minor

290

Elbow Injuries



291

Epicondylitis

- Epicondylitis is usually result of repetitive tissue overload resulting in microtears over time.
- Onset of symptoms are usually gradual and the athlete will report pain following practice or a game.
- Occurs due to intrinsic or extrinsic factors.

292

Epicondylitis

- Training errors are the #1 reason for this overuse injury.
- Most common training errors like inadequate rest periods, lack of warm-up or cool-down, sudden changes in routine, and a lack of physical conditioning are often associated.

293

Lateral Epicondylitis

- Seen most often in racquet sports and throwers. Can be seen in golfers in the non-dominant extremity.
- Tennis elbow is a degenerative tendinosis at the origin of the ECRB but also involves the EDC.

294

Lateral Epicondylitis

- Usually causes tenderness over the ECRB just anterior and distal to the lateral epicondyle. Point of maximum tenderness is usually within 1-2cm of the lateral epicondyle.
- If tenderness extends beyond this 1-2cm zone, to the level of the radial head, posterior interosseous nerve entrapment should be ruled out.

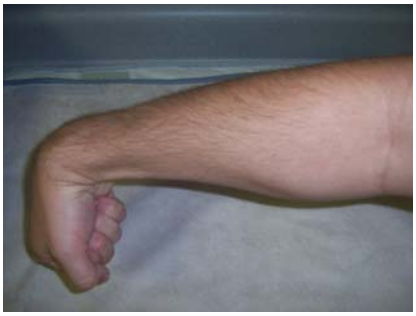
295

Lateral Epicondylitis

- If the athlete complains of pain in the area following blunt trauma, check for tenderness at the capitellum and radial head as this may suggest possible fracture.
- Provocative tests include: Mill's test; resisted wrist extension and resisted middle finger extension.

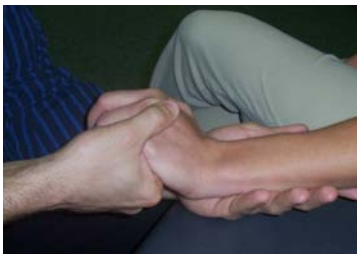
296

Mill's Test



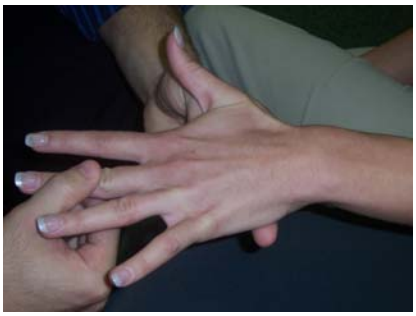
297

Resisted Wrist Extension



298

Resisted MF Extension



299

Medial Epicondylitis

- Tendinosis of the FCR and Pronator teres. Sometimes involves the common flexor mass origin.
- Point of greatest tenderness is usually within the affected tendons distal to the medial epicondyle and on the lateral edge of the flexor/pronator mass.

300

Medial Epicondylitis

- Medial epicondylitis is common in throwers due to the valgus stress placed on the elbow.
- Tennis players can be affected due to poor racquet handle sizing.
- Golfers often experience medial epicondylitis on the dominant arm.

301

Medial Epicondylitis

- Provocative tests used: Resisted wrist flexion with the forearm supinated and the elbow in extension and 90 degrees flexion.

302

Epicondylitis Treatment

- Ice and HVGS (100pps; - polarity) are effective modalities.
- Ultrasound (pulsed with mild extensor stretch) a
- Iontophoresis with dexamethasone are other commonly used modalities to manage inflammation and pain.

303

Epicondylitis Treatment

- Deep tissue massage, myofascial release, and transverse friction massage are common soft tissue mobilization techniques.

304

Watch Video

Deep Tissue Massage; TFM; Extensor Stretching

305

Epicondylitis Treatment

- Stretching exercises for the extensors/flexors should be performed with the elbow at 90 degrees and at full extension.
- Once pain has been reduced to a manageable level, eccentric strengthening exercises are initiated for flexors and extensors.
- Exercises should begin with low weight and repetitions and progress accordingly.

306

Epicondylitis Treatment

- Once athlete demonstrates pain free grip, grip strengthening should be initiated to promote increased activity of the wrist extensors.

307

Extensor Stretch

308

Wrist Extensor Training

309

Wrist Flexor Training

310

Power Web

311

Epiondylitis Treatment

- In addition to stretching and strengthening, make sure to correct mechanical problems.
- Also, look at handle size for racquet sports.

312

Nirschl Technique

313

Epicondylitis Treatment

- Most therapists quickly decide to use the counterforce brace for tennis elbow; however, if the wrist extensors are involved a wrist brace may be needed.
- For training and games, there is a taping method.

314

Watch Video

Epicondylitis Mobilization & Taping

315

Elbow Dislocations

- Usually occurs due to fall on outstretched arm.
- Dislocations are classified according to the position of the radius/ulna in relation to the humerus.
- Posterolateral dislocation is most common.

316

Elbow Dislocations

- Some physicians opt to immobilize the elbow for a short period following dislocation while others opt for mobilization within a protected range or hinged elbow brace.

317

Hinged Elbow Brace

318

Elbow Dislocations

- Complete dislocation of the elbow can often result in disruption of the UCL/RCL ligaments.
- Stability needs to be assessed,

319

Watch Video

Elbow Stability Testing

320

Elbow Dislocations

- Conservative treatment aims to control edema, decrease inflammation, and decrease muscle guarding to allow for ROM.
- Heat/ice; ultrasound (100%), and HVGS (100pps; - polarity x 20-30 minutes) are modalities that can be used to manage symptoms during the healing process.

321

Elbow Dislocations

- ROM should be initiated as soon as the physician deems the elbow stable. Active and active-assisted exercises should be used initially.

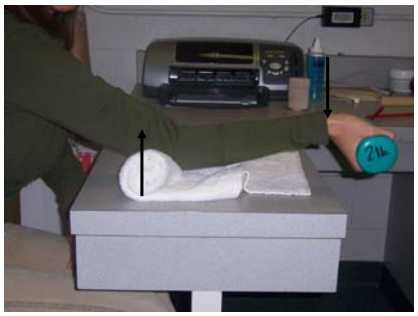
322

Elbow Dislocations

- Aggressive stretching cannot be tolerated by the elbow and also can result in heterotrophic ossification.
- Low-load stretching and contract/relax techniques are effective methods used.

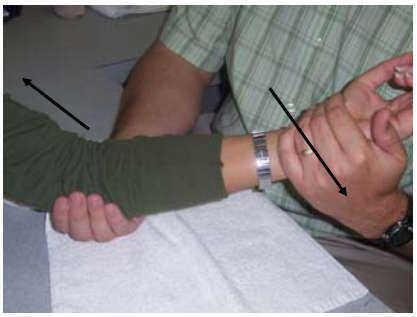
323

Low-load Stretch



324

Contract Relax



325

Elbow Dislocations

- Most athletes will gain flexion quickly with more limitations in extension. Elbow extension most often will increase quickly initially but begin to plateau around -30 degrees.
- A 10-15 degree loss is often deemed acceptable but this could be very limiting to a throwing or overhead athlete.

326

Little League Elbow

- Little league elbow occurs in the younger throwing athlete (9-12 years) and is due to repeated tension stress at the epiphyseal plate of the medial epicondyle.
- The athlete usually complains of medial elbow pain following throwing. Tenderness around the medial epicondyle is present and medial epicondylitis provocative testing is usually positive.
- X-rays confirm the diagnosis.

327

Little League Elbow

- Conservative measures include rest from throwing. If playing baseball, the athlete can switch to a different position. Also, the young athlete may decide to participate in other sports that do not require throwing.
- Rest from throwing for 2-3 months is usually sufficient. If there is still any evidence of pain at 6 months, the physician will most likely consider surgery.

328

Olecranon Stress Fracture

- Occurs as a result of repetitive throwing.
- It is often misdiagnosed as triceps tendonitis.
- Tenderness is usually located directly over the olecranon.
- X-rays often miss the fracture initially.

329

Olecranon Stress Fracture

- Conservative measures usually include rest from any throwing activity.
- Swimming and aquatic exercises are excellent and can be initiated around 8-9 weeks.
- A graduated throwing program can begin usually around 12 weeks (See Appendix)

330

Elbow UCL Injuries

- Usually occur in the throwing or overhead competitive athlete.
- Elbow becomes unstable as a result of the repetitive valgus stress on the medial elbow.
- In the throwing athlete, reconstruction is most often required to restore stability.

331

Acceleration Phase 1

332

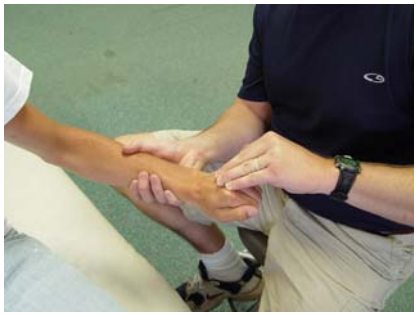
Elbow UCL Injury - Conservative

Phase 1:

- AROM / PROM / AAROM within arc of -20 to 90 degrees
- Wrist & Elbow isometrics
- Shoulder strengthening exercises (No ER)
- Ice as needed for edema and pain

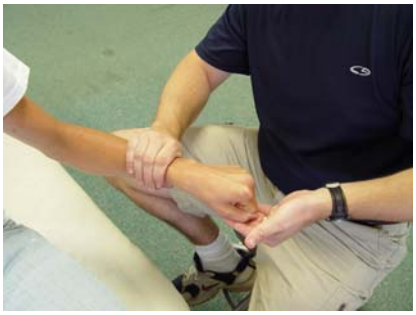
333

Wrist Ext - Isometric



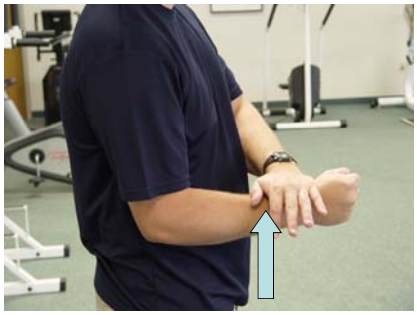
334

Wrist Flex - Isometric



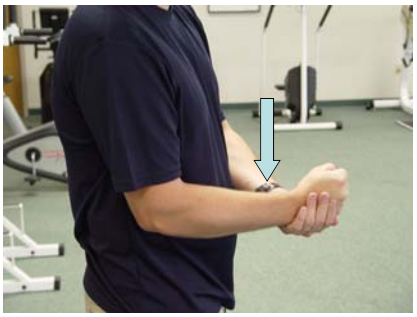
335

Isometric - Biceps



336

Isometric - Triceps



337

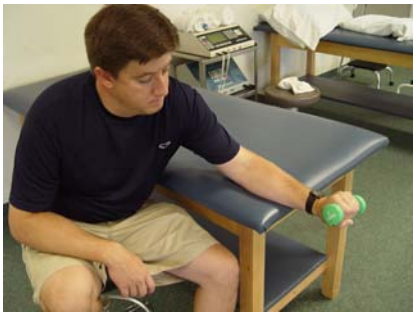
Elbow UCL Injury - Conservative

Phase 2:

- Increase ROM to arc of 0-135 degrees (10 degrees/wk)
- Isotonic exercises: wrist curls; wrist extension; supination/pronation; biceps curls, triceps extensions
- Dumbbell exercises for deltoid; suprapinatus; rhomboids, ER/IR

