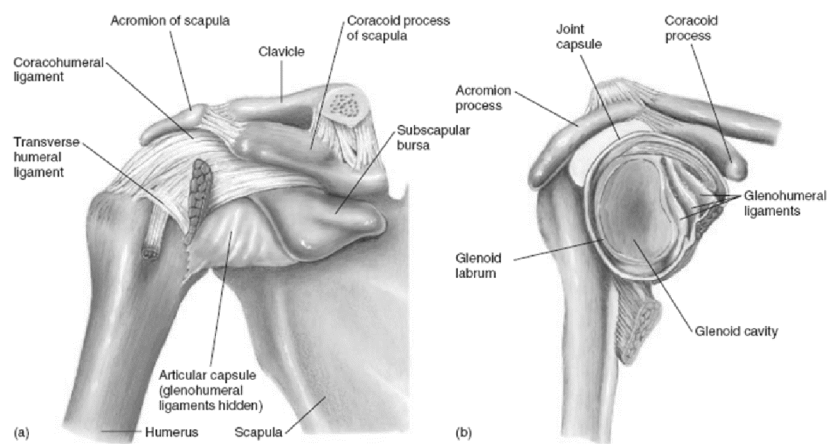


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PATHOLOGY

Shoulder joint



Q 1 /

2

Clavicle Fracture

- ⦿ A clavicle fracture is a break in the clavicle bone (also called the collarbone).
- ⦿ The clavicle can fracture in three different places:
- ⦿ Middle third—the middle portion of the clavicle, which is the most common site for a clavicle fracture.
- ⦿ Distal third—the end of the clavicle connecting to the shoulder.
- ⦿ Medial third—the end of the clavicle connecting to the sternum.



3

Clavicle Fracture

Causes

A clavicle fracture is caused by trauma to the clavicle bone. The trauma is usually caused by:

- Direct blow to the clavicle
- Falling on an outstretched arm

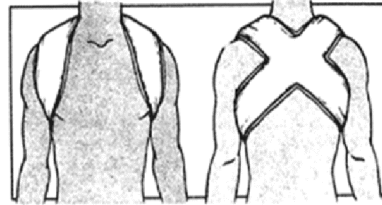
Newborn babies can break a clavicle passing through the birth canal



4

Symptoms

- ◉ Symptoms include:
- ◉ Pain, often severe
- ◉ Sagging shoulder, down and forward
- ◉ Inability to lift the arm because of pain
- ◉ A lump or visible deformity over the fracture site
- ◉ Tenderness and swelling of the affected area



5

Exercises

- ◉ When your doctor decides you are ready, start shoulder range-of-motion and strengthening exercises. You may be referred to a physical therapist to assist you with these exercises. Do not return to sports activity until your clavicle is fully healed.

6

Healing Time

- A child may heal as quickly as 3-4 weeks.
- An adolescent may take 6-8 weeks to heal.
- An adult who has stopped growing may require 8-10 weeks to heal.
- clip

7

Nonoperative Rehabilitation Of Clavicle Fractures

GUIDING PRINCIPLES OF NONOPERATIVE REHABILITATION

- Understand the healing rates of clavicular fractures
- Avoid positions and movements that place the most stress on fracture stability and healing
- Avoid painful ROM and/or strengthening exercises
- Avoid placing stress on the clavicle until radiographic union
- Achieve painless full range of motion and nearly symmetrical strength before return to play

8

Phase I (weeks 0 to 6)

- ◉ **Protection**
- ◉ Sling immobilization at all times
- ◉ Resting positions: lying supine with pillow support;
- ◉ lying on the contralateral side with pillow support

9

Phase I (weeks 0 to 6)

- ◉ **Management of Pain and Swelling**
- ◉ Oral pain medications
- ◉ Cryotherapy
- ◉ Transcutaneous electrical nerve stimulation (TENS)

10

Phase I (weeks 0 to 6)

- ◉ **Techniques for Progressive Increase in Range of Motion:**
- ◉ Initiate manual therapy techniques for IR and ER in the plane of the scapula.
- ◉ **Soft Tissue Techniques**
- ◉ Myofascial release for pectorals, trapezius
- ◉ AROM wrist extension/flexion; pronation/supination;
- ◉ elbow flexion/extension with arm at side; gripping exercises

11

Phase I (weeks 0 to 6)

- ◉ **TBS**
- ◉ Can be incorporated early while wearing the sling
- ◉ Stationary cycling and elliptical trainer
- ◉ Lower abdominals; hip musculature (seated machines)
- ◉ Ball squats, seated LE machines for hamstrings, quads, and hip musculature

12

Phase I (weeks 0 to 6)

- ◉ **Activation of Primary Muscles Involved**
- ◉ Muscle activation of the primary muscles (pectorals, anterior deltoid, upper trapezius, SCM) is not indicated during this healing phase.
- ◉ Submaximal rotator cuff isometrics in the plane of the scapula (PoS).

13

Phase I (weeks 0 to 6)

TIMELINE 7-7: Rehabilitation After Clavicle Fracture

PHASE I (weeks 1 to 6)

- Sling immobilization
- Patient education: sling, activity modification
- PT modalities, prn
- AROM of elbow, wrist, hand
- AAROM of shoulder for plane of scapula IR/ER
- Myofascial release for pectorals
- Postural retraining
- Codman's exercises
- Isometric rotator cuff strengthening as tolerated
- TBS/TAS/TLS activities as recommended and tolerated

14

Phase I (weeks 0 to 6)

- ⦿ **Milestones for Progression to the Next Phase**
- ⦿ No pain at rest
- ⦿ Pain and swelling controlled
- ⦿ Radiographic evidence of union

15

Phase II (weeks 6 to 10)

- ⦿ **Goals**
- ⦿ **Discontinue sling**
- ⦿ **Limit ROM to 90° abduction and forward flexion**
- ⦿ **Begin progressive ROM when signs of radiographic healing**

16

Phase II (weeks 6 to 10)

- ◉ **Management of Pain and Swelling**
- ◉ Oral pain medications
- ◉ Cryotherapy

17

Phase II (weeks 6 to 10)

- ◉ **Manual Therapy Techniques**
- ◉ ROM exercises: passive-to-active assistive-ROM of shoulder flexion/abduction, ER at 90° abduction, IR, scapular mobility in sidelying.
- ◉ **Soft Tissue Techniques**
- ◉ Therapeutic massage for the pectorals, subscapularis, posterior cuff, latissimus, trapezii.

18

Phase II (weeks 6 to 10)

- ⦿ **Stretching and Flexibility Techniques for the Musculotendinous Unit**
- ⦿ Increase ER at 90° abduction with cane/stick
- ⦿ Can begin doorway or corner stretch for pectorals (major and minor).
- ⦿ Pendulum exercises

19

Phase II (weeks 6 to 10)

- ⦿ **TBS**
- ⦿ Stationary cycling, elliptical
- ⦿ Lower abdominals, bridging, gluteals
- ⦿ **TAS**
- ⦿ Avoid carrying heavy weights and traction forces with training program.
- ⦿ Perform pain-free exercise within the available ROM
- ⦿ such as biceps curls, triceps curls, scapular retraction, scapular protraction, extension.
- ⦿ Squats, RDLs, knee extension, knee flexion.
- ⦿ • Machines for hip abd/add, gluteals.

20

Phase II (weeks 6 to 10)

- ◉ Open and Closed Kinetic Chain Exercises
- ◉ Progressive strengthening of the scapular musculature such as rhomboids, serratus anterior, lower trapezius to begin to address force couple involved in shoulder flexion/abduction.
- ◉ Rotator cuff strengthening
- ◉ Hydrotherapy exercises

21

Phase II (weeks 6 to 10)

PHASE II (weeks 6 to 10)

- Discontinue sling
- PT modalities, prn; moist heat, cryotherapy
- Patient education: activity modification, carrying heavy weights
- ROM—Start scapular plane elevation, PROM, AAROM
- Manual therapy, evaluation-based: joint mobilization
- Soft-tissue techniques, evaluation-based: pectorals, subscapularis, latissimus, trapezii.
- Pendulums
- Isometric strengthening of deltoid, trapezius
- Rotator cuff strengthening: PREs
- Periscapular strengthening exercises
- Hydrotherapy
- Upper body ergometry, limited arc
- CKC physioball stabilization
- Rhythmic stabilization
- PROM limited to <90° of abduction
- TBS/TAS/TLS activities as recommended and tolerated

22

Phase III (weeks 10 to 14)

- ⊙ Perform pain-free exercise within the available ROM such as biceps curls, triceps curls, scapular retraction, scapular protraction, extension (dumbbell row).
- ⊙ • Upper body ergometry; use of arms in c-v equipment (row, elliptical, bicycle) progresses pain-free.

23

Phase III (weeks 10 to 14)

- ⊙ Pain should be controlled without medication
- ⊙ ROM exercises for flexion, abduction, ER at 90° abduction, IR.
- ⊙ Stationary cycling, elliptical, utilization of upper body with c-v equipment, pain-free.
- ⊙ Pushing activities such as wall push-ups

24

Phase IV (weeks 15 to 20)

- ◉ **Management of Pain and Swelling**
- ◉ Safe exercise progression
- ◉ Monitor for swelling
- ◉ **Activation of Primary Muscles Involved**
- ◉ Chest press
- ◉ Shrugs
- ◉ Push-ups

25

Phase IV (weeks 15 to 20)

- ◉ **Open and Closed Kinetic Chain Exercises**
- ◉ Progress to single arm ball stabilization
- ◉ Pushup progression
- ◉ **Neuromuscular Dynamic Stability Exercises**
- ◉ Body blade
- ◉ Ball stabilization exercises (single arm)
- ◉ PNF diagonal patterns

26

Phase IV (weeks 15 to 20)

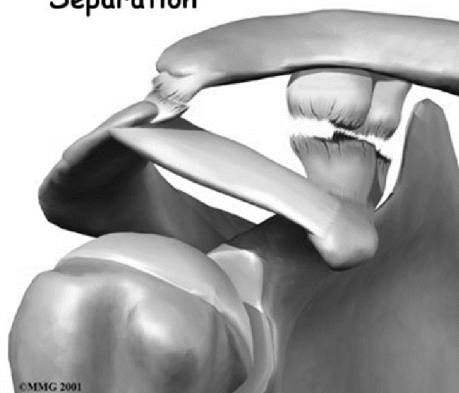
- ◉ **Plyometrics**
- ◉ Activity-specific plyos
- ◉ Ball tosses: chest pass, overhead pass
- ◉ Functional Exercises
- ◉ PNF diagonal pattern progressions

27

Acromioclavicular dislocation

- ◉ **Introduction:**
- ◉ A shoulder separation is a fairly common injury, especially in certain sports.
- ◉ The AC joint is where the acromion and the clavicle meet. *Ligaments* hold these two bones together.
- ◉ Clip

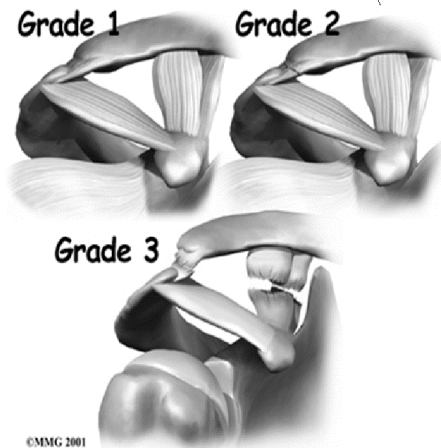
Acromioclavicular
Separation



28

Acromioclavicular dislocation

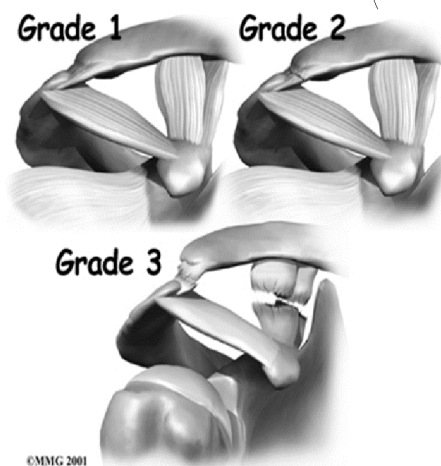
- Ligaments are soft tissue structures that connect bone to bone.
- The *AC ligaments* surround and support the AC joint.
- AC joint separations are graded from mild to severe, depending on which ligaments are sprained or torn.
- The mildest type of injury is a simple sprain of the AC ligaments. Doctors call this a *grade one* injury.



29

Acromioclavicular dislocation

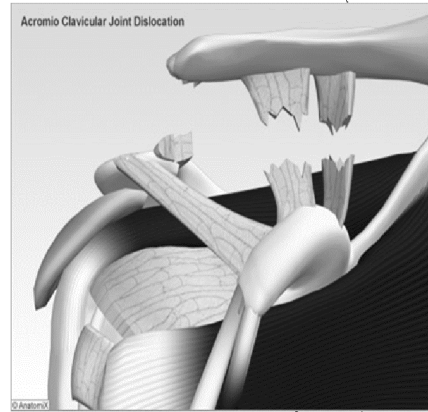
- A *grade two* AC separation involves a tear of the AC ligaments and a sprain of the coracoclavicular ligaments.
- A complete tear of the AC ligaments and the coracoclavicular ligaments is a *grade three* AC separation.
- Clip



30

Causes

- The most common cause of an AC joint separation is **falling on the shoulder**.
- As the shoulder strikes the ground, the force from the fall pushes the scapula down.
- The collarbone, because it is attached to the rib cage, cannot move enough to follow the motion of the scapula.
- The result is that the ligaments around the AC joint begin to tear, separating (dislocating) the joint.



31

Symptoms

- Symptoms range from mild tenderness felt over the joint after a ligament sprain to the intense pain of a complete separation.
- Grade two and three separations can cause a considerable amount of swelling.
- In grade three separations, you may feel a popping sensation due to shifting of the loose joint. Grade three separations usually cause a noticeable bump on the shoulder.

32

Diagnosis

- ⦿ Diagnosis is usually made by the physical examination.
- ⦿ Your doctor may move and feel your sore joint.
- ⦿ This may hurt, but it is very important that your doctor understand exactly where your joint hurts and what movements cause you pain.
- ⦿ Your doctor may order X-rays.
- ⦿ In some cases, X-rays are taken while holding a weight in each hand to stress the joint and show how unstable it is.