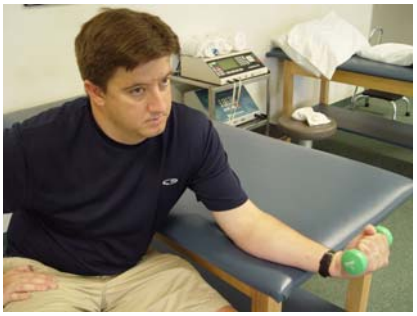
338

Wrist Extension - Dumbbell



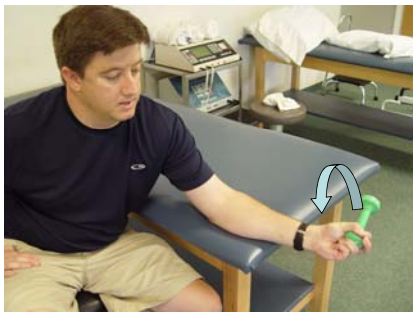
339

Wrist Flexion - Dumbbell



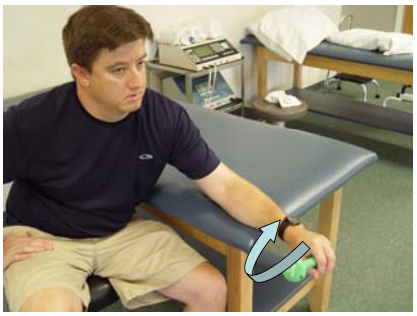
340

Pronation - Dumbbell



341

Supination - Dumbbell



342

Biceps - Dumbbell

343

French Curl

344

Elbow UCL Injury - Conservative

Phase 3:

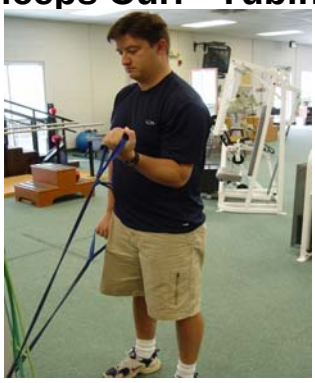
- Tubing Exercises: Biceps; Triceps; Thrower's 10; Pronation/Supination; Wrist extension/flexion

Phase 4:

- Interval throwing (See Appendix)
- Plyometrics (Discuss & Demo)
- Thrower's 10

345

Biceps Curl - Tubing



346

Triceps - Tubing

347

Elbow UCL – Post-operative

Week 1:

- Posterior elbow splint at 90 degrees flexion
- Wrist AROM
- Biceps isometrics
- Shoulder isometrics: IR; Flex; Ext; Abd; Add **(No ER)**
- Use Ice as needed for pain and edema

348

Isometric Biceps

349

Isometric Triceps

350

Isometric Flexion

351

Isometric Extension

352

Isometric Abduction

353

Isometric IR

354

Isometric ER

355

Elbow UCL – Post-operative

Week 2:
- Hinged brace set at 30-100 degrees
- Wrist isometrics
- Elbow ext/flex isometrics
- Continue shoulder & biceps isometrics

Week 3:
- Set brace for 15-110 degrees
- Continue exercises

356

Elbow UCL – Post-operative

Week 4:
- Set brace for 10-120 degrees
- Using gravity or 1 lb: wrist curls; wrist extensions; supination; pronation; elbow extension / flexion
- Emphasize rotator cuff strengthening. **(No ER until 6 weeks)**

357

Elbow UCL – Post-operative

Week 6:
- Set brace 0-130 degrees
- AROM of elbow 0-145 degrees without brace
- Progress all strengthening
- Begin ER strengthening (light isometrics)

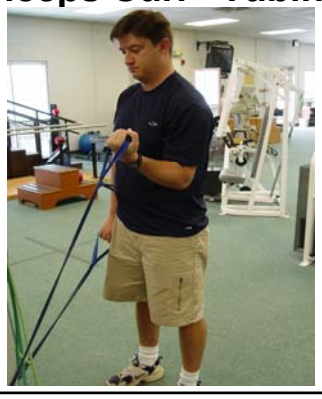
358

Elbow UCL – Post-operative

Week 9:
- Eccentric elbow flexion/extension using tubing
- Begin manual resisted PNF diagonals
- Continue with strengthening
- Thrower's 10

359

Biceps Curl - Tubing



360

Triceps - Tubing

361

Rhythmic Stabilization – D2 Ext/Flex

362

Elbow UCL – Post-operative

Week 14:

- Initiate interval throwing (See Appendix)
- Continue strengthening
- Begin to monitor stretching and flexibility

Week 22-26:

- Return to competitive throwing

363

Quick review

364

What is the technique for determining racquet handle size?

365

Nirschl technique

366

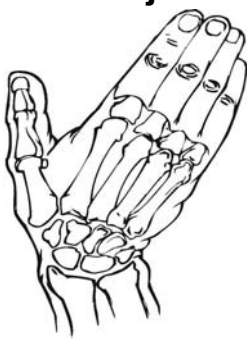
What fracture is commonly misdiagnosed as triceps tendonitis?

367

Olecranon Stress Fracture

368

Wrist Injuries



369

Scaphoid Fractures

- Most commonly fractured carpal bone.
- Occurs as a result of fall on outstretched, extended hand.
- Complain of vague, diffuse wrist pain secondary to fall.

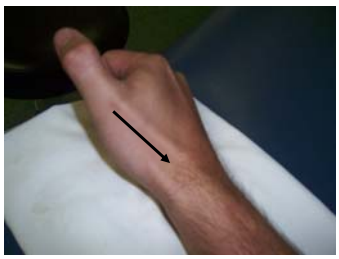
370

Scaphoid Fracture

- Tenderness in the anatomical snuffbox but athlete may report tenderness at the scaphoid tuberosity and also just distal to Lister's tubercle. With tenderness at any of these areas, further assessment should be performed.
- Athlete will demonstrate wrist ROM but will have pain at end ranges.

371

Anatomical Snuffbox



372

Scaphoid Fracture

- There is usually no swelling or bruising present with an isolated scaphoid fracture.
- Non-displaced fractures of the distal pole are usually treated with short arm thumb spica casts for 6-8 weeks.
- Other fractures require ORIF due to poor vascular supply.

373

Scaphoid Fracture

- Rehab includes possible fabrication of removable thumb spica splint, therapeutic exercises for wrist and thumb ROM. Strengthening is not initiated until good union is reported by physician.

374

Hamate Fractures

- Hamate fractures occur in sports where the athlete is holding or gripping a structure.
- Occurs due to blunt trauma from the object they are holding resulting in fracture of the hook.
- Athlete usually complains of deep, diffuse ulnar-sided wrist pain which is over or around the hamate.

375

Hamate Fracture

- Many athletes will play with pain for some time.
- Fractures are treated with a cast for 6-8 weeks or excision.

376

Distal Radius Fractures

- Occur due to fall on outstretched hand.
- Usually the higher the energy fall, the more complex the fracture.
- The type of stabilization depends on the severity of injury and can range from closed reduction / casting to external fixation to ORIF.

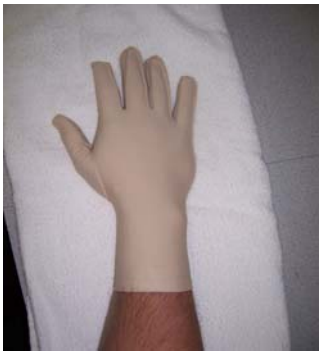
377

Distal Radius Fracture

- Edema has to be monitored close as this can affect pain and ROM throughout the later stages of rehab.

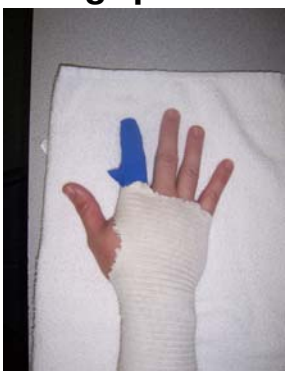
378

Compression Glove



379

Tubigrip & Coban



380

Distal Radius Fracture

- The goal for therapy is to restore motion as quickly as possible.
- ROM should focus on forearm, wrist, and hand.

381

Distal Radius Fracture

- Strengthening should focus on the wrist extensors/flexors in addition to grip, pinch, and intrinsics.
- Most athletes have excellent physical conditioning and do not require therapy beyond edema management or splinting.

382

Distal Radius Fractures

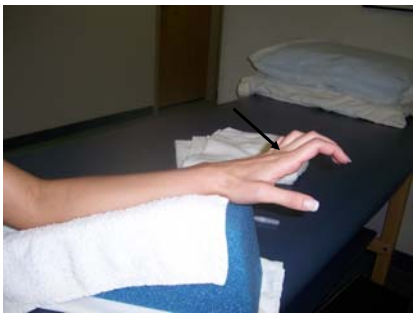
- Wrist extensor training is an area that has to be monitored.
- If the wrist extensors are weak, the finger extensors will substitute for the wrist extensors.

383

Wrist Extension - Normal

384

Wrist Extension - Abnormal



385

Wrist Sprain

- Soft tissue injuries to the wrist are often grouped together under the diagnosis “wrist sprain”.
- Soft tissue injuries at the wrist occur during sports mostly due to repetitive loading of the wrist or blunt trauma/contact.

386

Wrist Sprain

- “Stick ball” sports (tennis, baseball, etc) usually have athletes who complain of ulnar-wrist pain. This is due to repetitive loading of the wrist.
- Injuries to the ulnar wrist typically involve the lunotriquetral (LT) ligament or the triangular fibrocartilage complex (TFCC).

387

Wrist Sprain

- Contact sports or impact injuries and weight training usually result in injuries to the radial wrist and involve the scapholunate (SL) complex and the scaphoid/radius interval.
- In addition to ROM, strength, and sensation, a generalized ligamentous laxity assessment should be performed.

388

Watch Video

Wrist Assessment

389

Scapholunate injury

- Athlete complains of radial-sided wrist pain.
- Injury most often occurs due to a compressive force to the radial wrist while the wrist is in an extended position.
- Most often the time of injury is not exact.

390

Scapholunate Injury

- Tenderness is noted at the SL interval with possibly mild swelling. There may only be swelling present after activity.
- Athlete will complain of pain with wrist extension and also sustained grip. In some cases, a “clunk” may be noted during wrist ROM.

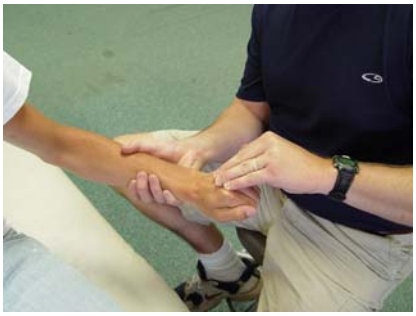
391

Scapholunate Injury

- Perform a Watson test to confirm.
- Physician often places wrist in a short arm cast for 4-8 weeks.
- Conservative rehab includes modalities (heat/ice; ultrasound (pulsed); Laser) to decrease pain and inflammation
- Exercises for ROM and strengthening. Isometric exercises are best. Avoid repetitive loading exercises.

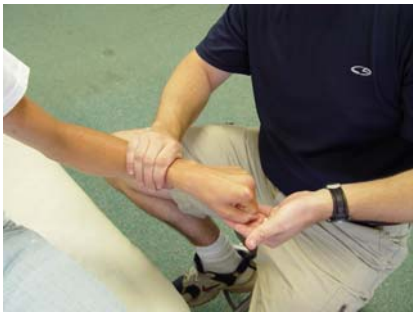
392

Wrist Ext - Isometric



393

Wrist Flex - Isometric



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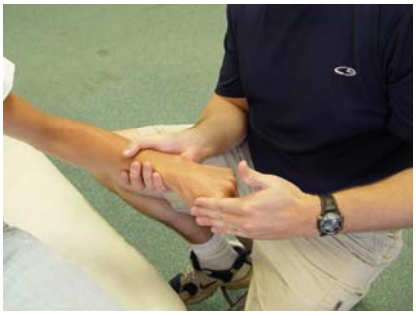
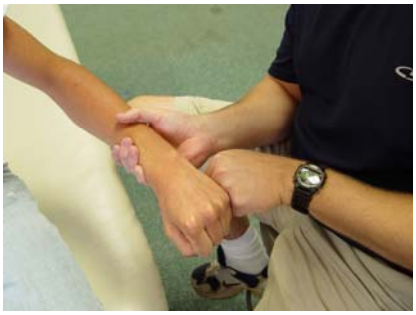
Wrist RD - Isometric



395

Wrist UD - Isometric



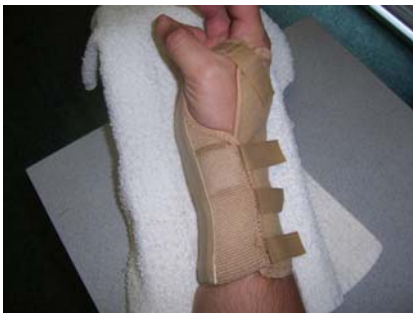
396

Scapholunate Injury

- Training programs have to be modified to decrease loading of the radial wrist.

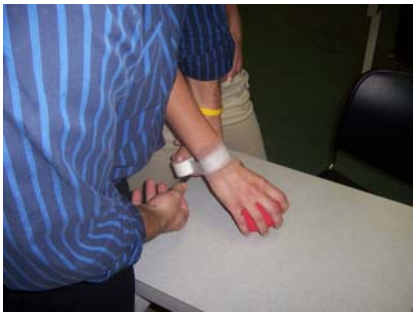
397

Wrist Cock-up splint



398

Wrist Taping - Supportive

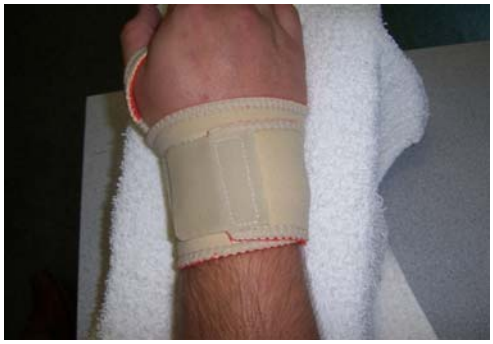


399

SL Neoprene Support Application

400

SL Neoprene Support



401

Scapholunate (SL) Injury – Post-operative

Arthroscopic stabilization with Kirschner wire:

- Thumb spica cast / splint x 8 weeks
- At 8 weeks, pins removed. Removable thumb spica splint applied.
- AROM exercises for wrist **(No PROM)**
- At 12 weeks, light isometric wrist exercises
- No loading, power grip, or weight bearing for 6 months.

402

Scaphoid Impingement

- Occurs most often due to weight lifting and performance of an excessive amount of push-ups.
- Athlete complains of radial-sided wrist pain.
- Reports pain with hyperextension with tenderness and swelling over the dorsal-radial aspect of the wrist.

403

Scaphoid Impingement

- Conservative rehab includes wrist brace for rest, activity/training modification,
- Modalities (heat/ice, ultrasound (100%) to decrease pain and inflammation. Iontophoresis is occasionally used to decrease inflammation when other measures are unsuccessful.

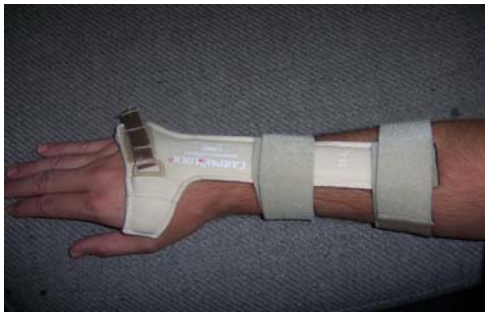
404

Scaphoid Impingement

- If conservative measures fail, surgical intervention is required.

405

Dorsal Wrist Cock-up Splint



406

Lunotriquetral (LT) injury

- Athlete complains of ulnar-sided wrist pain.
- Usually occurs from ulnar deviation and extension with force on the radial side of the wrist forcing increased extension, ulnar deviation, and intercarpal supination.

407

Lunotriquetral (LT) Injury

- Injuries have also been known to occur due to fall on outstretched hand in extension and radial deviation in addition to wrist hyper-flexion injuries.

408

Lunotriquetral (LT) Injury

- Athletes usually present with the following complaints: ulnar wrist pain, loss of ROM, loss of grip strength, and pain or clunk when moving from radial to ulnar deviation.
- Tenderness can be palpated just distal to the TFCC at the LT interval

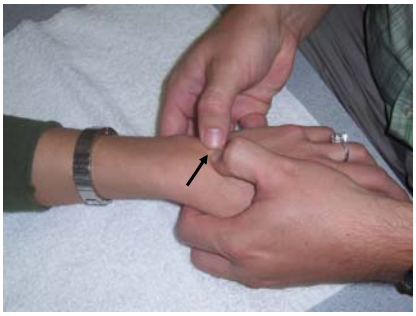
409

Lunotriquetral (LT) Injury

- Ballottement test is commonly used to confirm injury.
- Arthroscopy is most effective method of diagnosis. Often the physician will perform the arthroscopy to diagnose and debride.

410

Ballottement Test



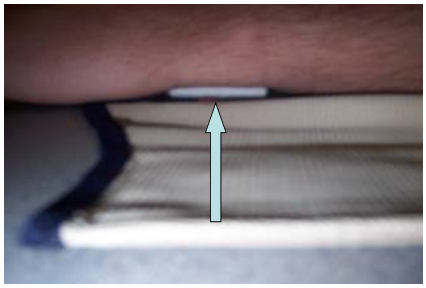
411

Lunotriquetral (LT) Injury

- Conservative treatment includes splinting or casting the wrist for 4-8 weeks. The splint should apply volar support (pressure) to the pisiform.

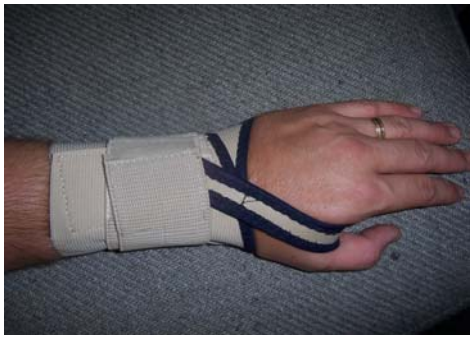
412

LT Splint Volar Support



413

LT Injury Splint



414

Lunotriquetral (LT) Injury

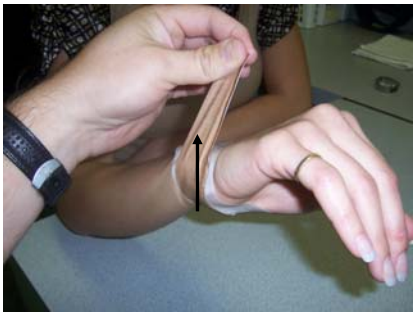
- Taping can be done as long as it provides the volar support to the pisiform.

415

Carpal Instability Taping - Lift

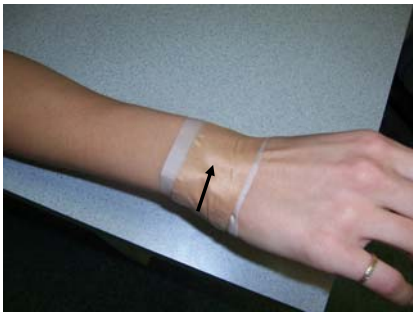
416

Carpal Instability Taping - Procedure



417

Carpal Instability Taping - Complete



418

Lunotriquetral (LT) Injury – Post-operative

LT repair with pinning:

- Short arm cast or volar cock-up splint for **8 weeks continuous.**
- Pins removed at 8 weeks.
- Removable wrist splint used for additional 4 weeks. Remove for exercise & bathing only.
- At 8 weeks begin wrist AROM (No PROM)
- Being wrist isometrics at 12 weeks. Gradually add grip strengthening.
- Avoid impact loading & forced rotation for 4-6 months

419

Triangular Fibrocartilage Complex (TFCC)

- Injuries are usually due to trauma but can be due to degenerative changes.
- Compressive loading of the ulnar deviated wrist with forearm rotation can result in a TFCC tear.
- Repetitive motions like forearm rotation with ulnar deviation can also lead to degenerative changes and tears in the TFCC.

420

Triangular Fibrocartilage Complex (TFCC)

- Athletes usually present reporting an event where there was sudden onset of pain with extension loading of the wrist. May report difficulty and pain with gripping.
- Symptoms can be reproduced with axial loading of the wrist, ulnar deviating the wrist and then performing extension/flexion.

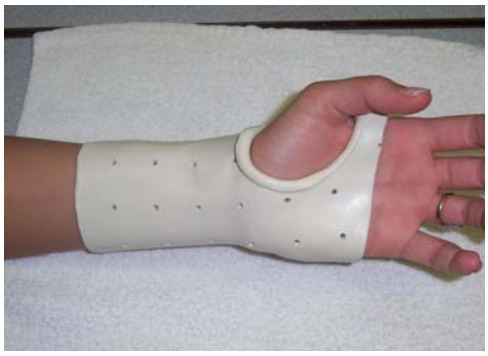
421

Triangular Fibrocartilage Complex (TFCC)

- Conservative rehab includes splinting, therapeutic exercises, and modalities (heat/ice, ultrasound (pulsed), Laser, Iontophoresis).
- Splinting can vary due to injury and also due to physician. The most effective means of immobilization splinting is done by placing the patient in a long arm splint with the wrist in flexion and ulnar deviation. The splint should continue above the elbow or have a block above the elbow to limit forearm rotation. Splint wear is usually done for 4 weeks.

422

Wrist Gauntlet



423

TFCC Conservative Management

0-6 weeks:

- LAC or splint with elbow at 70 degrees flexion; forearm and wrist in neutral is worn 18 hours/day.

6 weeks:

- Wrist gauntlet splint is used
- AROM / AAROM for wrist and forearm every hour
- Tendon gliding / Median nerve glides

424

TFCC Conservative Management

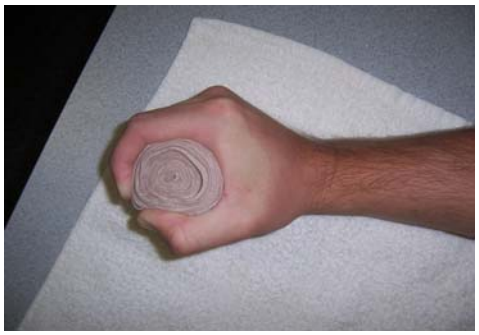
- Gentle PROM for pronation/supination
- Basic ADL tasks allowed. (Keep wrist in neutral!)

8 weeks:

- **Strengthening initiated. Neutral forearm**.
- Isometric grip
- Putty exercises for grip and intrinsics
- Wrist curls and extensions with dumbbell

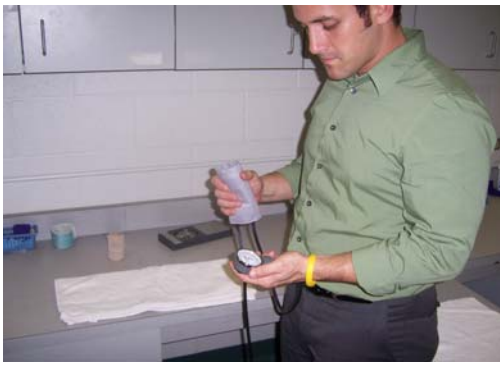
425

Isometric Grip



426

Isometric Grip Exercise with Feedback



427

TFCC Conservative Management

10-12 weeks:

- Overhead, torquing, and weight bearing is allowed if patient is asymptomatic.