33

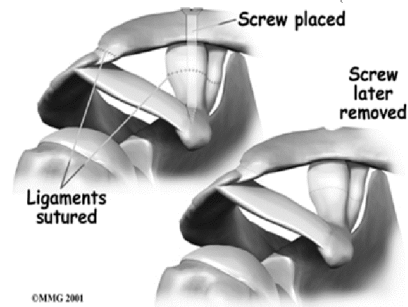
Treatment

- ⦿ **Nonsurgical Treatment:**
- ⦿ Treatment for a grade one or grade two separation usually consists of pain medications and a short period of rest using a shoulder sling.
- ⦿ Your rehabilitation program may be directed by a physical or occupational therapist.
- ⦿ The treatment of grade three AC separations is somewhat controversial.
- ⦿ Many studies show no difference whether a person is treated with surgery or conservative treatment.
- ⦿ Even with surgery, a bump may still be present where the separation occurred. And a significant portion of people who undergo surgery will need another operation later.

34

Treatment

- **Surgery**
- Some surgeons prefer to repair severe grade three AC separations, especially in high-level throwing athletes.
- A screw or some other type of fixation may be used to hold the clavicle in place while the ligaments heal.
- To fix the joint using a screw, the surgeon inserts the screw through the top of the clavicle and into the coracoid process.
- When a screw is used, it is usually removed six to eight weeks after the surgery. If it is not removed, the screw will probably break.



Some surgeons use surgical tape to connect the clavicle and coracoid.
Clip

35

Rehabilitation

- **Nonsurgical Rehabilitation:**
- If you don't need surgery, range-of-motion exercises should be started as pain eases, followed by a program of strengthening.
- At first, exercises are done with the arm kept below shoulder level.
- The program advances to include strength exercises for the rotator cuff and shoulder blade muscles.
- In most cases, the pain goes away almost completely within three weeks.
- Full recovery can take up to six weeks for grade two separations and up to 12 weeks for grade three separations.

36

Rehabilitation

- ◉ **After Surgery:**
- ◉ Your surgeon may have you wear a sling to support and protect the shoulder for a few days.
- ◉ The first few therapy treatments will focus on controlling the pain and swelling from surgery.
- ◉ Ice and electrical stimulation treatments may help.
- ◉ Your therapist may also use massage and other types of hands-on treatments to ease muscle spasm and pain.
- ◉ Therapists usually wait four weeks before starting range-of-motion exercises.

37

Rehabilitation

- ◉ You will probably begin with passive exercises.
- ◉ In passive exercises, the shoulder joint is moved, but your muscles stay relaxed.
- ◉ Your therapist gently moves your joint and gradually stretches your arm. You may be taught how to do passive exercises at home.
- ◉ Active therapy starts six to eight weeks after surgery, giving the ligaments time to heal.
- ◉ Active range-of-motion exercises help you regain shoulder movement using your own muscle power.

38

Rehabilitation

- ⦿ You might begin with light isometric strengthening exercises. These exercises work the muscles without straining the healing joint.
- ⦿ After about three months, you will start more active strengthening. Exercises will focus on improving strength and control of the rotator cuff muscles and the muscles around the shoulder blade.
- ⦿ Recovery from shoulder surgery can take some time.

39

Acromioclavicular Joint Injuries

- ⦿ most common orthopedic injuries to the shoulder in the young athletic population.
- ⦿ 9% or 12% of all injuries to the shoulder.
- ⦿ A majority of injuries affecting this joint occur in the first three decades of life (66%).
- ⦿ AC dislocation has been reported to be more common in males than females (5 : 1 to 10 : 1).

40

Acromioclavicular Joint Injuries

- ⦿ AC dislocation is the most prevalent sports injury to participants in contact sports including hockey, rugby, and American football.
- ⦿ 38.5% of shoulder injuries in athletes.

41

Classification of Injury/Pathological Findings

- ⦿ **Type I Injury**
- ⦿ AC ligament sprain
- ⦿ No displacement on radiographs
- ⦿ **Type II Injury**
- ⦿ AC ligament tear, CC ligaments intact
- ⦿ Lateral end of the clavicle superior in relation to acromion but not 100% displaced.

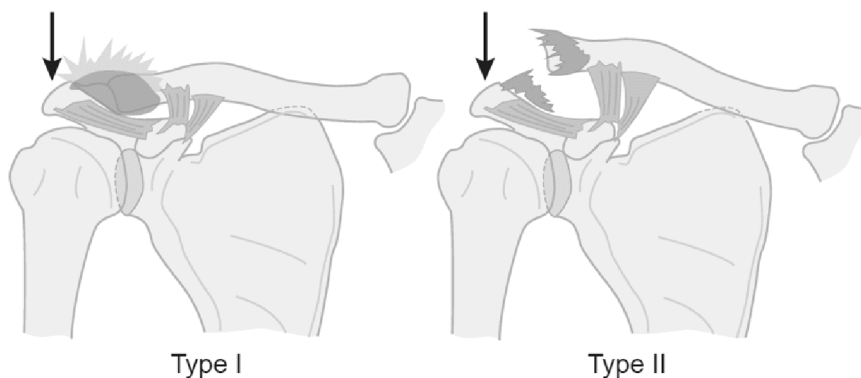
42

Classification of Injury/Pathological Findings

- ◉ **Type III Injury**
- ◉ AC and CC ligaments torn
- ◉ 100% displacement of the clavicle on radiographs.
- ◉ **Type IV Injury**
- ◉ Complete dislocation with posterior displacement of the distal clavicle into or through trapezius muscle.
- ◉ Posteriorly displaced clavicle on axillary radiographs.

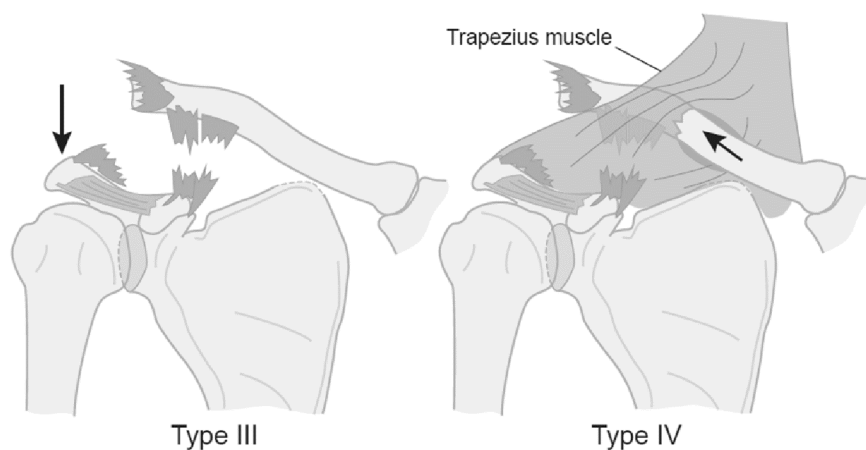
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Classification of Injury/Pathological Findings



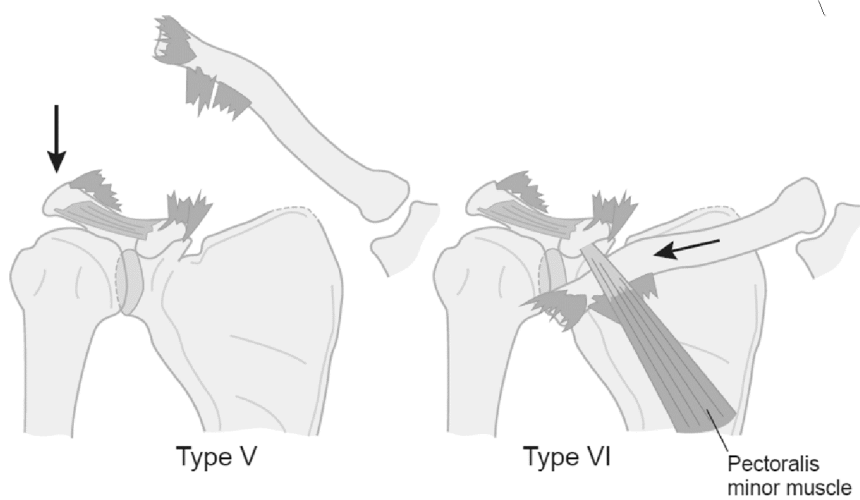
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Classification of Injury/Pathological Findings



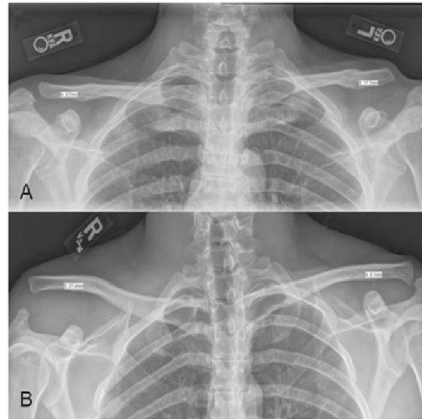
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Classification of Injury/Pathological Findings



46

Classification of Injury/Pathological Findings



47

Physical Examination

- ⦿ Point tenderness
- ⦿ Deformity at the AC joint and is palpable and different from contralateral (uninjured) side.
- ⦿ Pain at AC joint with forward elevation greater than 140° .
- ⦿ Pain at joint with cross-arm adduction
- ⦿ Cross-arm adduction test performed with arm elevated to 90° and then adducted across the chest with the elbow bent at 90°

48

Physical Examination



49

Differential Diagnosis

- ⦿ O'Brien test
- ⦿ **Radiographs**
- ⦿ **Shrug Test**
- ⦿ Used to distinguish type III from type V injuries

50

Treatment

- Type I and II (incomplete injuries) are typically treated nonoperatively
- Type IV, V, and VI (complete injuries) are typically treated operatively due to significance of morbidity
- Type III injuries remain the most controversial.
- Current trends lean more towards initial nonoperative treatment

51

NONOPERATIVE REHABILITATION OF ACROMIOCLAVICULAR JOINT SPRAIN/SEPARATION

52

Phase I (48 hours to weeks 2)

- **Protection**
- Immobilization via a sling is used on as needed basis.
- The amount of time immobilized will vary depending on the grade of injury.
- Grade I separations typically require little to no sling use.
- Grade II separations involve disruption of ligamentous tissue that may result in prolonged periods of pain associated with early phases of tissue healing. During this time, a sling may be required to avoid stress on the AC joint.

53

Phase I (48 hours to weeks 2)

- **Protection**
- The sling is discontinued following cessation of pain with the arm at the side and with self-care activities. Generally speaking, this time period does not exceed 1 week.
- Grades III and V involve complete ligament rupture While sling use up to 4 weeks for these higher-grade AC separations.

54

Phase I (48 hours to weeks 2)

- ◉ **Protection**
- ◉ In all cases, immobilization is discontinued following the cessation of pain at rest with the arm at the side and with self-care activities.
- ◉ **Management of Pain and Swelling**
- ◉ Ice
- ◉ Sling

55

Phase I (48 hours to weeks 2)

- ◉ **Protection**
- ◉ In all cases, immobilization is discontinued following the cessation of pain at rest with the arm at the side and with self-care activities.
- ◉ **Management of Pain and Swelling**
- ◉ Ice
- ◉ Sling

56

Phase I (48 hours to weeks 2)

PHASE I (first 48 hours to weeks 2)

- Sling
 - Grade I—as needed for pain
 - Grade II—up to 2 weeks
 - Grade III—discontinue sling at 2 weeks (earlier if symptoms allow)
 - D/C sling if the patient is no longer having pain with the UE at the side during ADLs
- PT Modalities and Manual Techniques
 - As indicated to reduce pain
- Exercise
 - Closed chain AAROM (table slides, etc.)
 - Supine ER with a cane
 - Isometrics (submaximal, nonpainful)
 - Scapular clocks

57

Phase I (48 hours to weeks 2)



58

Phase I (48 hours to weeks 2)



59

Phase I (48 hours to weeks 2)



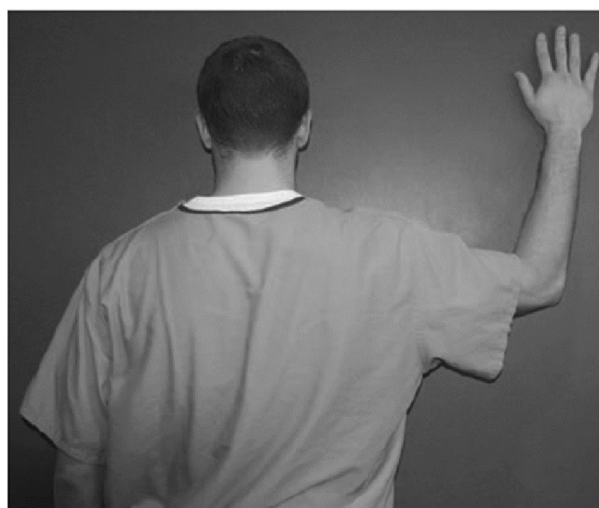
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Phase I (48 hours to weeks 2)



61

Phase I (48 hours to weeks 2)



62

Phase II (weeks 2 to 6)

- ◉ **Conditioning (bike or elliptical)**
- ◉ Nonweight bearing upper extremity core stability (bridge, crunch, etc.)
- ◉ **Activation of Primary Muscles Involved**
- ◉ Isotonic strengthening exercises directed at restoring and maintaining adequate scapular retraction

63

Phase II (weeks 2 to 6)

- ◉ Lower extremity exercise including shoulder dumps ,single leg trunk flexion bends, single leg balance, hip hike, squats.
- ◉ Full active ROM (equal to the uninjured side with visual estimation) without pain.

64

Phase III (weeks 6 to 12)

- ◉ Continued conditioning described in phase II.
- ◉ Initiate upper extremity weight-bearing core stability exercise, e.g., plank, side plank (grades I and II may tolerate before or at 6 weeks).
- ◉ **Activation of Primary Muscles Involved**
- ◉ Isotonic exercises are progressed at this phase with continued emphasis on maintaining scapula retraction.

65

Phase III (weeks 6 to 12)

- ◉ exercise tubing or cable resistance exercises are utilized to progress the strengthening program.
- ◉ Strengthening targeted at the rotator cuff muscles (emphasis on ERs), biceps brachii, pectoralis major, and minor and scapular rotators.
- ◉ PNF utilizing rubber tubing is introduced at this time.