428

TFCC Repair of Peripheral Tear

1-8 weeks:

- LAC or splint with elbow at 90 degrees flexion; forearm and wrist in neutral.
- Hand AROM

3-4 weeks:

- Gentle wrist extension & flexion initiated
- May perform PROM for supination to 45-60 degrees.

429

TFCC Repair of Peripheral Tear

6-8 Weeks:

- Full AROM for wrist and forearm is main goal
- Perform end range stretch to tolerance. (Do not be overly aggressive)

8 weeks:

- Begin to work on grasp reflex (Demonstrate)
- Wrist gauntlet splint

430

TFCC Repair of Peripheral Tear

8-12 Weeks:

- Begin strengthening. Keep wrist in neutral.
- Isometric grip.
- Putty exercises for grip and for FDP.
- Demonstrate putty exercises
- Wrist curls and extensions with dumbbell

431

TFCC Repair of Peripheral Tear

12 Weeks:

- Low-load repetitive grip
- Torque motion with gradual increase in load

432

Extensor Carpi Ulnaris (ECU) Tendinopathy

- It occurs when the wrist is flexed and the forearm is forced into supination with the wrist ulnarly deviated.
- There can be an isolated injury or repetitive trauma which leads to swelling of the tendon and/or tendon sheath.

433

Extensor Carpi Ulnaris (ECU) Tendinopathy

- The athlete will complain of ulnar-sided wrist pain following activity. There may be some mild swelling and tenderness over the tendon. With a subluxation, there is palpable rolling or popping of the tendon.
- Symptoms can be elicited with resisted wrist extension while holding the forearm in supination and the wrist in ulnar deviation.

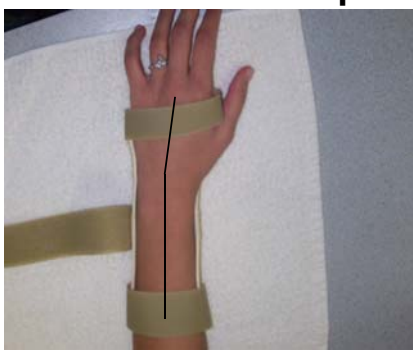
434

Extensor Carpi Ulnaris (ECU) Tendinopathy

- For ECU subluxation, conservative measures would include modalities (heat/ice, ultrasound (pulsed)) to decrease pain and inflammation and splinting the forearm in pronation with slight wrist extension and radial deviation.

435

ECU Subluxation Splint



436

Quick Review

437

What test is used for SL injury?

438

Watson's Test

439

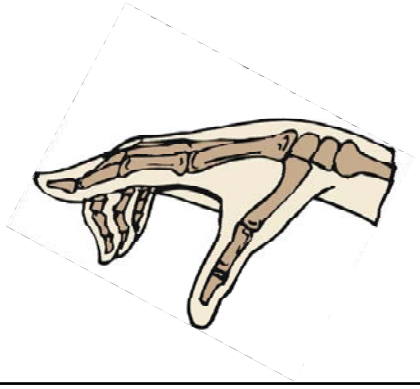
What condition is common in training with an excessive amount of push ups?

440

Scaphoid Impingement

441

Hand Injuries



442

Metacarpal Fracture

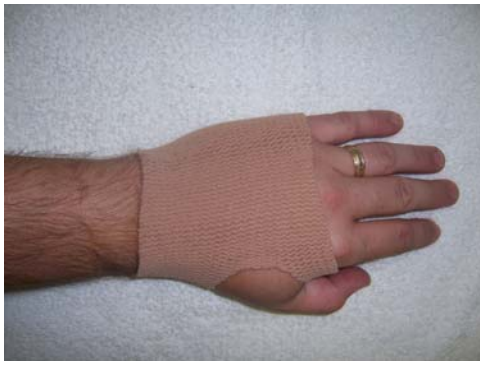
- Fractures can occur due to blunt trauma from an object or are stepped on during play.
- The majority of metacarpal fractures are stable and are treated with casting or splints which allows the athlete to resume competitive play.
- If the fracture is located where there is risk or rotation or is intra-articular then ORIF is likely performed.

443

Fracture Padding Supplies

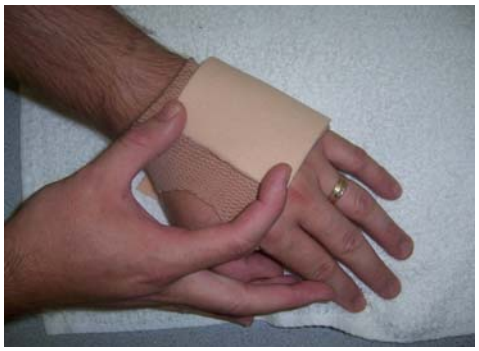
444

Metacarpal Fracture Padding - 1



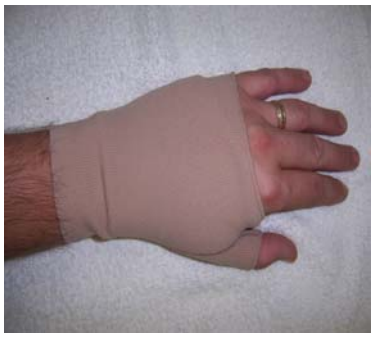
445

Metacarpal Fracture Padding - 2



446

Metacarpal Fracture Padding 3



447

Bennett's Fracture

- Fracture of the base of the 1st metacarpal with subluxation of the metacarpal trapezial joint.
- Occurs when there is thumb adduction overload.

448

Bennett's Fracture

- Sudden onset of pain with tenderness and clicking at the 1st metacarpal trapezial joint.
- Throwing athletes are often restricted from return to play for up to 8 weeks.
- A playing cast can be applied to the non-throwing athlete and return to play as early as 2 weeks.

449

Bennett's Fracture – Post-operative

- Following surgery or prolonged immobilization, therapy may be indicated if on the throwing hand.
- Isolated thumb AROM exercises are performed. Stretching exercises are performed.

450

Bennett's Fracture – Post-operative

- Focus for therapy is to return thumb motion to normal for proper gripping of the ball.
- Have athlete grip ball and perform light tossing drills once cleared by physician.

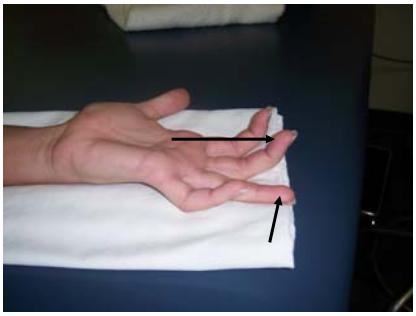
451

Jersey Finger

- Avulsion of the FDP insertion from the distal phalanx.
- The finger is forcibly extended while actively contracting the FDP.
- Often goes undetected until the athlete discovers and inability to flex the DIP joint.

452

Jersey Finger



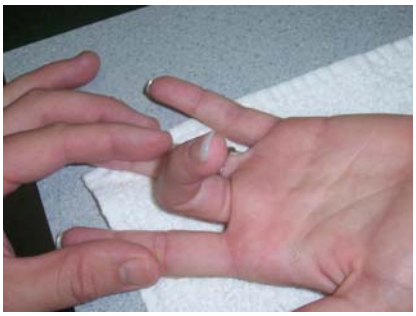
453

Jersey Finger

- Assessment of FDS/FDP function should be performed in all digits.
- If a jersey finger is confirmed, the athlete needs to be referred for an x-ray to determine if an avulsed fragment is present.

454

FDS Testing



455

Jersey Finger

- Treatment is determined by severity of injury and time of confirmation.
- Surgical intervention is Zone I flexor tendon repair and protocol is used accordingly.

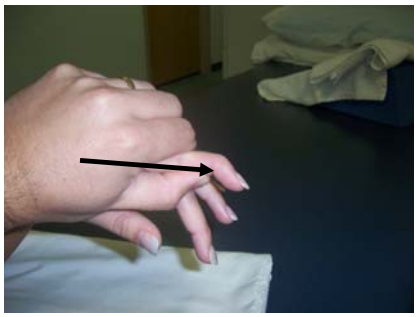
456

Mallet Finger

- Injury to the terminal extensor tendon at the distal phalanx.
- Occurs as a result of forced flexion of the DIP while the extensor tendon is actively contracting.

457

Mallet Finger



458

Mallet Finger

- Athletes many times disregard the injury as a “jammed” finger and continue play.
- Many times immediately following injury there will be no disruption of DIP extension but as time progresses an extensor lag will develop.

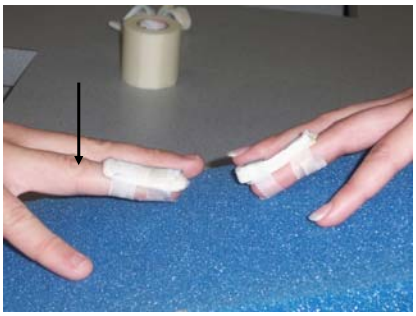
459

Mallet Finger

- Continuous splinting is used initially with the DIP in extension or slight hyperextension.
- For athletic use, a dorsal splint is used. Tape or strapping can be used to secure the splint. There are some commercially made splints available.

460

Mallet Finger Splints



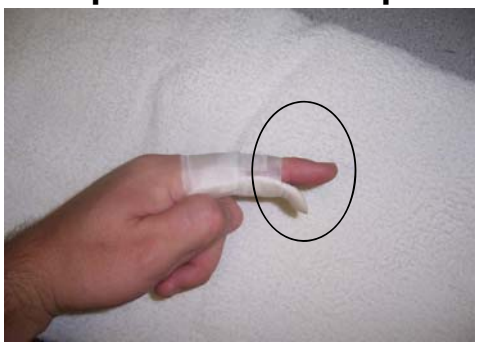
461

Mallet Finger

- The course of splinting is done for a period of 6-10 weeks. If the DIP is allowed to flex at all during the initial 6 weeks, the splinting regimen must start all over.
- Aside from splinting, therapy is usually restricted until 6 weeks when AROM exercises for the DIP are initiated. ROM is progressed in increments beginning with 0-25 degrees at week 6. Each week the flexion arc is increased 5-10 degrees. Template splints can be used.

462

Template Exercise Splint



463

Mallet Finger

- The patient should have full AROM within 3 months.
- If at any point an extensor lag develops, the finger is placed in the splint again 24 hours a day for 1 week and then exercises attempted again.

464

Central Slip Injuries

- These injuries involve a rupture of the central slip of the extensor mechanism over the dorsal PIP joint.
- Can occur due to forced flexion of the PIP while the extensors are contracting or due to direct trauma at the dorsal PIP joint.

465

Central Slip Injuries

- The athlete may report “jamming” the finger on a pass or player. There is usually swelling at the PIP and tenderness over the dorsal PIP.
- To test, flex the wrist and MP joint and have the athlete actively extend the PIP joint. If there is 15-20 degrees lost in extension, a central slip injury should be suspected.

466

Watch Video

Testing for Central Slip

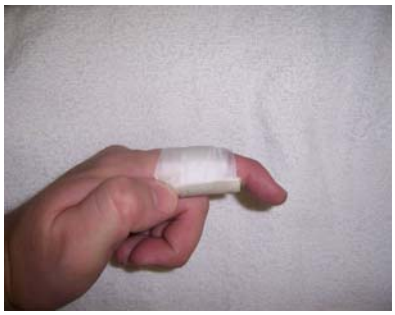
467

Central Slip Injuries

- Treatment is focused on preventing a boutonniere deformity which could severely limit the athlete’s performance.
- Edema management is an essential.
- PIP extension splinting is used with the PIP in the maximum amount of extension possible.
- Splints should leave the DIP free but the athlete and therapist need to perform DIP ROM to prevent ORL tightness.

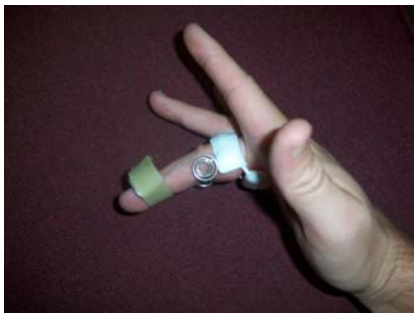
468

PIP Extension Splint



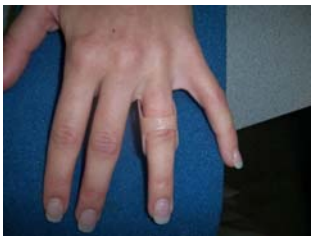
469

Capner Splint



470

Figure Eight Splint



471

Central Slip Injuries

0-8 Weeks:

- **Continuous splinting of PIP joint at 0 degrees.**
- Perform DIP exercises within splint.

8-10 Weeks:

- Active flexion 30-40 degrees of PIP. Increase in increments of 10-20 degrees each week.
- Perform DIP exercises in splint.

472

Central Slip Exercise Splint

473

Central Slip Injuries

10-12 Weeks:

- If no extension lag, D/C splint.

12 Weeks:

- Begin unrestricted use
- Incorporate strengthening only if necessary

474

Central Slip Injuries – Post-operative

0-4 Weeks:

- PIP extension splint or k-wire used to maintain PIP extension.
- Active, isolated, DIP flexion is encouraged

4-6 Weeks:

- Continue splinting of PIP at all times, except exercise
- Gentle AROM of PIP into flexion (Do not be overly aggressive)

475

Central Slip Injuries – Post-operative

6-8 Weeks:

- Begin to wean from splint during day
- If extension lag begins, resume day splinting
- Advance AROM for increased flexion

8-12 Weeks:

- Splint at night, if lag persists
- Continue AROM. Initiate strengthening for PIP flexion.

476

Thumb UCL Injuries

- Thumb UCL provides stability during pinch and grip.
- Common in ball-handling sports (football, basketball, etc).
- Injuries often occur due to forced radial deviation of the thumb proximal phalanx which strains or tears the UCL.

477

Thumb UCL Injuries

- There is usually swelling at the thumb MP joint and there is tenderness on the ulnar side of the thumb at the UCL.
- UCL should be assessed with the thumb in neutral and 30 degrees flexion. **Radial deviation >35 degrees or >15 degrees as compared to the contra-lateral thumb is indicative of injury**.

478

Thumb UCL Injuries

- The physician will often perform an x-ray to rule out a Stener lesion.

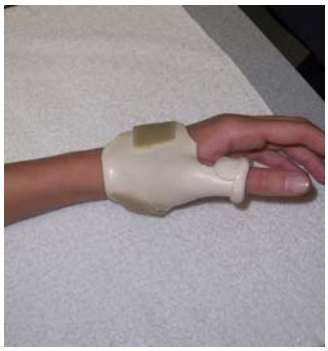
479

Thumb UCL - Conservative

- Initial treatment for partial tears includes a thumb spica cast or splint with the thumb at 30 degrees palmar abduction and the IP left free. The cast is worn for 3-4 weeks.
- Therapy should focus on maintaining ROM of joints outside of the splint or cast, including the thumb IP.
- At 3-4 weeks, the thumb is placed in a short opponens splint which is worn for 4-5 weeks after injury.

480

Short Opponens Splint



481

Thumb UCL - Conservative

- AROM of the thumb can begin once the short opponens splint is applied.
- 5 weeks: PROM is initiated. Avoid stress on the UCL.
- 8 weeks: **Begin strengthening**: grip, lateral pinch; tip pinch; tripod pinch. Strengthen locking of the thumb using a cylinder.

482

Thumb UCL - Conservative

- Athletes which are required to perform ball handling tasks are restricted for up to 6-10 weeks. If they do no have to perform any ball handling, the athlete may return as early as 2-3 weeks.

483

Thumb UCL – Post-operative

0-3 Weeks:

- Immobilization in thumb spica cast or splint.
- AROM of all uninvolved joints, including thumb IP.

2-3 Weeks:

- If k-wire or pullout wire removed, place in in a hand-based or forearm-based splint for continuous wear.
- Perform supervised AROM of thumb CMC; IP and the wrist

484

Thumb UCL – Post-operative

Week 4:

- Begin AROM of thumb MP. Avoid any stress to repaired ligament.

Weeks 6-8:

- Begin PROM of thumb MP if tightness persists
- Begin to wean splint wear

485

Thumb UCL – Post-operative

Weeks 10-12:

- Begin strengthening: grip; lateral/tripod/tip pinch. Perform thumb locking around cylinder.

Weeks 12-16:

- Begin unrestricted use.
- Tape thumb for support or have patient wear neoprene support.

486

Watch Video

Thumb UCL Taping

487

PIP Collateral Ligament Injuries

- Occurs due to forced radial / ulnar deviation with extension.
- Complain of swelling and pain that is localized to the PIP joint.
- Often complain of stiff finger.

488

PIP Collateral Ligament Injuries

- Tenderness over the injured collateral ligament.
- Stress testing will reproduce symptoms. Compare with contralateral side.
- Treatment focuses on ROM and edema management.
- Edema management should include ice, compression sleeves, coban, etc.

489

Finger Compression Measures

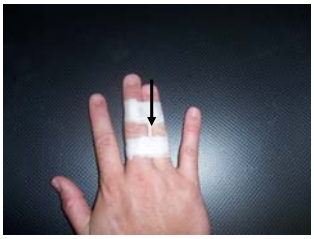
490

PIP Collateral Ligament Injuries

- ROM can be accomplished by buddy taping.
- The injured finger can be buddy taped to the finger adjacent the injured ligament.

491

Buddy Taping



492

PIP Collateral Ligament Injuries

- For the index and small fingers buddy taping may not be an option. In these digits, an extension gutter splint can be used.
- There should be unrestricted return to play within 3 weeks unless there is a chronic inflammatory process and/or more severe ligament damage.

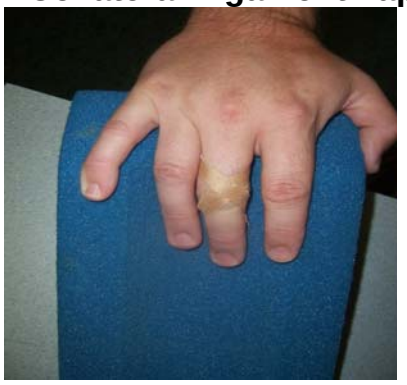
493

PIP Collateral Ligament Injuries

- Once general ROM is achieved, athlete may complain of discomfort with digit PIP ROM.
- In this case, there is another taping method available to support the PIP.
- Also, a portion of a neoprene digitube can be cut to fit the affected PIP joint for support and compression. This should only be used during games.

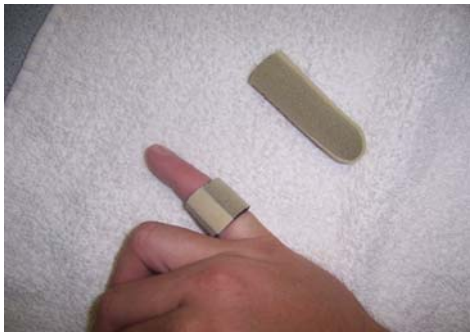
494

PIP Collateral Ligament Taping



495

Digitube PIP Support



496

Dorsal PIP Dislocations

- Occurs due to hyperextension injury as a result of axial loading (i.e. being hit on the tip of the finger by a ball)
- Dislocation is usually reduced at time of injury. Some require a local anesthetic.

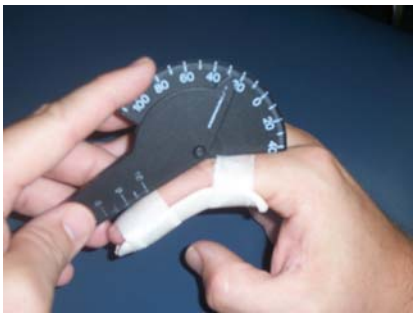
497

Dorsal PIP Dislocation

- Treatment focuses on edema and immobilization initially.
- Ice, compression sleeves, and coban are used for edema management.
- The PIP is immobilized in 30 degrees PIP flexion. If the athlete can tolerate, AROM is initiated within 30 degree extension block of motion. (Avoid PIP extension past the block)

498

PIP Dislocation Splint



499

PIP Dislocation Exercise Splint

500

Dorsal PIP Dislocations

- Over the course of the next 3 weeks following injury, PIP extension is increased in increments of 10 degrees each week.
- At 3-4 weeks, buddy taping is initiated to promote full ROM.
- If swelling persists, place the digit in a finger gutter extension splint at night to prevent flexion contracture.

501

Volar PIP Dislocations

- Occurs due to axial loading of a flexed PIP joint with a rotary component.
- Usually results in injury to the central slip which causes a boutonniere deformity.
- Check the integrity of the central slip as performed earlier.

502

Volar PIP Dislocations

- If the central slip is intact, edema management and ROM should be the focus.
- Edema can be managed with ice, compression sleeves, and coban.
- ROM can be accomplished with buddy taping.
- If central slip is disrupted, follow protocol for central slip injuries.

503

Quick Review

504

What is the name of the injury when there is disruption of FDP due to forced extension of flexed DIP?

505

Jersey Finger

506

If you flex the wrist and the MP joint and have the patient actively extend the PIP, what are you testing?

507

Central Slip Integrity

508

Tune in to E.S.P.N.

Returning the Athlete to Competition

509

E.S.P.N.

- **E**quipment Assessment
- **S**port / Position
- **P**hysical / Psychological Assessment
- **N**eed to Communicate with Physician

510

Equipment Assessment

- What is the purpose of the equipment to be used?
- The equipment should be able to perform the assigned task without limiting athletic function.

511

Equipment Assessment

- Playing casts are usually made with a rubber-based material
- Playing casts are usually bi-valved so they can be easily removed.
- Plaster of paris casts and thermoplastic splints will have to be covered with padding and tape.
- Finger splints must be covered with padding or tape.

512

Equipment Assessment

- Neoprene supports are acceptable if secured with tape.
- Most often the team physician or ATC will know the equipment restrictions.

513

Sport / Position

- Time for return to play can be affected by the sport played due to contact required and stress on the injured area.
- The position determines return to play due to certain physical requirements.
- Analyze the sport/position to evaluate physical requirements of the athlete and amount of contact.

514

Sport / Position

- Determine if the athlete can change their role and return sooner, if necessary.
- EVALUATE THE RISK!!!

515

Physical Assessment

- Is the athlete functional? This does not mean full ROM, no pain, no swelling, and 5/5 strength. Can the athlete perform safely and contribute in competition?
- What is the athlete's cardiovascular status?
- Is the trunk or core strength ready for play?
- Have mechanics been checked or altered?