66

Phase III (weeks 6 to 12)

- ◉ Multilevel rows
- ◉ Prone scapula exercises—Is, Ts and Ys (start with no weight and high repetitions to fatigue).
- ◉ IR/ER (tubing/cable)
- ◉ One-hand pushup on wall with light ball
- ◉ Plyometrics
- ◉ 90-90 supine ball toss (Figure 7-13A)
- ◉ Overhead supine ball toss (Figure 7-13B)
- ◉ Medicine ball chest pass

67

Phase III (weeks 6 to 12)



68

Phase III (weeks 6 to 12)



69

Phase IV (weeks 12+)

- ⦿ Return to gym (grades I and II typically can start gym activity at or before 8 weeks).
- ⦿ Bench press at 50% or less than presurgical
- ⦿ Overhead press at 50% or less than presurgical
- ⦿ Continue one hand ball pushup on wall.
- ⦿ **Plyometrics**
- ⦿ Two-handed medicine ball chest
- ⦿ pass, standing two-handed overhead chest pass, singlehand
- ⦿ 90/90 ball toss to upright with rebounder.

70

Sternoclavicular Joint Injury

- ◉ The *sternoclavicular* (SC) joint is important because it helps support the shoulder. The SC joint links the bones of the arms and shoulder to the vertical skeleton.



71

Anatomy

- ◉ Like most joints, the SC joint is made up of two bones covered with a material called *articular cartilage*.
- ◉ The *intra-articular disc ligament* attaches to the first rib and divides the joint into two separate spaces. This ligament is very thick and fibrous.
- ◉ The *costoclavicular ligament* is short and strong. It attaches underneath the clavicle to the first rib just below. It helps steady the SC joint during certain motions.

72

Anatomy

- ◉ The *interclavicular ligament* supports the ends of both clavicle bones near the SC joint. It passes over the top of the sternum, connecting one clavicle to the other.
- ◉ The *capsular ligament* reinforces the capsule that surrounds the SC joint. This ligament keeps the sternum end of the clavicle from pointing up as the other end of the clavicle drops down.

73

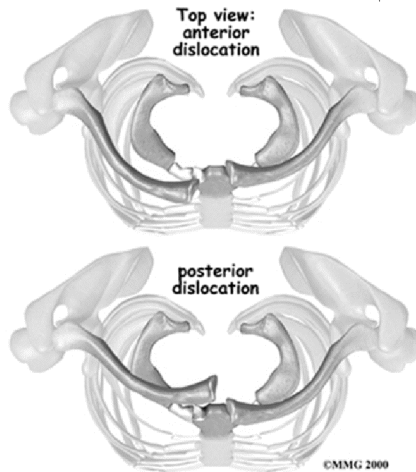
Causes

- ◉ The SC joint is one of the least commonly dislocated joints in the body. Car accidents cause nearly half of all SC dislocations. Sports injuries cause about 20 percent. Falls and other types of accidents cause the rest. These sorts of traumatic injuries can also cause injuries to the physis in people under 25 years old.

74

Causes

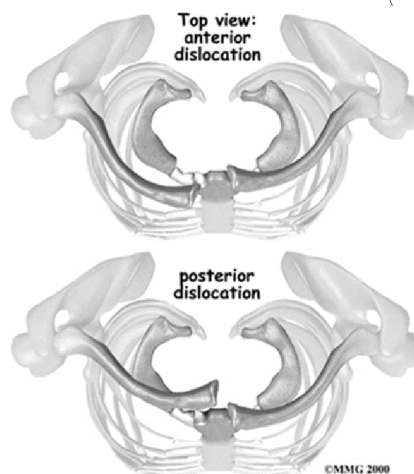
- When the SC joint is dislocated, it is usually an *anterior dislocation*. This means that the clavicle is pushed forward, in front of the sternum. Dislocating in the opposite direction is less common because the ligaments on the back side of the joint are so strong.



75

Causes

- Posterior dislocations can be very dangerous, because the area behind the sternum contains vital organs and tissues. The heart and its large vessels, the trachea, the esophagus, and lymph nodes can all be seriously damaged in a posterior dislocation of the SC joint.



76

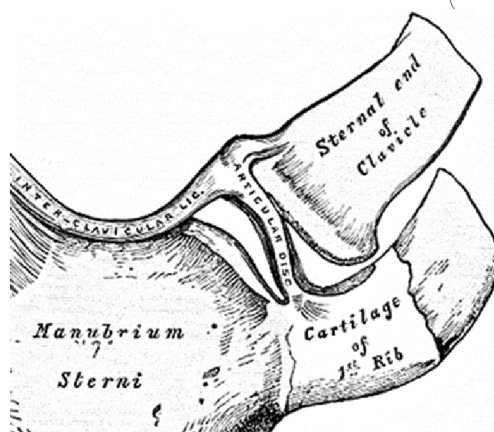
Symptoms: Dislocation

- You will know immediately if your SC joint has dislocated.
- Dislocation causes severe pain that gets worse with any arm movements.
- In anterior dislocation, the end of the clavicle juts out near the sternum. This causes a hard bump in the middle of the chest.
- Posterior dislocations can cause difficulty breathing, shortness of breath, or a feeling of choking. Some patients have trouble swallowing or have a tight feeling in their throats.

77

Sprains

- Sometimes force may only sprain the SC joint. Mild sprains cause pain, but the joint is still stable. In moderate sprains, the joint becomes unstable.



78

Diagnosis

- ⦿ **Nonsurgical Treatment Sprains :**
- ⦿ A mild sprain usually gets better by resting the joint for two to three days. Ice packs can be placed on the sore joint for 15 minutes at a time during the first few days after the injury.
- ⦿ Moderate sprains may require some help to get the joint back into position. A *figure-eight strap* wraps around both shoulders to support the SC joint.

79

Nonsurgical Treatment Sprains :

- ⦿ Patients with a moderate sprain may need to wear this type of strap for four to six weeks. The strap protects the joint from another injury and lets the injured ligaments heal and become strong again.

80

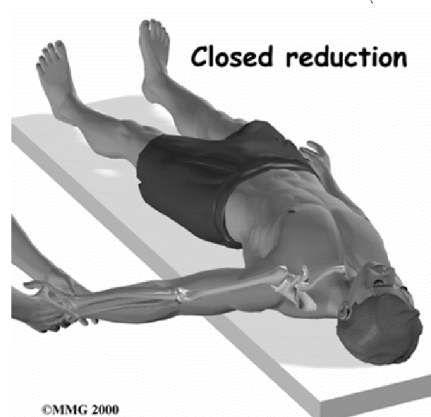
Anterior Dislocation

- ⦿ Doctors have different ways of treating anterior dislocation. Some feel that surgery is needed when the dislocation is severe. Most doctors treat the anterior dislocation by letting it heal where it is or by performing a *closed reduction*.
- ⦿ Closed reduction involves pulling, pushing, and moving the clavicle until it pops back into joint.

81

Posterior Dislocation

- ⦿ If your doctor suspects posterior dislocation, you will need to have a complete physical examination right away. A series of X-rays and CT scans will be needed.



82

Posterior Dislocation

- ⦿ Sometimes closed reduction for a posterior dislocation does not work, or SC joint problems become chronic. In these cases, adult patients may need surgery.
- ⦿ **Surgery:**
- ⦿ If nonsurgical measures fail to relieve your pain, you may need surgery.

83

Rehabilitation

- ⦿ **Nonsurgical Rehabilitation:**
- ⦿ If you don't need surgery, you should start range-of-motion exercises as pain eases, followed by a program of strengthening.
- ⦿ At first, exercises are done with the arm below shoulder level. The program advances to include strength exercises for the rotator cuff and shoulder blade muscles.

84

Rehabilitation

- ◉ You will probably progress to a home program within four to six weeks.
- ◉ **After Surgery:**
- ◉ Your surgeon may have you wear a sling to support and protect the shoulder for a few days.
- ◉ The first few therapy treatments will focus on controlling the pain and swelling from surgery. Ice and electrical stimulation treatments may help. Your therapist may also use massage and other types of hands-on treatments to ease muscle spasm and pain.

85

Rehabilitation

- ◉ Treatments start out with range-of-motion exercises and gradually work into active stretching and strengthening. You need to avoid doing too much, too quickly.
- ◉ Active therapy starts four to six weeks after graft surgery. Active range-of-motion exercises help you regain shoulder movement using your own muscle power. You might begin with light isometric strengthening exercises. These exercises work the muscles without straining the healing joint.

86

Rehabilitation

- ⦿ At about six weeks, you will start more active strengthening. These exercises focus on improving strength and control of the rotator cuff muscles and the muscles around the shoulder blade.

87

NONOPERATIVE REHABILITATION OF STERNOCLAVICULAR JOINT SPRAINS

88

Symptoms

- ⦿ SC joint pathology produces localized pain over the joint surfaces and adjacent capsule.
- ⦿ swelling is usually visually evident
- ⦿ CT or
- ⦿ MRI scan

89

Phase I (weeks 0 to 4)

- ⦿ The SC joint pathology can be divided into those caused by trauma and those of insidious onset.
- ⦿ The acute sprain can be classified into grade I (mild), grade II (moderate) and grade III (severe).
- ⦿ A grade I SC joint sprain is symptom-limited with a fairly rapid return to activity based on resolution of symptoms within 7 to 10 days.

90

Phase I (weeks 0 to 4)

- ◉ **Protection**
- ◉ Grade I: 5 to 10 days in a sling
- ◉ Grade II: 2 to 3 weeks using a sling for anterior instability and “figure of 8” brace for posterior instability.
- ◉ Grade III: 3 to 4 weeks using a sling for anterior instability and “figure of 8” brace for posterior instability.

91

Phase I (weeks 0 to 4)

- ◉ **Management of Pain and Swelling**
- ◉ Ice, Ultrasound, Interferential Current Electrical Stimulation.
- ◉ **Techniques for Progressive Increase in Range of Motion**
- ◉ PROM flexion and scaption:
 - ◉ • 0° to 90° (week 1 to 2) to avoid excessive clavicular retraction, elevation, and posterior rotation on the thorax
 - ◉ • 0° to 180° (week 2 to 3)
 - ◉ • AAROM 0° to 90° flexion and scaption (week 2 to 3)
- ◉ Pendulum exercises
- ◉ • Active elbow and wrist ROM

92

Phase I (weeks 0 to 4)

- Techniques to Increase Muscle Strength, Power, and Endurance
- Week 2 to 3: Submaximal isometric flexion, abduction, IR, ER in neutral; progress to maximal isometric if pain-free
- Week 2 to 3: Active scapular retraction and depression, scapular protraction, biceps curls, triceps extensions

93

Phase II (weeks 4 to 8)

- **Protection**
- • Taping prn for anterior instability



Activate Win

94

Phase II (weeks 4 to 8)

- ◉ Stretching and Flexibility Techniques for the Musculotendinous Unit
- ◉ upper trapezius and
- ◉ pectoralis muscles prn, and strengthening of middle
- ◉ and lower trapezius, rhomboids and deep cervical flexor muscle groups.
- ◉ **Other Therapeutic Exercises**
- ◉ • TBS, Core, TLS as tolerated and recommended

95

Phase II (weeks 4 to 8)

- ◉ Open and Closed Kinetic Chain Exercises
- ◉ press-ups, wall pushup with a plus, table pushup, 4-point weight shifts, prone on
- ◉ elbows, prone ball punches (Figure 7-20), standing ball punches with perturbations, modified pushups, partial ball walk-outs, full-walk-outs and full pushups.

96

Phase II (weeks 4 to 8)

- ◉ Open and Closed Kinetic Chain Exercises



FIGURE 7-20. Prone ball punches.

97

Phase II (weeks 4 to 8)

- ◉ **Techniques to Increase Muscle Strength, Power, and Endurance**
- ◉ Continue total arm strengthening, including bicep curls, triceps extensions.
- ◉ Progress strengthening of scapular stabilizers, posterior cuff, and glenohumeral muscles.
 - ◉ • Prone rows
 - ◉ • Prone GH extension
 - ◉ • Supine protraction
 - ◉ • Horizontal abduction with external rotation
 - ◉ • Sidelying ER
 - ◉ • TheraBand IR/ER

98

Phase II (weeks 4 to 8)

- ◉ Plyometrics
- ◉ two-handed chest level toss, progress to an overhead throw, and then to a single arm 90/90.

99

Phase III (weeks 8 to 12)

- ◉ **Protection**
- ◉ • Taping prn for anterior instability
- ◉ **Management of Pain and Swelling**
- ◉ • Ice, Ultrasound, Interferential Current Electrical Stimulation prn.
- ◉ Open and Closed Kinetic Chain Exercises
- ◉ CKC pushup activity by incorporating an unstable surface, an elevated position (box pushups), or unilateral support.

100

Phase III (weeks 8 to 12)



FIGURE 7-21. Overhead wall dribbles.

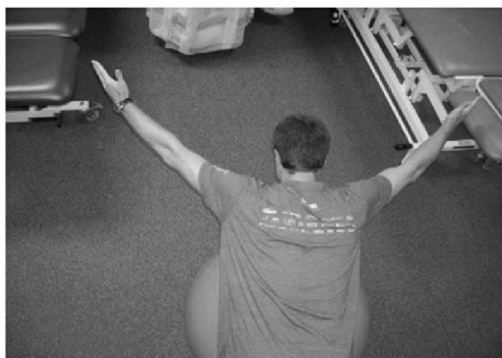


FIGURE 7-24. Prone Y exercise.

101

Phase III (weeks 8 to 12)



FIGURE 7-22. Pushup with ball rolls.



FIGURE 7-23. Pushup with unilateral touches.

102

Phase III (weeks 8 to 12)

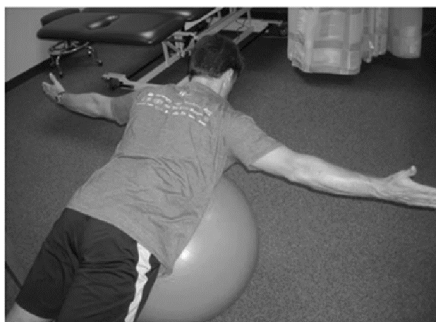


FIGURE 7-25. Prone T exercise.

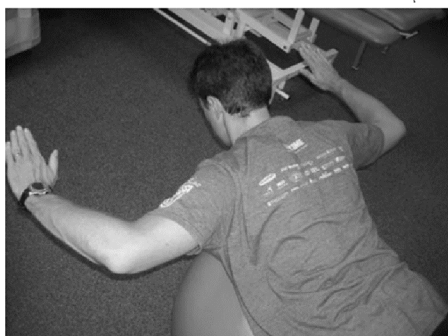


FIGURE 7-26. Prone goalpost exercise.