516

Psychological / Emotional Concerns

- Is the athlete mentally ready to return to action?
- Is the athlete aware of the risk of re-injury?
- Is the athlete ready to accept a different role on the team, if necessary?

517

Need to Communicate with Physician

- The physician must issue clearance.
- If so, is the clearance to practice, practice with contact, or return to play.
- Has the physician imposed restrictions on playing time, equipment use, etc?
- If there are restrictions imposed, have they been communicated with the athlete, coach, training staff, etc?

518

Rehab Following Return to Play

- Make sure the athlete, coaching staff, and trainers are aware of continued rehab.
- Communicate with the training staff to make sure that, when necessary, stretching or warm up is performed prior to game, equipment is used, structures are protected, edema/pain management measures are implemented following the game.

519

Rehab Following Return to Play

- The athlete will require constant re-assessment and adjustment of the rehab program to accommodate physical changes and competitive demands.

520

How to Prevent Injuries to the Throwing Arm

1. Make sure the athlete has total body conditioning: Arm, trunk, hip, leg.
2. Be sure proper stretching is performed before warm-up: Supine Flexion; Extension; ER; IR; Elbow Circles; Wrist Circles
3. Do not throw to warm-up. Warm-up to throw.
4. Make sure mechanics are correct.

521

How to Prevent Injuries to the Throwing Arm

5. Make sure the athlete has an in-season and off-season throwing and strengthening program. (The Athlete's Shoulder is an excellent book for reference)
6. Make certain the athlete is dressed properly during hot or cold temperatures. Monitor fluid intake.
7. Avoid "overuse". Get the proper rest.

522

Conditioning for the Athlete

- Thrower's 10 Program in addition to following exercises.
- A copy of the program is included in the Appendix.

523

Bench Press – Swiss Ball

524

Prone Rowing – Swiss Ball

525

Scapula Ball Walk

526

Swiss Ball Roll up

527

Plyoball Crunch

528

Plyoball Hip Flexion

529

Plyoball Knee Extension

530

Upright Bike

531

How to Be Successful in Sports Medicine Rehab

1. Establish a good rapport with the physicians.
2. Invite the physician, coaching staff, and/or athletic trainer to you facility for a tour. Have an open door.
3. Make your presence known at practice, games, etc. Get out of the clinic.
4. Collaborate with trainer on treatment regimens and equipment.

532

How to Be Successful in Sports Medicine Rehab

5. If there is a formal athlete physical day, participate in it.
6. Learn as much about the sport / position as possible. This will make you more effective.
7. Pay attention to detail with <u>each athlete and each injury</u>. Individualize treatment.
8. Continue to learn new techniques.
9. Communicate.

533

Practice is Over

It is time to play!

534

Anterior Shoulder Instability - Conservative

Phase:	Instructions:
Acute Motion	• Ice / HVGS for pain • Pendulums • Pulleys: Flexion / Abduction • Cane Exercises: Flexion/Abduction/IR/ER • Posterior Capsular stretch • UBE • Avoid shoulder extension initially • Progress to isometrics: flexion/abduction/IR/ER/extension
Intermediate	• Full ROM before initiating this phase • Isotonic strengthening: flexion; abduction; IR; sidelying ER to 45; shrugs; extension; supraspinatus; biceps • Push-ups: Wall; Table; Floor • ER/IR with tubing at 0 degrees abd • Rhythmic stabilization: Ext/Flex; IR/ER; D2 Ext/Flex
Advanced Strengthening	• Posterior capsular stretch • Continue all strengthening • Continue rhythmic stabilization • PNF diagonals with tubing • Plyometrics

Posterior Shoulder Instability - Conservative

Phase:	Instructions:
Acute Motion	• Ice / HVGS for pain • Pendulums • Pulleys: Flexion / Abduction • Cane Exercises: Flexion/Abduction/ER • Progress to isometrics: flexion/abduction/ER/extension • Anterior capsular stretch - gentle
Intermediate	• Full ROM before initiating this phase • Isotonic strengthening: flexion; abduction; IR; ER; extension; supraspinatus; prone horizontal abduction • Isolate posterior deltoid • Push-ups: Wall; Table; Floor • ER/IR with tubing at 0 degrees abd • PNF Diagonals: No tubing or weight • Rhythmic stabilization: Ext/Flex; IR/ER; D2 Ext/Flex
Advanced Strengthening	• Anterior capsular stretch • Continue all strengthening • Continue rhythmic stabilization • D2 Extension with tubing • Plyometrics

Open Bankart Anterior Capsulolabral Reconstruction

Time:	Instructions:
0-2 weeks	• Use Ice and HVGS • PROM to tolerance • Cane Exercises to tolerance • Submax isometrics • Rhythmic stabilization
3-4 weeks	• Progress ROM: flexion – 140 degrees; ER 35-45 degrees; IR 45-60 degrees • Shoulder extension • Tubing exercises for ER/IR • Dumbbell: Deltoid; Supraspinatus; Biceps; Scapula • Rhythmic stabilization • PNF diagonals • Capsular stretching
5-6 weeks	• Progress ROM to tolerance: flexion- 160; ER/IR @ 90 degrees abd; Shoulder extension 30-35 degrees • Progress all strengthening exercises
6-7 weeks	• Progress to full ROM by week 7 • Progress ER past 90 for throwing athletes • Thrower's 10 Program • Isotonic strengthening for shoulder and scapula • Manual PNF training
14-20 weeks	• Continue flexibility exercises • Continue isotonic strengthening • Emphasize balance between ER/IR • Manual PNF training • Plyometrics • Interval throwing
6-9 months	• Continue Thrower's 10 • Return to Sport

Posterior Capsular Shift

Time:	Instructions:
0-4 weeks	• Use Ice and HVGS • AROM elbow: Ext/Flex/Pronation/Supination • Shoulder PROM progressing to AAROM • Cane Exercises: Flexion to 90; ER @30-45 abd – 25-30 degrees; IR @30-45 abd – 15-25 degrees • Submax isometrics: Flexion; Abduction; Extension; ER
4-6 weeks	• Cane Exercises: Flexion to tolerance; Abduction 90; ER @ 45 degrees abd; IR @ 45 abd – 35 degrees • Pulleys: Flexion to 90; Abd to tolerance • Gentle capsular stretches • Active ROM: Abd to 90 degrees; ER 0-90 degrees
6-9 weeks	• Cane Exercises and Pulleys: to tolerance • ER/IR – Tubing at 0 degrees abd • Dumbbell: Shoulder abd; flexion; lats; rhomboids; biceps; triceps; shrugs • Wall push-ups
10-12 weeks	• Continue above exercises • Supraspinatus – dumbbell • Progress push-ups
13-15 weeks	• Tubing Exericises: ER/IR; Rhomboid rowing; Lat pulls; Bicep curls; Triceps • Dumbbell: Supraspinatus and Deltoid • Progress Push-up
28-32 months	• Continue Thrower's 10 • Return to Sport

Subacromial Decompression / Distal Clavicle Excision

Time:	Instructions:
0-4 weeks	• Use Ice and HVGS initially • May use heat before and ice following exercise • Pendulums • PROM of shoulder (Avoid shoulder abd >60 degrees) • Capsular stretching: Anterior, Posterior, Inferior • AAROM Shoulder: Flexion; Extension; IR; ER
4-8 weeks	• Moist heat before and ice following exercise • HVGS and Ultrasound for pain management • Increase AROM in all directions (Flexion - 160; Abd – 80; ER – 60; IR – L1) • Use joint mobilization to address capsular restrictions, especially posterior • Begin Isometric Rotator Cuff: ER/IR/Abd • Progress strengthening to Open Chain tubing exercises: IR/ER/Abd/Flex/Ext • Progress to isotonic dumbbell: IR/ER/Abd/Flex/Ext • Scapula stabilization should begin with closed chain exercises focusing on retraction/protraction/depression • Progress scapula stabilization to open chain exercises
8-12 weeks	• Motion should equal unaffected shoulder • Advance rotator cuff and scapula strengthening • Plyometrics • Begin cross body adduction
12-16 weeks	• Thrower's 10 Program • Begin Interval Throwing or Return to Sports Program

Mini-Open Rotator Cuff Repair (Small – Medium Tears)

Time:	Instructions:
1-10 days	• Ice as needed for pain • Sling • Pendulums • Cane Exercises: ER/IR • PROM: Flexion to tolerance; ER/IR in scapular plane • Elbow ROM • Submax isometrics: Flex/Abd/IR/ER/Biceps
7-10 days	• Discontinue sling • Pendulums • PROM to tolerance: Flexion – 115 degrees; ER to 45-55 degrees • Cane Exercises: Flexion/ER/IR • Continue Submax isometrics: Flex/Ext (with elbow at 90); Abduction; ER/IR; Biceps
11-14 days	• Progress PROM: Flexion – 160 degrees; ER – 75 degrees 9@90 Abd); IR – 55-60 degrees • Cane Exercises: Flexion; IR/ER (in scapular plane and at 90 degrees abd) • Rhythmic stabilization: Ext/Flex; ER/IR • Isotonic IR/ER with tubing • Prone Rowing • Initiate active flexion/abduction
3-4 weeks	• Full PROM; Almost complete AROM • Initiate scapula strengthening • Initiate sidelying ER with dumbbell • Isotonic elbow flexion
5 weeks	• Full AROM • Continue AAROM / PROM exercises • Isotonic strengthening: ER tubing; Sidelying IR; Prone Rowing; Prone Horizontal abduction; shoulder flexion (scaption); shoulder abduction; bicep curl
6-11 weeks	• Continue ROM exercises • Rhythmic stabilization: Ext/Flex; IR/ER • ER/IR tubing • ER Sidelying • Supraspinatus (Full can) • Prone Rowing • Prone HA • Prone Extension • Biceps/Triceps
12-19 weeks	• Begin Interval Return to Sports Program

Type 1 or 3 SLAP Repair and/or Partial Rotator Cuff Debridement

Time:	Instructions:
1-10 days	• Ice/E-stim as needed • Pendulums • Pulleys • Cane Exercises: Ext/Flex; Abd; ER/IR • Capsular stretches • At 10 days, initiate ER/IR tubing with arm by side
2-4 weeks	• Isotonic strengthening with dumbbells: shoulder; scapula • Tubing for ER/IR • Sidelying ER • Prone Rowing • Rythmic stabilization – PNF • Initiate PNF exercises
3 weeks	• Thrower's 10 Program • Emphasize Rotator cuff and scapula strengthening • Rhythmic stabilization drills
5-6 weeks	• Thrower's 10 Program • Dumbbell: Deltoid; supraspinatus • Tubing for ER/IR @ 90 abd • Scapula stabilization exercises • Biceps curls – Tubing • PNF – Tubing • Plyometrics
7+ weeks	• Interval throwing and return to sport • Continue all strengthening

Elbow Dislocation

Time:	Instructions:
1-4 days	• Physician may immobilize elbow at 90 degrees in posterior splint for 3-4 days. • Use Ice and HVGS
4-14 days	• Physician may choose to apply hinged elbow brace set at 15-90 degrees • AROM elbow (ext/flex/pronation/supination) avoid any valgus stress • Biceps isometrics at various angles • Wrist curls • Elbow curls with no weight, then progress to 1 lb. • Shoulder exercises avoiding ER
2-6 weeks	• Hinged brace with full ROM setting • Progress wrist and elbow strengthening • Sport-specific exercises and drills
5-6 weeks	• Low-load stretching to increase elbow extension
6-8 weeks	• Initiate shoulder IR/ER exercises