103

Phase III (weeks 8 to 12)

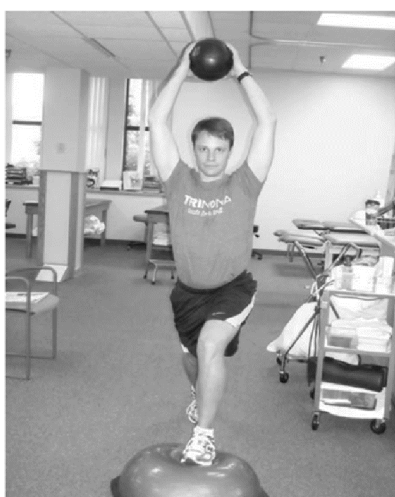


FIGURE 7-27. Lunge with overhead press.



FIGURE 7-28. Squat with overhead press.

104

پارگی تاندون عضله فوق خاری

Rotator Cuff Tears



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- آناتومی:
- از حفره فوق خاری به برجستگی بزرگ استخوان بازو می چسبید.
- این آسیب غالباً در ورزشکاران مسن اتفاق می افتد.
- بعد از یک دوره بی تمرینی، مجدداً تمرین را شروع می کنید.
- در ورزشهایی از قبیل هندبال، فوتبال آمریکایی، تنیس، بدمینتون، کریکت و ورزشهای پرتابی اتفاق می افتد.
- این عارضه در جوانان رشته کشتی، وزنه برداری و ورزشهای پرتابی و راکتی شایع است.

105

Tears of the subscapularis

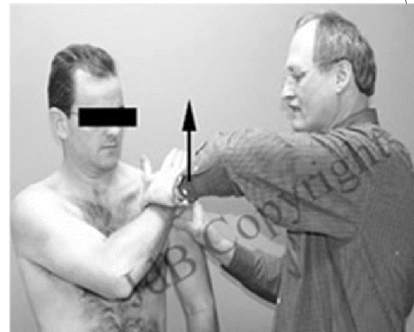
- These are often due to injuries e.g. the patient falls with an outstretched arm or the arm is forced backwards through some force.
- Some **tears** can also be due to degeneration ("wear and tear"). Note that **tears** of the subscapularis may be isolated or in combination with the rest of the rotator cuff tendons often with supraspinatus.



106

Diagnosis

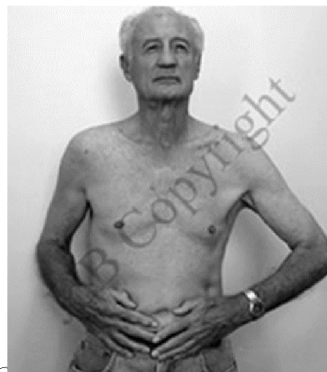
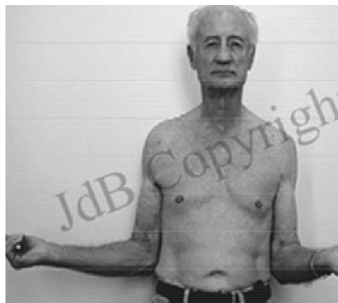
⦿ Diagnosis



107

Diagnosis

⦿ Radiological diagnosis:



108

Diagnosis

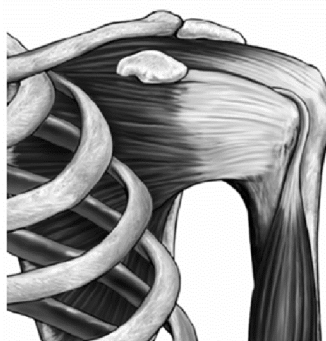
- ⦿ **MRI**
- ⦿ **Ultrasound**



109

Dislocation of long head biceps

- ⦿ The biceps muscle has two tendons at the shoulder, called the Long Head and Short Head.
- ⦿ The Long Head of Biceps is a very important tendon that travels through the shoulder joint (glenohumeral joint). The biceps tendon begins at the top of the shoulder socket and then passes across the front of the shoulder to connect to the biceps muscle.

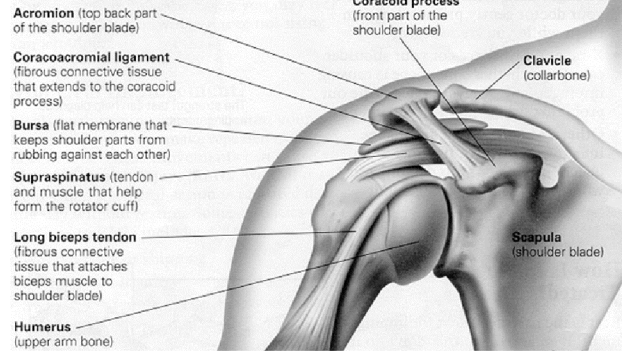


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110

Dislocation of long head biceps

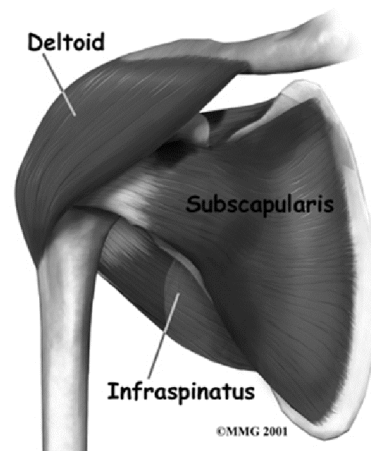
A Normal Shoulder



111

SHOULDER & UPPER ARM INJURIES - Deltoid Muscle Strain/Rupture

- Tears of the **Deltoid Muscle** do not occur very often, but do occur in handball and volleyball players, American footballers, weightlifters and wrestlers.
- In most cases the muscle is damaged by direct impact, but can also be injured by overuse. The tear actually affects a small part of the muscle. This will make it difficult to raise the arm upwards.



112

Symptoms for Deltoid Muscle Strain

- ⦿ A sudden sharp pain in the muscle at the back of the shoulder.
- ⦿ Pain when lifting arms from the side out and backwards against resistance, when keeping the arm straight (**extension**)
- ⦿ Swelling and tenderness at the site of the muscle

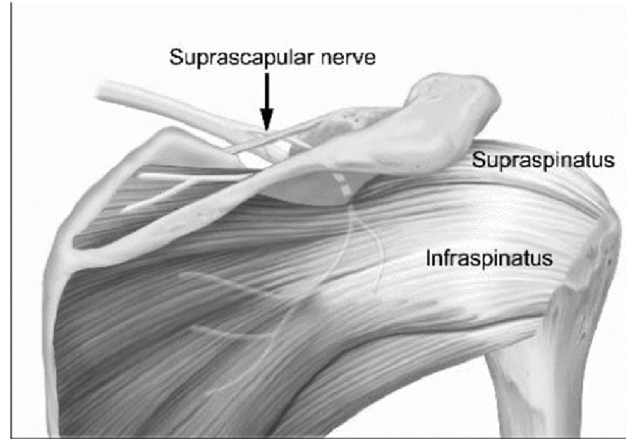
113

Treatment

- ⦿ For the first 48hrs apply ice 15 minutes each time, but not directly to the skin, wrap in a wet cloth.
- ⦿ rest

114

Suprascapular nerve injuries

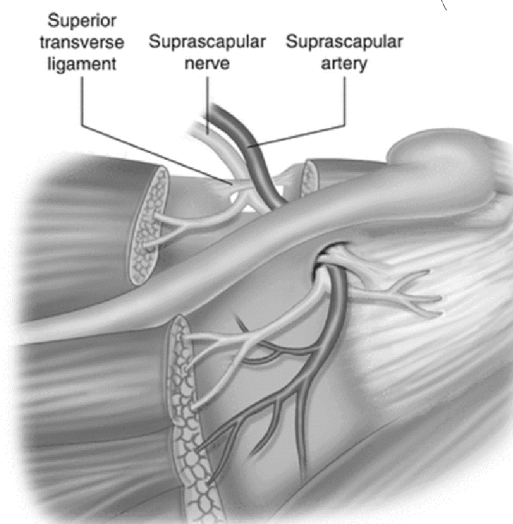


- Peripheral **nerves** are highly susceptible to **injury** result of trauma, repetitive overuse from stretch and compression. Both of these mechanisms result in **nerve ischemia, edema, microenvironmental changes, and conduction impairment.**

115

Suprascapular nerve injuries

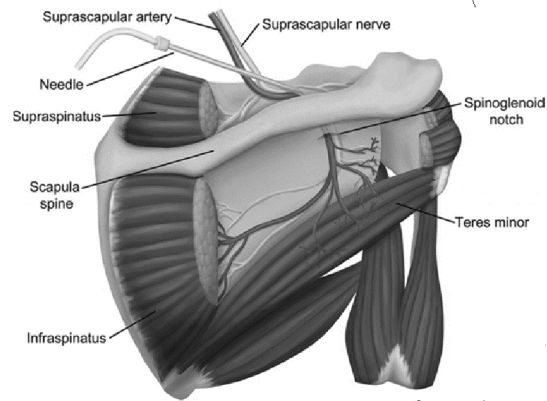
- Traumatic causes of Suprascapular **nerve injury** include
- scapular fractures, clavicular fractures, shoulder dislocations.



116

Clinical Evaluation

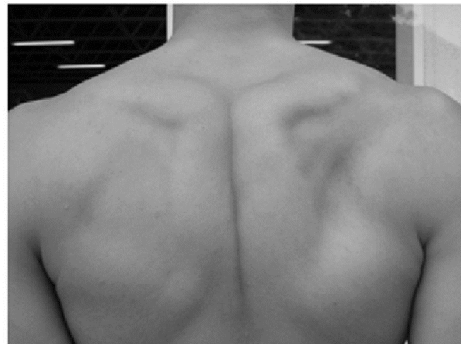
- The typical patient is between the ages of twenty and fifty years.
- The most common presenting symptom is pain, which is typically located in the posterior aspect of the shoulder, characterized as a dull ache, and exacerbated by overhead activities.



117

Clinical Evaluation

- Patients may also have weakness of the affected shoulder.
- A substantial number of patients may present with weakness as the chief symptom, with little or no pain. Certain patients may be completely asymptomatic, and the atrophy may be detected as an incidental finding.



118

Physical Examination

- ⦿ A common finding associated with Suprascapular **nerve injury** is atrophy of the scapular muscles. Atrophy of the **supraspinatus** muscle may be difficult to appreciate because of the overlying trapezius muscle.
- ⦿ Weakness may be demonstrated on abduction or external rotation, depending on the location of the **nerve injury**. External rotation strength is a result of both the infraspinatus and the teres minor muscle; therefore, loss of function of the infraspinatus contribution may be difficult to identify.

119

Treatment

- ⦿ The initial treatment includes avoidance of activities that result in trauma and irritation to the **nerve**.
- ⦿ These activities vary from patient to patient but typically involve repetitive overhead motions.
- ⦿ This treatment should be combined with a rehabilitation program to enhance flexibility of the surrounding muscles of the glenohumeral joint and a gradual strengthening program of the scapular stabilizing muscles.

120

Treatment

- Later, the rotator cuff should be strengthened and advancement in the rehabilitation program should be monitored closely to avoid reinjure to the **nerve** while it is healing. The results of nonoperative treatment depend on the etiology and location of the **nerve** lesion.

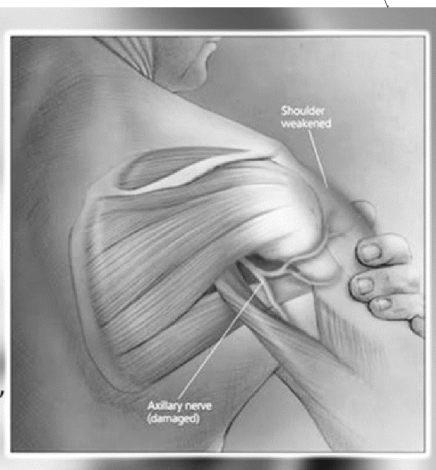
121

Axillary nerve injury

Sensory function: sensation of an oval shaped area over the lateral shoulder "sergeant's patch"

Motor function: it innervates the deltoid (shoulder abduction) and teres minor (shoulder external rotation) muscles.

Common causes of injury: Trauma, usually with shoulder dislocation or humeral fracture, iatrogenic



122

Mode of injury

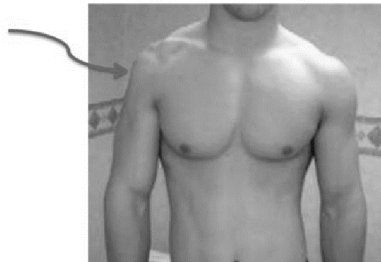
- ⊙ Conditions associated with axillary nerve dysfunction include:
- ⊙ Fracture of the upper arm bone
- ⊙ Pressure from casts or splints
- ⊙ Improper use of crutches
- ⊙ Shoulder dislocation
- ⊙ Body-wide disorders that cause nerve inflammation

123

Symptoms

AXILLARY NERVE (C5 – C6) INJURY

Loss of deltoid contour and greater tuberosity prominent.



- *Clinical features: inability to abduct the arm because of the paralysis of the deltoid and teres minor.*
 - *Muscle wasting, can be observed by the loss in contour over the shoulder.*
- Sensory loss is minimal and seen in the lower half of the muscle*

124

Symptoms

- ⦿ Numbness over part of the outer shoulder
- ⦿ Shoulder weakness
- ⦿ Difficulty lifting objects with the sore arm
- ⦿ Difficulty lifting arm above the head

125

Exams and Tests

- ⦿ Your health care provider will examine the arm and shoulder. There may be weakness of the shoulder with difficulty moving the arm.
- ⦿ The deltoid muscle of the shoulder may show signs of muscle atrophy.
- ⦿ Tests that reveal axillary nerve dysfunction may include:
- ⦿ EMG -- will be normal right after the injury; it should be performed several weeks after the injury or symptoms start
- ⦿ Nerve biopsy
- ⦿ MRI

126

Treatment

- ⊙ Anti-inflammatory medications may be given if you have sudden symptoms, These medicines reduce swelling and pressure on the nerve. They may be injected directly into the area or taken by mouth.
- ⊙ Surgery
- ⊙ Physical therapy may help you maintain muscle strength

127

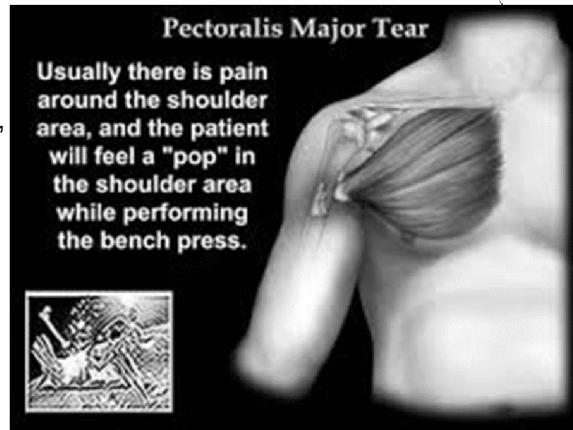
آسیب عصب سینه ای

- ⊙ عضله دندانه ای قدامی را عصب دهی می کند.
- ⊙ در وزنه برداران و شناگران پشت وجود دارد.
- ⊙ علائم:
- ⊙ بال کبوتری شدن کتف
- ⊙ درد
- ⊙ در صورت وجود عارضه کتف بیرون می زند.
- ⊙ درمان:
- ⊙ داروهای ضد التهاب
- ⊙ تمرینات مقاومتی

128

Rupture of the pectoralis major muscle

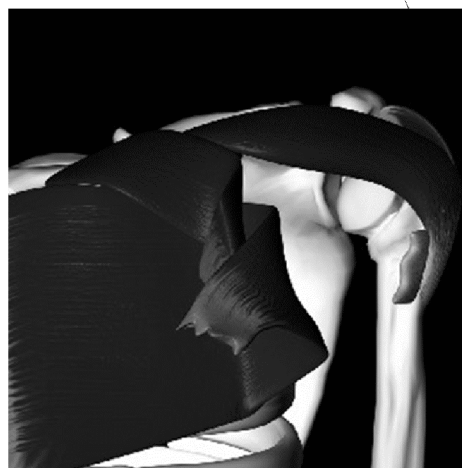
- Pectoralis major tendon rupture is a relatively rare injury, resulting from violent, eccentric contraction of the muscle. Over 50% of these injuries occur in athletes, classically in weight-lifters during the 'bench press' maneuver.



129

Anatomy

- As a result of the anatomy, the fibers of the sterno-costal head are maximally stretched during activities when the arm is abducted, externally rotated and extended such as during a bench press.



130

Diagnosis of injury

- ⦿ local tenderness
- ⦿ bruising and loss of contour of the pectoralis major muscle .
- ⦿ Significant weakness of adduction and internal rotation of the arm were also noted.



131

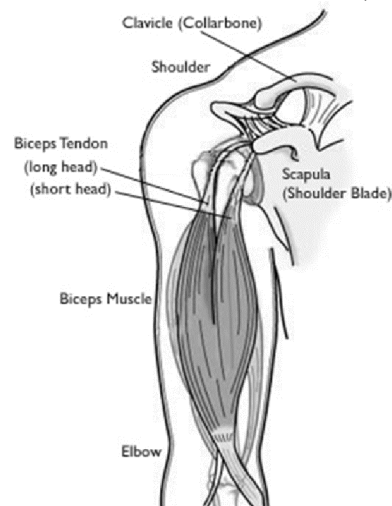
Rehabilitation

- ⦿ (1) elbow exercises from day 1
- ⦿ (2) Isometric rotator cuff and pectoralis major strengthening was permitted with the shoulder in neutral rotation at 2 weeks along with passive external rotation within the documented 'safe arc'.
- ⦿ (3) Progressive physiotherapy included range of motion, strengthening and endurance exercises.

132

Biceps Tendon Tear at the Shoulder

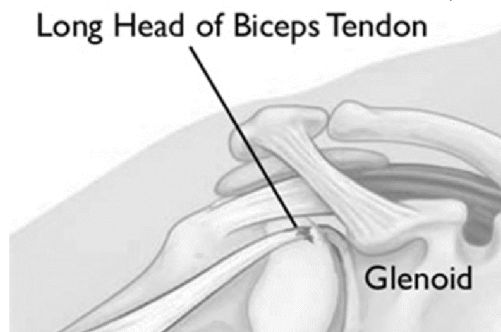
- ⦿ The biceps muscle is in the front of your upper arm. It helps you bend your elbow and rotate your arm.
- ⦿ The upper end of the biceps muscle has two tendons that attach it to bones in the shoulder.



133

Biceps Tendon Tear at the Shoulder

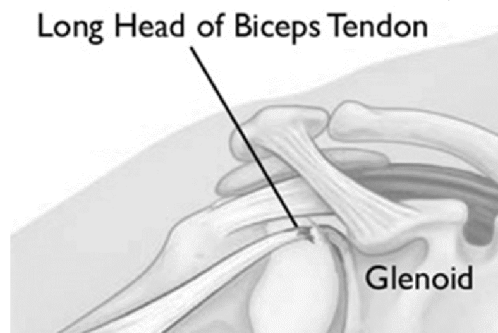
- ⦿ The long head attaches to the top of the shoulder socket (glenoid). The short head attaches to a bump on the shoulder blade called the coracoid process.



134

Description

- ⦿ Biceps tendon tears can be either partial or complete.
- ⦿ **Partial tears.** Many tears do not completely sever the tendon.
- ⦿ **Complete tears.** A complete tear will split the tendon into two pieces.



135

Cause

- ⦿ There are two main causes of biceps tendon tears: injury and overuse.
- ⦿ **Injury:** If you fall hard on an outstretched arm or lift something too heavy, you can tear your biceps tendon.
- ⦿ **Overuse:** Many tears are the result of a wearing down and fraying of the tendon that occurs slowly over time. This naturally occurs as we age.

136

Risk Factors

- **Age**
- **Heavy overhead activities:** Too much load during weightlifting is a prime example of this risk, but many jobs require heavy overhead lifting and put excess wear and tear on the tendons.
- **Shoulder overuse.** Repetitive overhead sports - such as swimming or tennis - can cause more tendon wear and tear.
- **Smoking.** Nicotine use can affect nutrition in the tendon.
- **Corticosteroid medications.** Using corticosteroids has been linked to increased muscle and tendon weakness.

137

Symptoms

- Sudden, sharp pain in the upper arm
- Sometimes an audible pop or snap
- Cramping of the biceps muscle with strenuous use of the arm
- Bruising from the middle of the upper arm down toward the elbow
- Pain or tenderness at the shoulder and the elbow
- Weakness in the shoulder and the elbow
- Difficulty turning the arm palm up or palm down
- Because a torn tendon can no longer keep the biceps muscle tight, a bulge in the upper arm above the elbow ("Popeye Muscle") may appear, with a dent closer to the shoulder.

138

Symptoms

- ◉ The diagnosis is often obvious for complete ruptures because of the deformity of the arm muscle ("Popeye Muscle").
- ◉ Partial ruptures are less obvious. To diagnose a partial tear, your doctor may ask you to bend your arm and tighten the biceps muscle. Pain when you use your biceps muscle may mean there is a partial tear.
- ◉ **X-rays**
- ◉ **Magnetic resonance imaging (MRI)**



139

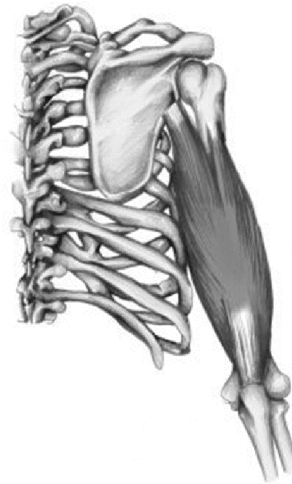
Nonsurgical Treatment

- ◉ **Ice.** Apply cold packs for 20 minutes at a time, several times a day to keep down swelling. Do not apply ice directly to the skin.
- ◉ **Nonsteroidal anti-inflammatory medications.** Drugs like ibuprofen, aspirin, or naproxen reduce pain and swelling.
- ◉ **Rest.** Avoid heavy lifting and overhead activities to relieve pain and limit swelling. Your doctor may recommend using a sling for a brief time.
- ◉ **Physical therapy.** Flexibility and strengthening exercises will restore movement and strengthen your shoulder.

140

Inflammation and rupture of the *triceps* tendon

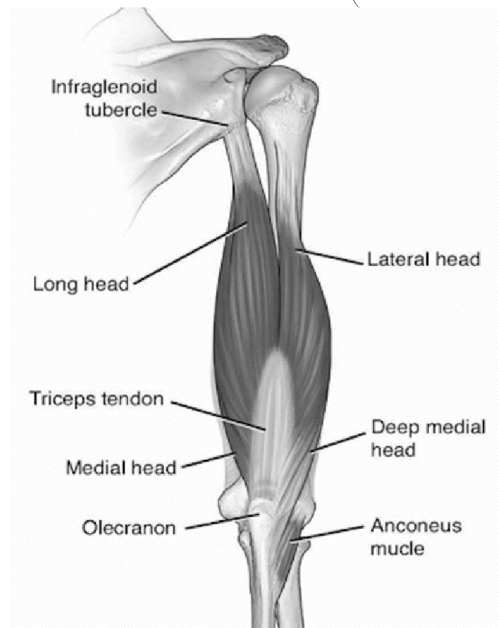
- ◉ The triceps tendon is the one at the back of the upper arm - as shown opposite. It inserts into the back of the elbow. If you fall onto your hands you can rupture this tendon. If you over-do the weights or try to push something too heavy you can also rupture the tendon or it could become inflamed through over use.



141

Symptoms

- ◉ Elbow pain at rest and during exercise.
- ◉ A painful swelling on the back of the elbow.
- ◉ Limited mobility in the elbow.



142

Treatment

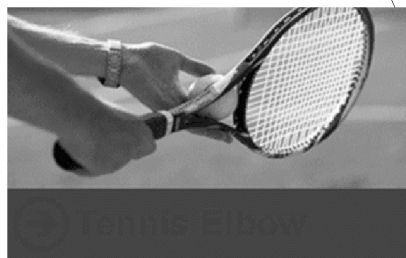
- ◉ Rest.
- ◉ Apply ice or cold therapy to the injury in the first two days.
- ◉ See a sports injury professional for advice on treatment and rehabilitation.



143

Tennis Elbow (Lateral Epicondylitis)

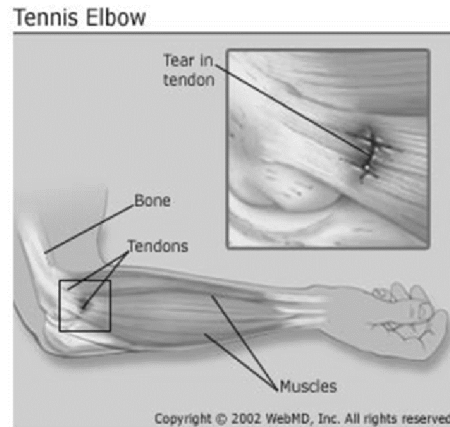
- ◉ Tennis elbow involves inflammation of the tendons (tendonitis) on the outside of the elbow at or below the lateral epicondyle due to repetitive strain.
- ◉ It is caused by repetitive extension (bending backwards) of the wrist and fingers or tasks that require repetitive squeezing and gripping.



144

Tennis Elbow (Lateral Epicondylitis)

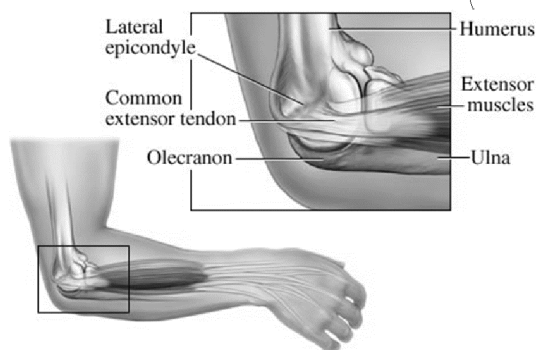
- Sporting overuse during tennis may be due to:
- Poor backhand and forehand technique – hitting the ball with a bent or limp wrist. Hitting the shot late and therefore not getting the body behind the ball to generate the power from the body not just the arm.
- Snapping and turning the wrist during service.



145

Tennis Elbow Symptoms

- Elbow pain and tenderness at or below the lateral epicondyle (the outer bony part of the elbow)
- Tenderness to the touch around the same area.
- Weakness of the wrist with difficulty performing simple tasks
- Symptoms worse in the morning
- Tennis Elbow pain aggravated by
 - Extending (bending backwards) wrist and fingers
 - Grasping or holding objects with the hand



146

What you can do

- ⦿ Ice therapy
- ⦿ Rest with gradual return to normal activity level. A training diary may be useful to help monitor the level of activity that can be performed without aggravating symptoms and regulate progress.
- ⦿ Take anti-inflammatory medication (speak to pharmacist or doctor about a suitable product)
- ⦿ Use of wrist band. This is worn below the elbow and takes the strain off the muscles attachments at the elbow

147

Prevention

- ⦿ **Tennis specific advice – the following changes can help reduce the load on the elbow:**
- ⦿ Racquet material – the use of a graphite frame and nylon strings
- ⦿ Racquet size – midsize racquets better than oversized
- ⦿ Decrease string tension
- ⦿ Grip size – not too large or too small
- ⦿ **At home**
- ⦿ The avoidance or reduction of repetitive tasks that aggravate symptoms.

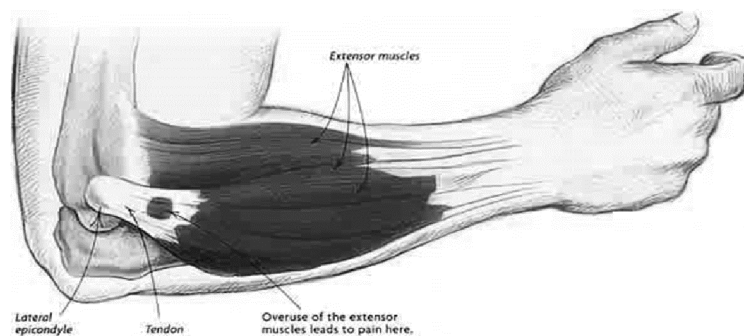
148

Tennis Elbow Exercises

- ⦿ Prescription of stretches of finger and wrist extensors to limit of pain free range. Initially held for 10-15 seconds and building up to 40 seconds duration repeated 5 times daily.
- ⦿ Prescription of strengthening exercises as permitted by pain
 - Initially isometric exercises – muscle held in fixed position
 - Then Concentric exercises – muscles working and shortening
 - Finally Eccentric exercises – muscle working but lengthening

149

Medical treatment (if physical therapy does not work)



- ⦿ Steroid injection – up to 2 or 3 injections per year to reduce inflammation (more injections will decrease strength of tendon)
- ⦿ Surgery – last resort, good success rates.