Elbow UCL Sprains – Conservative

Phase:	Instructions:
1	• Ice and compression • AAROM and PROM of the elbow and wrist • Wrist and elbow isometrics • Shoulder strengthening (No ER)
2	• Increase ROM to 0-135 degrees • Isotonic strengthening exercises • Wrist curls • Pronation/Supination • Biceps/Triceps • Shoulder ER/IR, Deltoid, Supraspinatus, rhomboids with dumbbell
3	• Shoulder strengthening with tubing • Thrower's 10 Program • Biceps/triceps with tubing
4	• Interval Throwing Program • Continue Thrower's 10 • Plyometrics

Elbow UCL Repair – Reconstruction using Autogenous Graft

Time:	Instructions:
1 week	• Posterior elbow splint at 90 degrees flexion • Wrist AROM • Shoulder isometrics (No ER) • Biceps isometrics
2 weeks	• Hinged elbow brace at 30-100 degrees • Wrist isometrics • Elbow extension/flexion isometrics • Continue all week 1 exercises
3 weeks	• Adjust brace to 15-110 degrees • Continue all exercises
4 weeks	• Adjust brace to 10-120 degrees • With 1 lb weight: wrist curls; pronation/supination; elbow extension/flexion • Progress shoulder strengthening (Avoid ER)
6 weeks	• Adjust brace to 0-130 degrees. Active elbow ROM 0-145 degrees without brace • Progress elbow strengthening • Initiate shoulder ER strengthening
9 weeks	• Thrower's 10 Program • Manual resistance of D2 Ext/Flex • Initiate eccentric elbow extension/flexion • Initiate plyometrics
11 weeks	• Begin light sport activity
14-26 weeks	• Gradual return to sports

TFCC – Conservative

Time:	Instructions:
0-6 weeks	• Long arm splint with elbow at 70-90 degrees flexion and forearm and wrist in neutral • Splint is worn 18 hours/day for 6 weeks
6 weeks	• A/AAROM for wrist and forearm • AROM is conducted with forearm in neutral • Tendon gliding • FDS/FDP exercises • Ulnar nerve or Median nerve glides • PROM for pronation/supination below pain tolerance • Wrist gauntlet can be used following long arm splint removal
8 weeks	• Strengthening with forearm in neutral position • Isometric grip and hold (May use BP cuff) • Isotonic grip with putty • Isotonic wrist ext/flex with weights
10-12 weeks	• Overhead, torquing, and weight bearing may be initiated if asymptomatic • Once patient is asymptomatic with isometric grip, initiate repetitive grip strengthening

Repair of TFCC Tear (with or without LT Pinning)

Time:	Instructions:
1-2 weeks	• Muenster cast or splint is applied • Shoulder, elbow, and hand AROM are encouraged
4-8 weeks	• Muenster cast is removed and a removable Muenster splint is applied • Elbow extension/flexion are continued but no forearm rotation • Gentle wrist AROM (ext/flex) initiated
8 weeks	• Muenster splint is removed and a neutral wrist splint is applied.
12 weeks	• Progressive A/PROM for the wrist and forearm • Once ROM is pain-free, strengthening is initiated. • Weighted wrist curls • D2 Extension/Flexion with dumbbells or tubing • Plyometrics initiated: wall fall/push-off • Medicine ball throw • Sports-specific exercises for overhead or throwing athletes. • Weighted baton to simulate throwing, shooting, or racquet motions. • Ball-free batting practice • Contact athletes can begin bench press and bench flies with only the bar.
12-24 weeks	• Athlete should be splint free for 3 months before returning to play.

Jersey Finger: Post-operative

Time Frame	Instruction:
0 – 10 days	• DBS: wrist @ 30 degrees flexion; MCP 70 degrees flexion; IP's in neutral • Gentle passive PIP and DIP flexion to 40 degrees within splint • Sutures removed at 10 days
10 days – 3 weeks	• Place in a removable DBS with wrist at neutral and MCP @ 50 degrees flexion • Passive PIP flexion to 90; DIP flexion to 40 degrees within splint • Active MCP flexion to 90 degrees • Active IP extension within DBS
3 – 5 weeks	• Discontinue splint at 5-6 weeks • A/AAROM exercises for MCP/PIP/DIP • Begin place / hold
5 weeks +	• Strengthening • Tendon gliding • PROM / Scar massage • AROM wrist extension/flexion • Composite finger flexion; wrist flexion; then extend wrist and fingers

Thumb UCL Tear – Conservative

Time:	Instructions:
1-4 weeks	• Thumb spica splint immobilization as directed by physician. • Consult physician regarding inclusion of wrist or thumb IP in the splint. • Maintain AROM of uninvolved joints, especially the thumb IP.
4 weeks	• If splint includes the wrist, modify to exclude the wrist. Continue splint wear at all times.
5 weeks	• Initiate PROM of thumb MP
6 weeks	• Initiate dynamic thumb MP splinting if needed. • Begin to wean static splint.
8 weeks	• Initiate strengthening during grip and pinch. • Strengthen the locking of the thumb around 6-8cm cylinder

Frequently Asked Questions

1. **Do therapists ever work on the sideline of games?**

   Yes. In some circumstances therapists, usually PTs, will work the sidelines of games. This is more likely in high school sports or small colleges and universities.

2. **What do you do if a physician orders therapy and an athlete refuses to participate?**

   In this scenario the importance of therapy needs to be explained to the athlete. If the athlete still refuses the therapist needs to discuss this with the coaching staff and physician as this could affect the playing status.

3. **If a physician refers an injured athlete to therapy with a wrist sprain and assessment findings reveal a possible LT injury what should you do?**

   Wrist sprain is a vague diagnosis of soft tissue injury. If there is a good rapport with the physician, discuss your findings the treatment plan. Be prepared to defend and explain your findings to the physician.

4. **You are treating an acute AC joint separation. The patient has significant pain, a step-off deformity, and limited ROM. He is a lineman on a high school football team in the playoffs. The physician gives clearance to play. What do you do?**

   If the athlete or coaching staff is pressuring the physician to allow a player to play and clearance is given, it is the therapist job to recommend equipment modifications, braces, or taping to help to protect the injured player. In this situation, the therapist would discuss the case with the physician and make recommendations to the training staff. Rehab will most likely resume at the end of the season.

5. **Can an athlete with a distal radius fracture actually be allowed to play in a football game?**

   Yes. Depending on the position the athlete plays and the type of fracture and stabilization used, an athlete can play with a distal radius fracture. Most often, the fracture is stable so it is being treated by closed reduction. In this case, the physician will order that the athlete be placed in a playing cast for games.

6. **Should therapists reduce an elbow dislocation on the field of play?**

   No. The therapist should help to protect the elbow and immobilize the arm until the athlete can be seen by a physician. The physician will most likely give a local anesthetic and reduce the dislocation. In addition, a vascular and neurological will need to be performed immediately after .

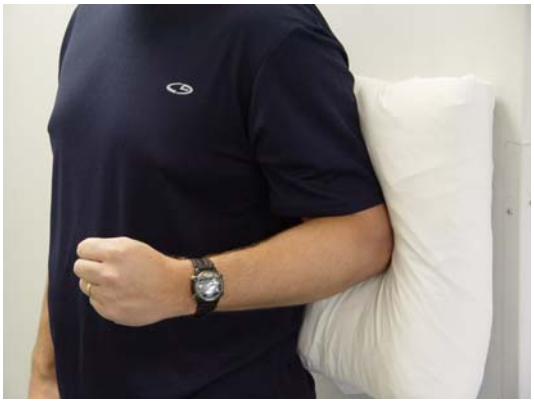
7. **How soon can a pitcher begin rehab following Elbow Collateral Ligament repair?**

   Most often the physician will initiate therapy within 2-3 days post-operative. Initially, the rehab program is slow and protected for the elbow but rehab should include trunk and core strengthening exercises. An athlete needs to maintain peak physical conditioning so rehab can also incorporate cardiovascular training in the early stages and progress them throughout.