150

Tennis Elbow (Lateral Epicondylitis)



151

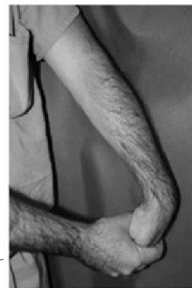
Cause

- ⊙ **Overuse**
- ⊙ **Activities**
- ⊙ **Age:** Most people who get tennis elbow are between the ages of 30 and 50, although anyone can get tennis elbow if they have the risk factors. In racquet sports like tennis, improper stroke technique and improper equipment may be risk factors.
- ⊙ **Unknown**
- ⊙ Lateral epicondylitis can occur without any recognized repetitive injury. This occurrence is called "insidious" or of an unknown cause.

152

Nonsurgical Treatment

- ⦿ **Rest**
- ⦿ **Non-steroidal anti-inflammatory medicines.** Drugs like aspirin or ibuprofen reduce pain and swelling.
- ⦿ **Physical therapy**
- ⦿ **Brace**
- ⦿ **Steroid injections**



153

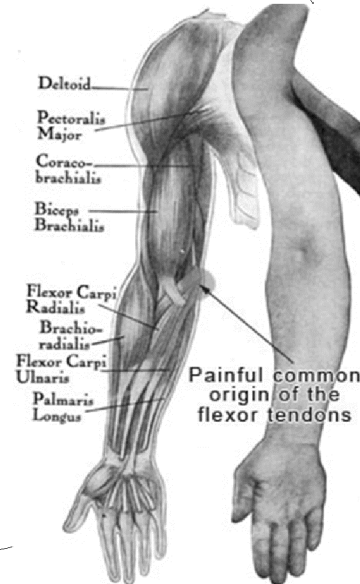
Rehabilitation

- ⦿ Following surgery, your arm may be immobilized temporarily with a splint. About 1 week later, the sutures and splint are removed.
- ⦿ After the splint is removed, exercises are started to stretch the elbow and restore flexibility. Light, gradual strengthening exercises are started about 2 months after surgery.

154

Golfers Elbow

- Just as tennis elbow causes pain in others besides tennis players, golfer's elbow causes pain in those who are not golfers.
- The pain is on the inside of the elbow with golfer's elbow and on the outside of the elbow with tennis elbow.



155

Sources of repetitive movement

- Golf
- Improper pitching
- Painting
- Typing
- Raking
- Hammering
- Excessive top spin when using a racquet

156

Symptoms of golfer's elbow

- ⦿ Pain and tenderness located on the inside of the elbow
- ⦿ When gripping objects there is a shooting painful sensation along forearm
- ⦿ Stiffness
- ⦿ Weakness in hands and wrists
- ⦿ Pain when flexing elbow

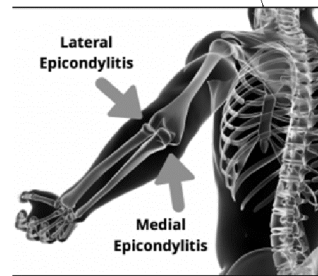
157

Treatment

- ⦿ One of the first steps to treating golfer's elbow is to let the elbow rest from the activity that caused it in the first place.
- ⦿ Using anti-inflammatory over the counter medications can be effective to relieve pain.
- ⦿ Putting ice on the effected area is a treatment option. When applying ice, be sure to protect the skin from ice burn.

158

Epicondylitis



159

Epidemiology

- ◉ **Age/ Sex:**
- ◉ 35 to 50 years
- ◉ Females and males
- ◉ **Sport:**
- ◉ Tennis
- ◉ Golf
- ◉ Occupations or hobbies with repetitive activities
- ◉ 1% to 3 % of population affected
- ◉ Adults: 35 to 50 %
- ◉ Elite: 11 to 13 %

160

Pathophysiology

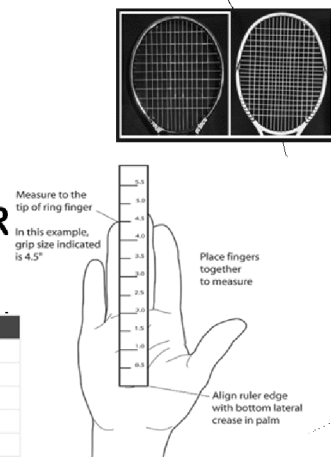
- ⦿ **Intrinsic Factors:**
- ⦿ Proximal strength deficits at the scapula and GH joint
- ⦿ GH flexibility deficits
- ⦿ Poor weight shifting during backhand, late back swing
- ⦿ Increased wrist extension at ball impact
- ⦿ Poor general condition
- ⦿ Poor upper limb posture
- ⦿ Inadequate rest and recovery
- ⦿ Inadequate warm up

161

Pathophysiology

- ⦿ **Extrinsic Factors:**
- ⦿ Improper racquet grip size
- ⦿ **How to Find Your Tennis R Grip Size**

US Sizes	European Sizes	Sizes in Millimeters
4 inches	0	100-103 mm
4-1/8 inches	1	103-106 mm
4-1/4 inches	2	106-110 mm
4-3/8 inches	3	110-113 mm
4-1/2 inches	4	113-118 mm
4-5/8 inches	5	118-120 mm
4-3/4 inches	6	120-123 mm



162

Pathophysiology

- ◉ **Extrinsic Factors:**
- ◉ Strings not resilient or soft enough
- ◉ Improper handle size of racquet
- ◉ **Traumatic factors:**
- ◉ Repetitive micro trauma
- ◉ Vascular compromise
- ◉ High ECC and CON stresses on extensor tendon



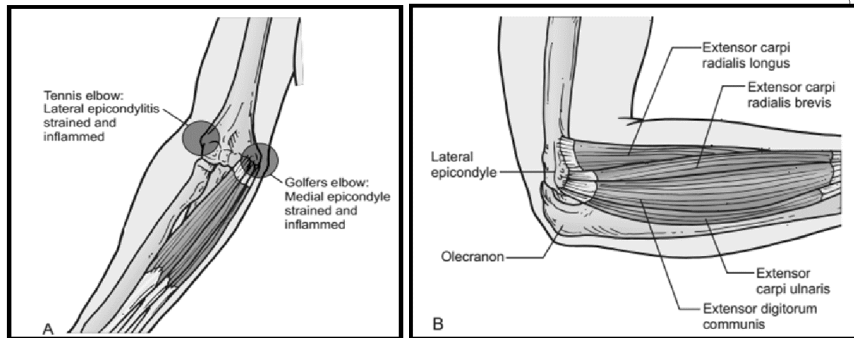
163

Clinical presentation

- ◉ History:
- ◉ درد تدریجی در محل اوريجن تاندون اکستنسور
- ◉ غالبا با حرکات بک هند و به ویژه در ورزشکاران مبتدی و تفریحی تنیس شایع است
- ◉ سایر موارد بروز آسیب شامل فعالیت های شغلی مکرر، فعالیت کامپیوتری و حمل کوله است.
- ◉ نشانه ها عمدتا بعد از فعالیت ورزشی و حتی فعالیت های روزمره نمایان می گردد
- ◉ آرنج در موقع خواب و بیداری همراه با درد می گردد

164

lateral and medial epicondyle of the elbow



165

Physical Examination

- **Abnormal Findings:**
- Loss of wrist flexion ROM
- Tenderness to palpation of Extensor origin at lateral epicondyle
- Localized edema
- Grip weakness (both side, hand grip)
- Pain with passive wrist flexion
- Pain with resistive wrist extension

166

Physical Examination

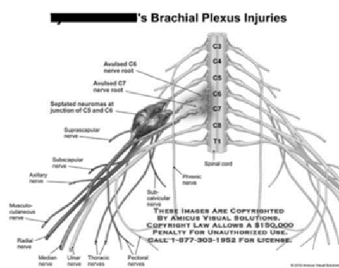
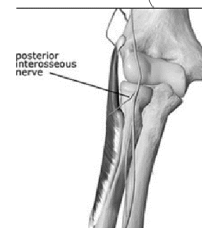
- ⦿ Radiographs: tendinous calcific changes
- ⦿ MRI: tears of the extensor tendon, abnormal tendinous tissue



167

Differential Diagnosis

- ⦿ C6 to C7 nerve root compression
- ⦿ Posterior interosseous nerve syndrome
- ⦿ Lateral antebrachial cutaneous nerve irritation



CUBITAL FOSSA

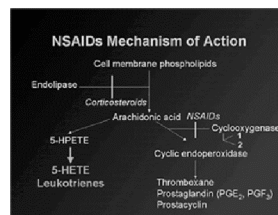
The cubital fossa is a triangular depression that lies in front of the elbow



168

Treatment

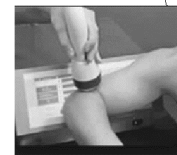
- **Nonoperative management**
- Activity modification
- Corticosteroid injection
- Nonsteroidal anti-inflammatory drugs



169

Nonoperative manage

- Bracing, wrist cockup splint
- Shock-wave therapy
- Physical therapy: strength, flexibility,
- Cryotherapy, TENS, iontophoresis, ultrasound, low level laser
- Improvement of sport mechanics
- Plasma rich platelet injection



170

Surgical indications

- ⦿ Failure of injections
- ⦿ Associated intraarticular pathology
- ⦿ Failure of treatment for a 6 months

171

Phase I

- ⦿ Protection:
 - ⦿ بریس مچ حتی در فعالیت های روزمره
 - ⦿ اسپلینت مچ در موقع خواب برداشته شود. ممکن است باعث کوتاه شدن اکستنسورهای مچ گردد
 - ⦿ تغییر فعالیت های روزمره
- ⦿ **Pain and swelling management**
 - ⦿ Cryotherapy
 - ⦿ Iontophoresis
 - ⦿ TENS
 - ⦿ Ultrasound
 - ⦿ low level laser

172

Phase I

- **Techniques for Progressive Increase in Range of Motion**
- **Manual therapy techniques**
- Mills manipulation: Mill's manipulation is a small-amplitude, high-velocity thrust performed at the end of elbow extension while the wrist and hand are held flexed.
- **Soft tissue techniques**
- It is the authors' opinion that deep-tissue massage of the forearm exacerbates symptoms and has little therapeutic value



173

Phase I

- **Stretching/flexibility techniques for the musculo-tendinous unit**
- Wrist and fingers e
- Pain free ROM

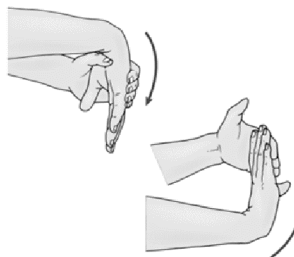


FIGURE 9.3. Stretching of the wrist and finger extensors.

174

Phase I

- ◉ **Other therapeutic exercise**
- ◉ TAS
- ◉ Scapula, deltoid, rotator cuff,
- ◉ Biceps and triceps strength should be in a pain free, avoid full extension elbow
- ◉ TLS without holding weights in hands
- ◉ **Open and Closed Kinetic Chain Exercises**
- ◉ This is contraindicated in phase I

175

Phase I

- ◉ **Milestones for Progression to the Next Phase**

- ◉ کاهش علائم حاد (درد، ادم و التهاب)
- ◉ کسب ثبات و استابیلیتی در کمربند شانه ای و روتیتور کاف
- ◉ کسب ROM طبیعی در فلکشن مچ

176

Phase II

Protection:

- ⊙ Counterforce bracing or wrist-cockup splint as needed

Pain and swelling management:

- ⊙ Cryotherapy
- ⊙ Iontophoresis
- ⊙ TENS
- ⊙ Ultrasound
- ⊙ low level laser

177

Phase II

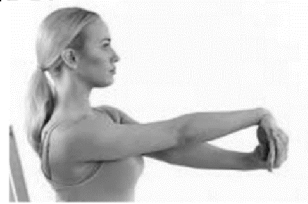
- ⊙ **Techniques for Progressive Increase in Range of Motion**
- ⊙ Continue pain-free stretching of the wrist and finger extensors. Begin to address any shoulder flexibility deficits.
- ⊙ **Manual therapy techniques**
- ⊙ Mills manipulation
- ⊙ **Soft tissue techniques**



178

Phase II

- ◉ **Stretching/flexibility techniques for the musculo-tendinous unit**
- ◉ Wrist and fingers extensor
- ◉ Pain free ROM



179

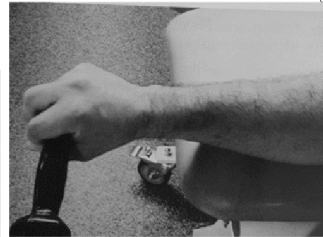
Phase II

- ◉ **Other Therapeutic Exercises**
Continue to progress general upper-extremity, multijoint exercises to normalize shoulder and scapula strength. For the tennis player, emphasize the scapula and posterior rotator cuff.
- ◉ Continue biceps- and triceps-strengthening to include concentric and eccentric activity.
- ◉ Initiate forearm-strengthening to include wrist flexion.
- ◉ Core and lower-extremity strengthening may be progressed, but the patient should still avoid holding heavy weights in the hands.

180

Phase II

- ◉ **Activation of Primary Muscles Involved**
- ◉ **Wrist extension**
- ◉ **Pronation**
- ◉ **Supination**



181

Phase II

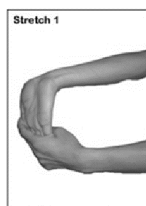
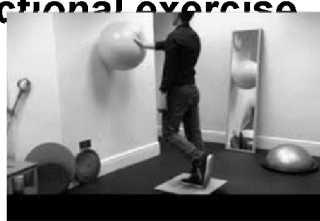
- ◉ **Techniques to Increase Muscle Strength, Power, and Endurance**
- ◉ If proximal strength is adequate
- ◉ Upper body ergometer



182

Phase II

- ◉ **Neuromuscular Dynamic Stability Exercises**
- ◉ Rhythmic stabilization
- ◉ **Functional exercise**
- ◉ PNF



183

Phase II

- ◉ **Milestones for Progression to the Next Phase**

◉ انعطاف پذیری طبیعی اندام فوقانی

◉ قدرت طبیعی

◉ حداقل درد در حین اکستنشن مچ

184

Phase III

- ◉ **Stretching/flexibility techniques for the musculo-tendinous unit**
- ◉ Wrist and fingers extensor
- ◉ Overstretching of the wrist and finger extensors should be avoided.
- ◉ Pain free ROM
- ◉ **Techniques to Increase Muscle Strength, Power, and Endurance**
- ◉ TLS, TAS, TAS
- ◉ Sport specific exercise

185

Phase III

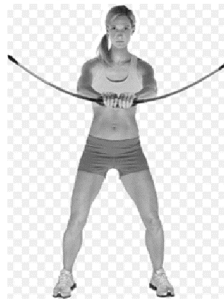
- ◉ **Activation of Primary Muscles Involved**
- ◉ ECC wrist extesion



186

Phase III

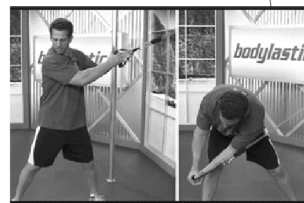
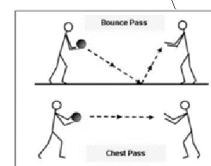
- ◉ **Neuromuscular Dynamic Stability Exercises**
- ◉ Rhythmic stabilization
- ◉ Body blade



187

Phase III

- ◉ **Plyometrics**
- ◉ Two handed chest pass
- ◉ side to side wood chops,
- ◉ over head soccer pass,
- ◉ One handed external rotation
- ◉ One handed bac



188

Phase III

- ⦿ **Sport specific exercise**
- ⦿ Resistive forehand and backhand exercise using elastic band



189

Phase IV

- ⦿ **Management of Pain and Swelling**
- ⦿ Cryotherapy should be utilized throughout the return

Stretching and Flexibility Techniques for the Musculotendinous Unit

- ⦿ Continue full upper-extremity flexibility program.
- ⦿ Avoid overstretching the extensor tendons.
- ⦿ Stretching should always be pain-free.

190

Phase IV

Other Therapeutic Exercises

- ⦿ Continue a full upper-extremity strengthening program to include the scapula, shoulder, elbow, forearm, and wrist
- ⦿ Continue core stability with emphasis on trunk rotation and posture.
- ⦿ Continue full lower-extremity strengthening program with emphasis on closed-chain activities

191

Techniques to Increase Muscle Strength, Power, and Endurance

- ⦿ Isokinetics for wrist flexion–extension and pronation–supination once a strength base has been established.
- ⦿ sport-specific speeds and train for endurance
- ⦿ **Plyometrics**
- ⦿ **Sport-Specific Exercises**
- ⦿ An interval tennis program
- ⦿ The program should entail a progression of volume and intensity.

192

Nonoperative Rehabilitation of Lateral Epicondylitis (Tennis Elbow)

PHASE I

- Physical therapy (PT) modalities
- Pain-free wrist extensor stretching
- Counterforce bracing/wrist-cockup splint
- TBS/TAS/TLS activities as recommended and tolerated
- Multijoint shoulder, scapula, and elbow strengthening
- Mobilization and manipulation as needed

193

Nonoperative Rehabilitation of Lateral Epicondylitis (Tennis Elbow)

PHASE II

- PT modalities
- Shoulder flexibility exercises
- TBS/TAS/TLS activities as recommended and tolerated
- Scapular exercises, shoulder exercises, and elbow exercises (including eccentrics)
- Wrist flexion–extension, forearm pronation–supination (elbow in flexion)
- Core and lower-extremity exercises
- Rhythmic stabilization with proximal resistance
- PNF patterns
- Upper-body ergometer

194

Nonoperative Rehabilitation of Lateral Epicondylitis (Tennis Elbow)

PHASE III

- PT modalities as needed
- TBS/TAS/TLS activities as recommended and tolerated
- Scapular exercises: PREs
- TAS: Biceps/triceps PREs
- Glenohumeral exercises: PREs
- Rotator cuff exercises, including 90° internal and 90° external position PREs
- Full forearm PREs
- Eccentric wrist extension: PREs
- PNF exercises
- Rhythmic stabilization exercises with long lever arm; progress to Bodyblade
- Core and lower-extremity exercises
- Sport-specific plyometrics
- Sport-specific PREs (forehand and backhand)

195

Nonoperative Rehabilitation of Lateral Epicondylitis (Tennis Elbow)

PHASE IV

- PT modalities as needed
- Full upper-extremity flexibility program
- Wrist flexion-extension isokinetics
- TBS/TAS/TLS activities as recommended and tolerated
- Scapular exercises: PREs
- TAS: biceps/triceps PREs
- Glenohumeral exercises: PREs
- Rotator cuff exercises: PREs
- Forearm exercises
- Core and lower extremity: PREs
- PNF exercises
- Open kinetic chain rhythmic stabilization exercises
- Core and lower-extremity flexibility exercises
- Interval tennis program

196

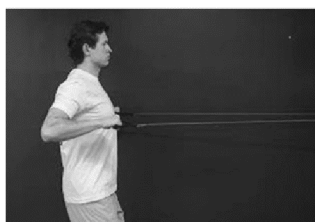


FIGURE 9-9. Scapula retraction with elastic resistance.



FIGURE 9-11. Latissimus dorsi pull-down.

197

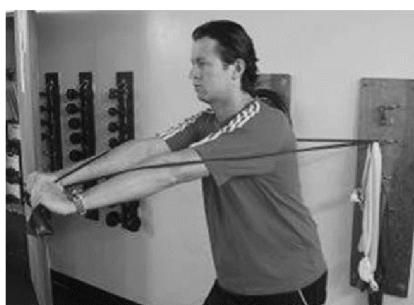
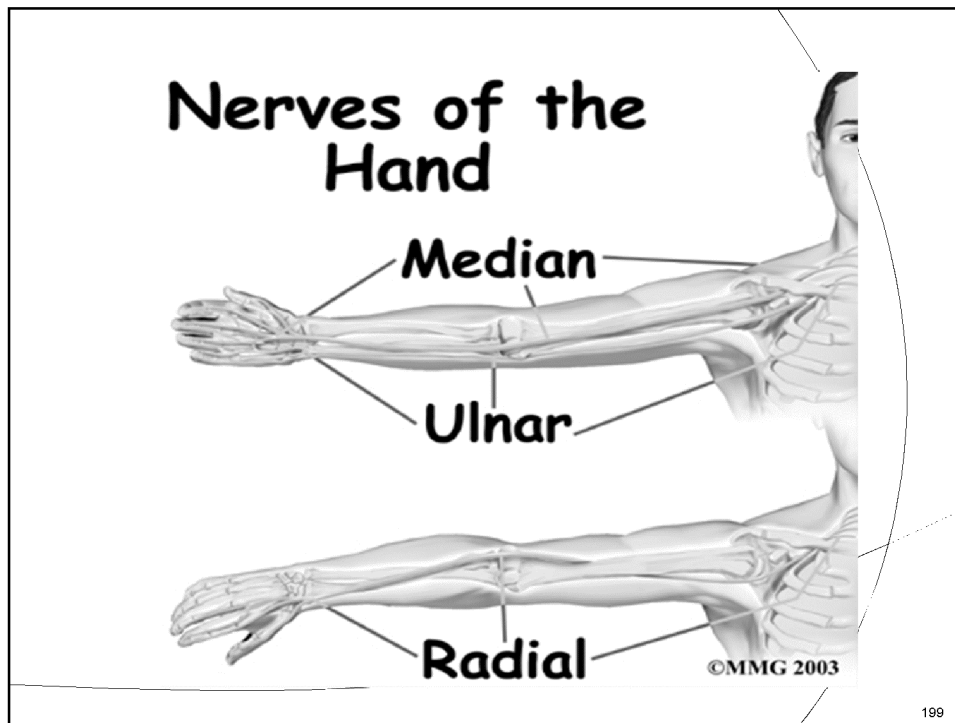


FIGURE 9-10. Serratus punch.

198



Radial Nerve Injury

- ◎ The radial nerve attaches to the skin and muscles of certain areas of the arm, forearm, and hand.



causes

- ⦿ the improper use of crutches, usually when a person rests his or her weight on the armpits rather than the hands.
- ⦿ hanging the arms over the back of a chair for too long or lying on an arm for too long.
- ⦿ bone fracture involving the upper arm bone, or humerus.
- ⦿ Long-term or repeated constriction of the wrist (caused by wearing a tight watch strap, for example)
- ⦿ Long-term pressure on the nerve

201

Symptoms

- ⦿ Abnormal sensations
- ⦿ Difficulty extending the arm at the elbow
- ⦿ Difficulty extending the wrist
- ⦿ Numbness, decreased sensation, tingling, or burning sensation
- ⦿ Pain
- ⦿ Symptoms can affect the following:
 - ⦿ Hand or forearm ("back" of the hand)
 - ⦿ "Thumb side" (radial surface) of the dorsal hand
 - ⦿ Fingers nearest the thumb (2nd and 3rd)

202

Tests

- ◉ EMG
- ◉ MRI of the head, neck, and shoulder
- ◉ Nerve biopsy
- ◉ Nerve conduction tests

203

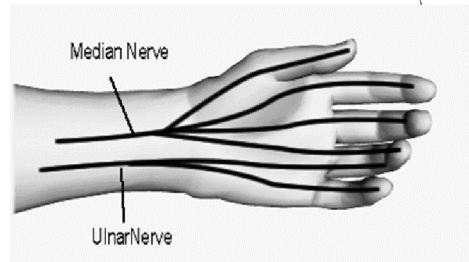
Treatment

- ◉ The goal of treatment is to maximize your ability to use the hand and arm.
- ◉ prescription pain medications to control pain
- ◉ Phenytoin, carbamazepine, or tricyclic antidepressants (amitriptyline) to reduce stabbing pain
- ◉ Steroids (prednisone) to reduce swelling
- ◉ Whenever possible, avoid or minimize your use of medications to reduce the risk of side effects.
- ◉ Other treatments include:
- ◉ Braces, splints, or other appliances to help you use the hand in severe cases
- ◉ Physical therapy to help maintain muscle strength.
- ◉ Surgery to remove masses that press on the nerve may help.

204

Ulnar nerve injury

- ⦿ Injury or damage to the ulnar nerve which runs down the length of the arm. The site of the damage is usually at the elbow or wrist.



205

Causes

- ⦿ Direct injury
- ⦿ Long-term pressure on the nerve
- ⦿ Pressure on the nerve caused by swelling or injury of nearby body structures
- ⦿ The ulnar nerve is commonly injured at the elbow because of elbow fracture or dislocation

206

Symptoms of Ulnar nerve injury

- ⦿ Hand pain
- ⦿ Finger pain
- ⦿ Pain in 4th and 5th fingers
- ⦿ Tingling in 4th and 5th fingers
- ⦿ Numbness, decreased sensation
- ⦿ Tingling, burning sensation
- ⦿ Weakness of the hand

207

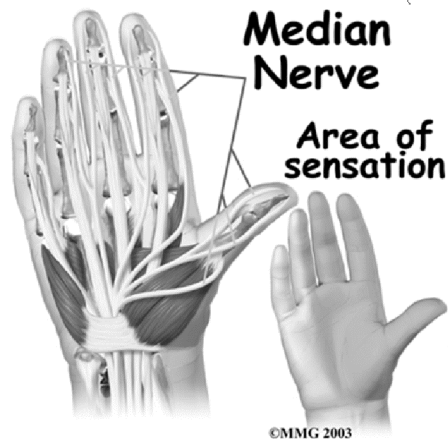
Treatment

- ⦿ A supportive splint or elbow pad to help prevent further injury
- ⦿ Corticosteroids injected into the area to reduce swelling and pressure on the nerve
- ⦿ Surgery to relieve pressure on the nerve
- ⦿ prescription pain medications to control pain.
- ⦿ Physical therapy exercises to help maintain muscle strength
- ⦿ Occupational counseling, occupational therapy, job changes, or retraining

208

Distal median nerve dysfunction

- Distal median nerve dysfunction is a form of peripheral neuropathy that affects the movement of or sensation in the hands.
- A common type of distal median nerve dysfunction is carpal tunnel syndrome.



209

Causes

- Inflammation of the tendons (tendonitis) or joints (arthritis) can also cause nerve compression.
- Dysfunction of one nerve group, such as the distal median nerve, is called a mononeuropathy. Mononeuropathy means there is a local cause of the nerve damage, although occasionally body-wide (systemic) disorders may cause isolated nerve damage.

210

Symptoms

- ⦿ Pain in the wrist or hand that wakes you up at night
 - May be severe
 - Pain may be felt in other areas (this is called referred pain)
- ⦿ Sensation changes in the thumb and first two fingers, such as:
 - Burning feeling
 - Decreased sensation
 - Numbness
 - Tingling
- ⦿ Weakness of the hand that causes you to:
 - Drop things
 - Have difficulty grasping objects

211

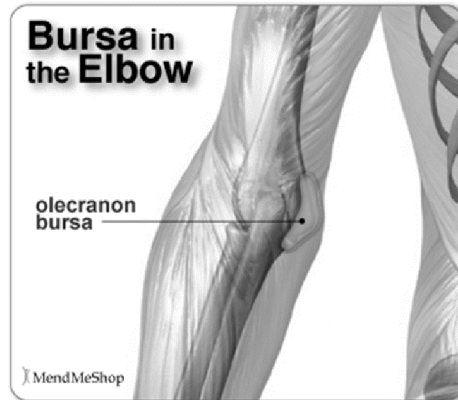
Treatment

- ⦿ Over-the-counter or prescription medication may be needed to control nerve pain (neuralgia).
- ⦿ rest
- ⦿ Surgery

212

Olecranon Bursitis - Student's Elbow

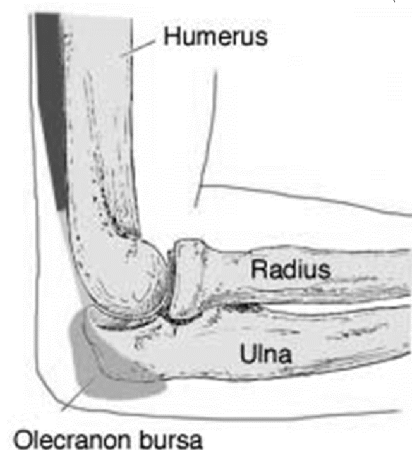
- The olecranon bursa lies over the ulna at the posterior tip of the elbow. Since it is so near the surface it is frequently subject to trauma. Typically this is caused by constant irritation when the patient leans on the table whilst reading or writing but can also be caused by a fall onto a hard surface.¹



213

Symptoms

- Elbow pain at rest and during exercise.
- A painful swelling on the back of the elbow.
- Limited mobility in the elbow.