Pendulums

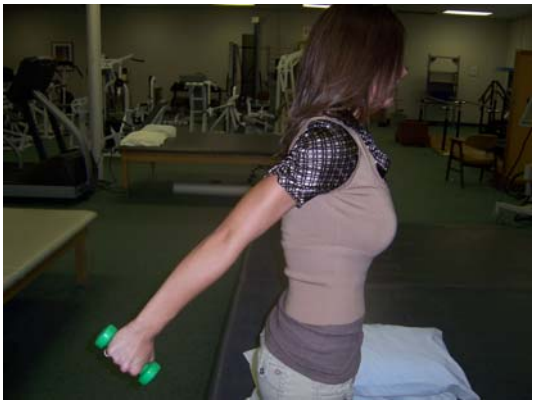
Cane Exercises

Shoulder Isometrics



Isotonic Dumbbell

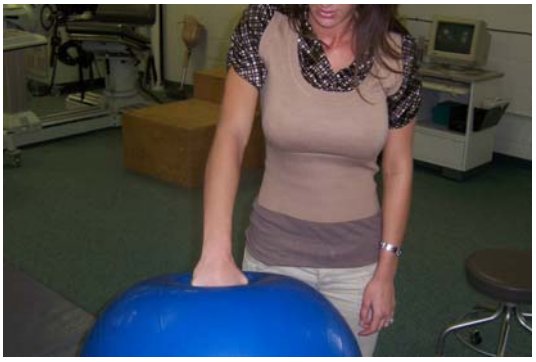
Deltoid

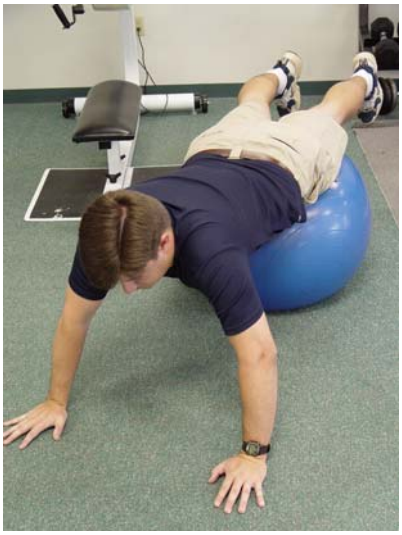


Tubing: Concentric / Eccentric

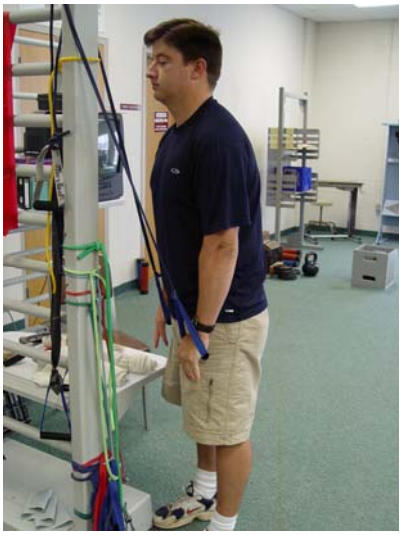
PNF: D2 Extension / Flexion

Closed Chain Scapula

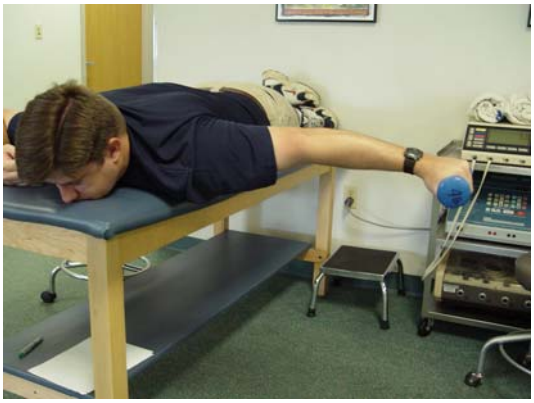




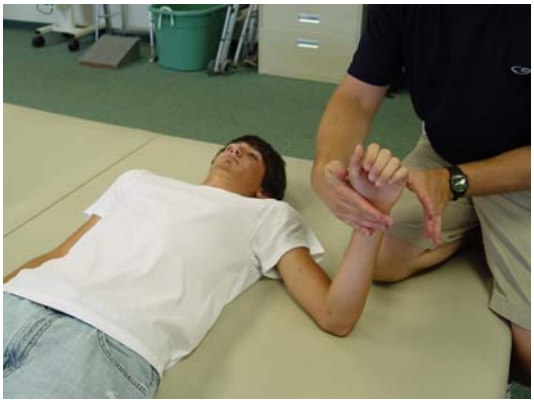
Open Chain Scapula Stabilization



Open Chain Scapula – Dumbbell



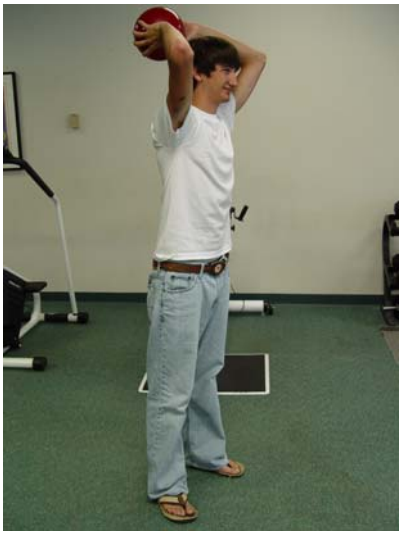
Rhythmic Stabilization

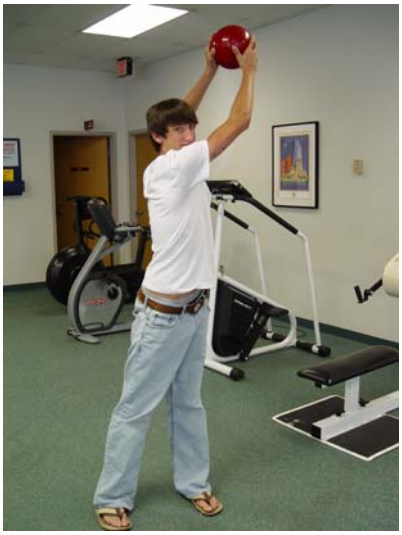


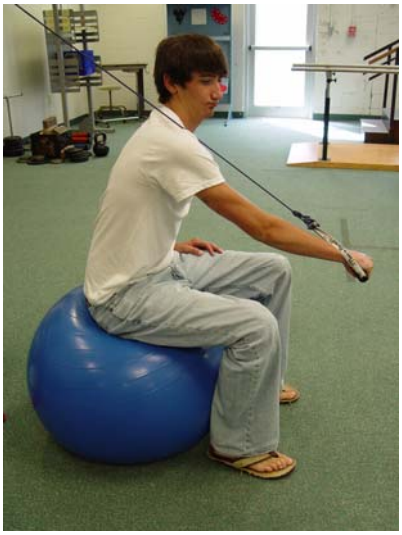
Biceps / Triceps: Dumbbell

Biceps / Triceps: Tubing

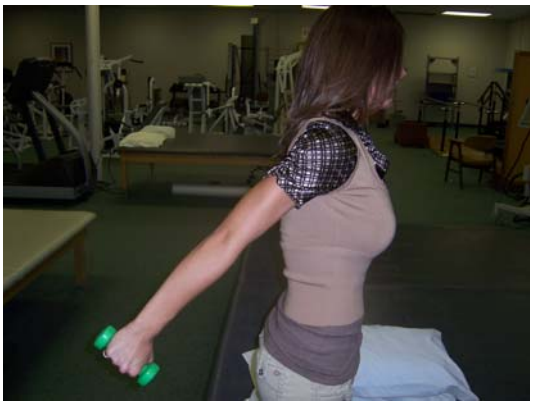
Plyometrics

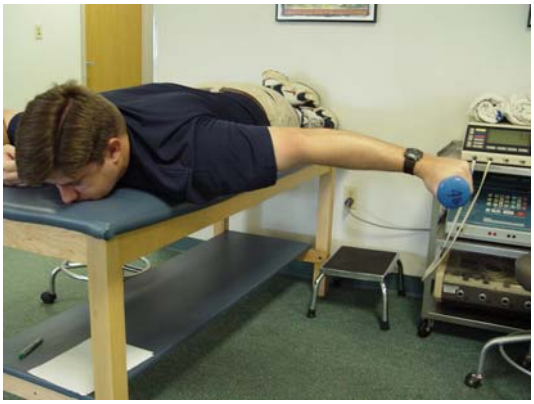




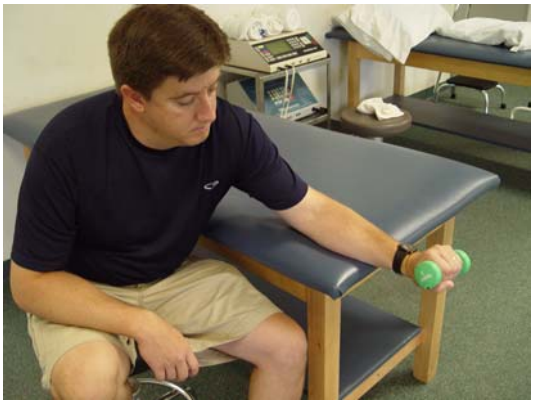


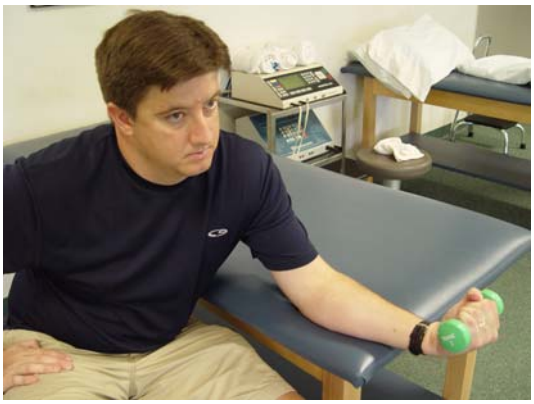
Thrower's 10 Program

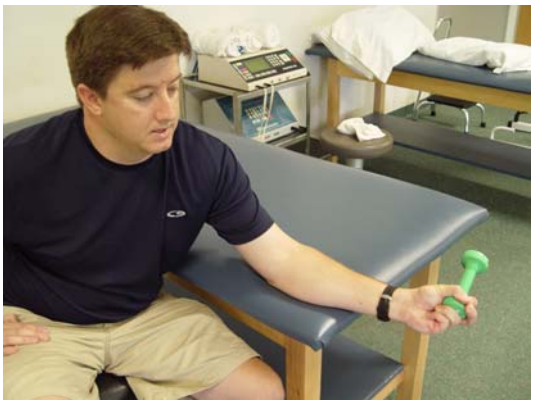


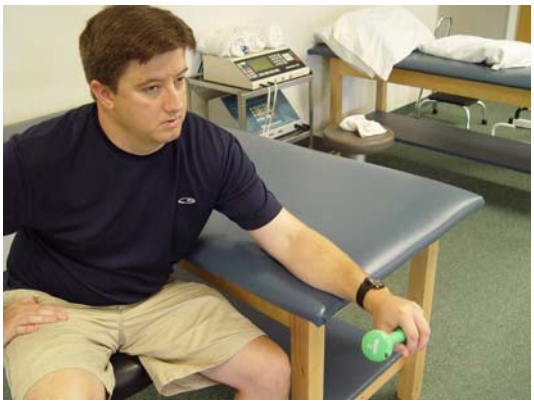



EXIT









Interval Throwing Program

- **Perform stretching exercises prior to and following throwing.**
- **Perform every other day**

40-45': Step 1	• **Warm up with short toss** • **25 Throws @ 45'** • **Rest 10-15 min** • **Perform short toss** • **25 Throws @ 45'**
40-45': Step 2	• **Warm up with short toss** • **25 Throws @ 45'** • **Rest 10-15 min** • **Perform short toss** • **25 Throws @ 45'** • **Rest 10-15 min** • **Warm up with short toss** • **25 Throws @ 45'**
60': Step 3	• **Warm up with short toss** • **25 Throws @ 60'** • **Rest 10-15 min** • **Perform short toss** • **25 Throws @ 60'**
60': Step 4	• **Warm up with short toss** • **25 Throws @ 60'** • **Rest 10 min** • **Perform short toss** • **25 Throws @ 60'** • **Rest 10 min** • **Perform short toss** • **25 Throws @ 60'**
90': Step 5	• **Warm up throwing** • **25 Throws @ 90'** • **Rest 15 min** • **Perform warm up throws** • **25 Throws @ 90'**
90': Step 6	• **Warm up** • **25 Throws @ 90'** • **Rest 10 min** • **Perform warm up throws** • **25 Throws @ 90'** • **Rest 10 min** • **Perform warm up throws**

	• **25 Throws @ 90’**
120’: Step 7	• **Warm up throwing** • **25 Throws @ 120’** • **Rest 15 min** • **Perform warm up throws** • **25 Throws @ 120’**
120: Step 8	• **Warm up** • **25 Throws @ 120’** • **Rest 10 min** • **Perform warm up throws** • **25 Throws @ 120’** • **Rest 10 min** • **Perform warm up throws** • **25 Throws @ 120’**
Continue Program increasing distance to 150’ and 180’ before throwing off the mound	
Fastball Only: Step 1	• **Begin with interval throwing** • **15 Pitches off the mound @ 50%**
Step 2	• **Begin with interval throwing** • **30 Pitches off the mound @ 50%**
Step 3	• **Begin with interval throwing** • **45 Pitches off the mound @ 50%**
Step 4	• **Begin with interval throwing** • **60 Pitches off the mound @ 50%**
Step 5	• **Begin with interval throwing** • **30 Pitches off the mound @ 75%**
Step 6	• **30 Pitches off the mound @ 75%** • **45 Pitches off the mound @50%**
Step 7	• **45 Pitches off the mound @ 75%** • **15 Pitches off the mound @50%**
Step 8	• **60 Pitches off the mound @ 75%**
Step 9	• **45 Pitches off the mound @ 75%** • **15 Pitches in Batting Practice**
Step 10	• **45 Pitches off the mound @ 75%** • **30 Pitches in Batting Practice**
Step 11	• **45 Pitches off the mound @ 75%** • **45 Pitches in Batting Practice**
From this stage progress to throwing breaking balls off the mound, then begin throwing breaking balls in batting practice.	

- **Perform massage, soft tissue mobilization, and ice following**

References

1. Hand and Upper Extremity Rehabilitation: A Practical Guide
   Burke, Higgins, McClinton, et al. 3rd Edition. Elsevier

2. The Athlete's Shoulder
   James Andrews & Kevin Wilk. 1994. Churchill Livingstone

3. Principles and Practice of Orthopaedic Sports Medicine
   Garrett WE, Speer KP, Kirkendall DT. 2000. Lippincott, Williams, and Wilkins

4. Rehabilitation of the Hand and Upper Extremity: 5th Edition
   Mackin, Callahan, Skirven, et al. 2002. Mosby

5. Hand Injuries in Sports
   Strickland JW, Rettig AC. 1992. WB Saunders

6. Clinical Orthopedic Rehabilitation
   Brotzman. Mosby