214

symptoms

- ◉ You cannot normally feel or see a bursa. If the olecranon bursa is inflamed then it causes a thickness and swelling over the back of the elbow.
- ◉ Most cases (those not infected or associated with arthritis) are painless, or are only mildly painful. The movement of the elbow joint is not affected.
- ◉ If the bursa is infected ('septic' olecranon bursitis) then you will usually develop pain, redness and tenderness behind the elbow.

215

treatment

- ◉ **RICE treatment.** You may find the swelling improves with (R)est, (I)ce packs, (C)ompression (wearing a bandage) and (E)levation (keeping the elbow in a raised position).
- ◉ **Anti-inflammatory medication (such as ibuprofen, naproxen, diclofenac, etc)** may be prescribed to reduce inflammation and swelling.

216

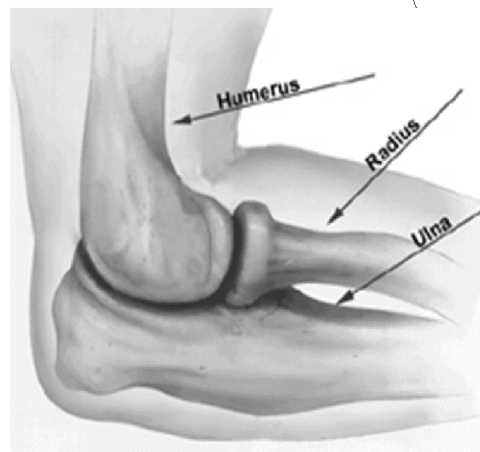
treatment

- **Ultrasound and electrical treatment** have helped some people.
- **A steroid injection** into the bursa may cure the problem. Steroids are good at reducing inflammation.
- **Aspiration (draining the fluid)** can be done with a needle and syringe if a lot of fluid builds up. However, the fluid tends to build up again after being drained. Therefore, you may be advised to wear a tight pressure bandage for a while after the fluid is drained to prevent it building up again.
- **Surgery** to remove the bursa is an option if the above do not work.
- **Antibiotics** are needed if the cause of the bursitis is an infection.

217

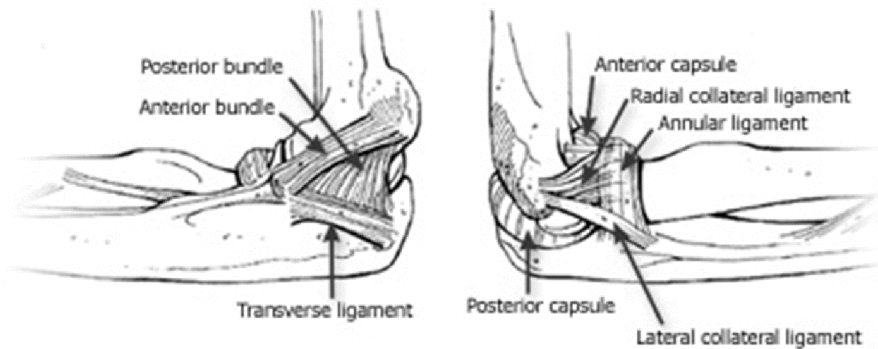
Elbow Dislocations and Fracture-Dislocations

- When the joint surfaces of an elbow are separated, the elbow is dislocated. Elbow dislocations can be complete or partial.
- Three bones come together to make up the elbow joint. The humerus is the bone in the upper arm. Two bones from the forearm (the radius and the ulna) form the lower part of the elbow.



218

Anatomy



219

Cause

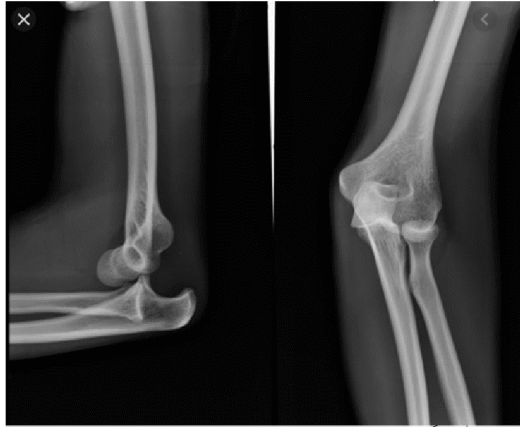
- ⊙ A **simple dislocation** does not have any major bone injury.
- ⊙ A **complex dislocation** can have severe bone and ligament injuries.



220

Symptoms

- ⦿ A complete elbow dislocation is extremely painful and very obvious. The arm will look deformed and may have an odd twist at the elbow.



221

Treatment

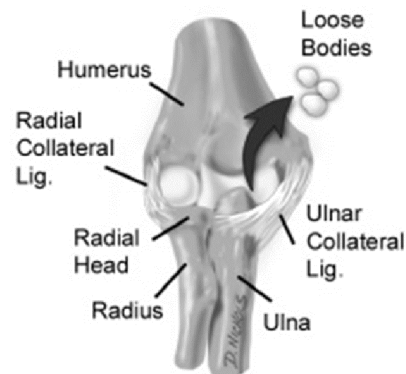
- ⦿ The goal of immediate treatment of a dislocated elbow is to return the elbow to its normal alignment. The long- term goal is to restore function to the arm.
- ⦿ ***Nonsurgical Treatment :***
- ⦿ Simple elbow dislocations are treated by keeping the elbow immobile in a splint or sling for two to three weeks, followed by early motion exercises. If the elbow is kept immobile for a long time, the ability to move the elbow fully (range of motion) may be affected. Physical therapy can be helpful during this period of recovery.

222

Loose Bodies in the Elbow Joint

- In throwing movements, the lateral part of the elbow is exposed to considerable forces.
- Occasionally, small pieces of cartilage or bone chips may break off in the elbow joint, and catch or get stuck in the joint.

LOOSE BODIES



223

Common Causes

- In addition to throwing, elbow trauma, such as a direct blow to the elbow, or a fall on the outstretched arm can cause injury.



224

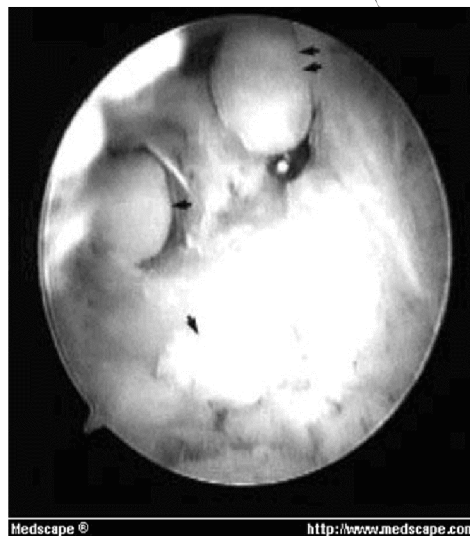
Symptoms

- ⦿ pain in the upper part of the elbow triggered mainly by throwing activities, and when a sense of catching, or getting 'stuck' is present.
- ⦿ There may be loss of motion and swelling in the joint.
- ⦿ physical examination, there may be areas of tenderness, loss of joint motion, or swelling in the elbow.

225

Non-Operative Treatment

- ⦿ Anti-inflammatory medication
- ⦿ corticosteroid injections may reduce symptoms.
- ⦿ **Surgical Treatment**
- ⦿ Arthroscopy, with removal of the loose body, is the treatment of choice.



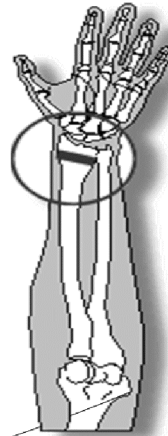
Medscape ©

<http://www.medscape.com>

226

Wrist fracture

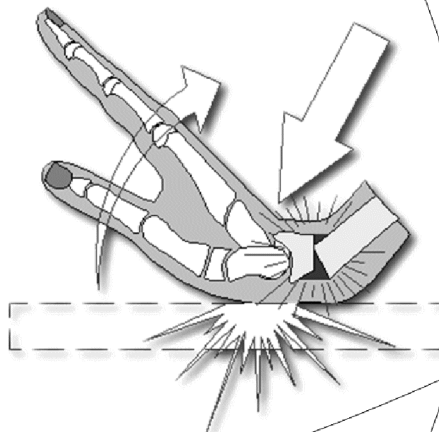
- ◉ **Colles Fracture:**
- ◉ A Colles fracture is a wrist fracture involving a break of the end of the radius bone of the forearm ("distal radius fracture").



227

What caused it?

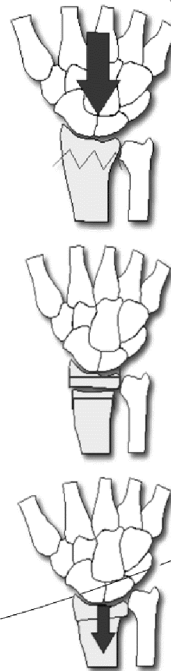
- ◉ Wrist fractures occur most often in a fall or in a motor vehicle accident, but any sufficiently strong force on the hand can break the wrist. The wrist can be broken from a sudden force pushing the hand backwards.



228

What caused it?

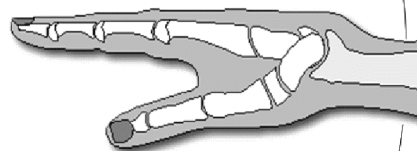
- ◉ A strong force pushing the hand into the forearm can also cause a Colles fracture, which often involves a break of the radius bone near its end.
- ◉ Wrist arthritis may occur following a distal radius fracture. This can be the result of cartilage injury at the time of the break, or wear and tear from changes in the joint alignment after the bone is healed.



229

Symptoms

- ◉ Carpal tunnel syndrome, causing numbness and tingling in the fingertips may also develop when a wrist fracture narrows the path for the nerve and tendons in front of the bone.



230

Treatment

- ◎ Ice, elevation and rest. (RICE)
 - moving the fingers and doing exercises right away
 - wearing a splint or a cast
 - having surgery to set the break.

231

Smith's Fracture

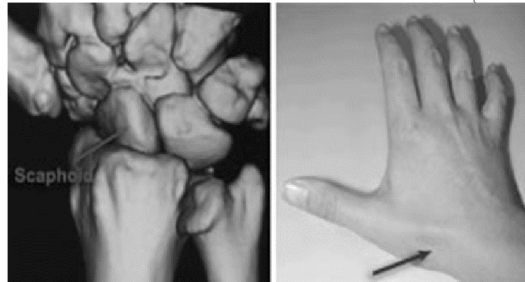
- ◎ The injury is most commonly found after falling on to the back of the hand.
- ◎ It is caused by a direct blow to the dorsal forearm or falling onto flexed wrists, as opposed to a Colles' fracture which occurs as a result of falling onto wrists in extension.



232

Scaphoid Fracture

- ◉ The scaphoid is one of the small bones in the wrist. It is the wrist bone that is most likely to break.



233

Cause

- ◉ A fracture of the scaphoid usually happens from a fall on an outstretched hand, with the weight landing on the palm.
- ◉ Fractures of the scaphoid occur in people of all ages, including children. The injury often happens during sports activities or a motor vehicle accident. Men aged 20 to 30 years are most likely to experience this injury.

234

Symptoms

- ◉ Unless the wrist is deformed, it might not be obvious that the scaphoid bone is broken. Sometimes, it might seem to be just a sprained wrist.
- ◉ Scaphoid fractures usually cause pain in the base of the thumb, with swelling in the same area. The pain may be severe when the thumb or wrist is moved or the hand grips anything. In some cases, the pain is not severe, and may be mistaken for a sprain.

235

Treatment

- ◉ If the scaphoid is broken in the middle (waist) or at the part closer to the forearm (proximal pole), healing is more difficult. These areas of the scaphoid do not have very good blood supply. This makes it more difficult to heal. If a fracture of the scaphoid in these locations is treated in a cast, it will probably include the thumb. The cast will extend above the elbow.



236

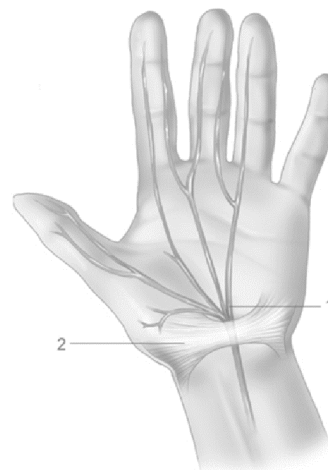
Surgical Treatment



237

Carpal Tunnel Syndrome

- The wrist is surrounded by a band of fibrous tissue that normally functions as a support for the joint.
- The tight space between this fibrous band and the wrist bone is called the carpal tunnel. The median nerve passes through the carpal tunnel to receive sensations from the thumb, index, and middle fingers of the hand.



238

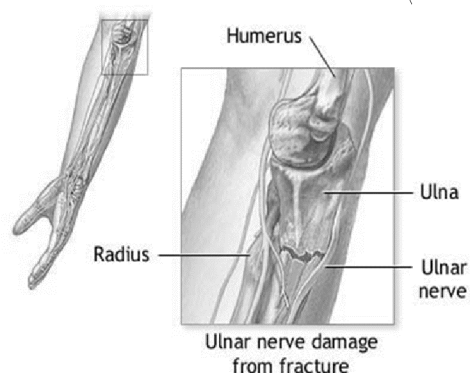
Carpal Tunnel Syndrome

- Any condition that causes swelling or a change in position of the tissue within the carpal tunnel can squeeze and irritate the median nerve.
- Irritation of the median nerve in this manner causes tingling and numbness of the thumb, index, and the middle fingers, a condition known as "carpal tunnel syndrome."

239

Ulnar Nerve Compression Syndromes

- Ulnar nerve dysfunction is a problem with the nerve that travels from the wrist to the shoulder, which leads to movement or sensation problems in the wrist and hand.



ADAM.

240

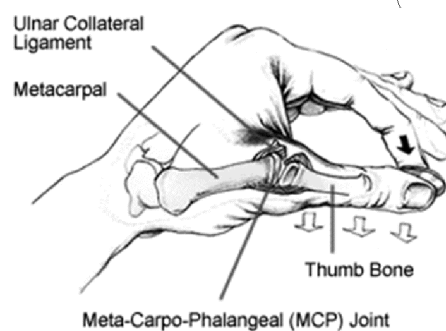
Symptoms

- Abnormal sensations in the 4th or 5th fingers, usually on the palm side; Numbness, decreased sensation; Pain; Tingling

241

Sprained Thumb Injury Explained

- A Sprained Thumb is often referred to as Skier's Thumb, due to the prevalence of this injury during skiing.
- Skier's Thumb refers to damage to the Ulnar Collateral Ligament at the base of the thumb.

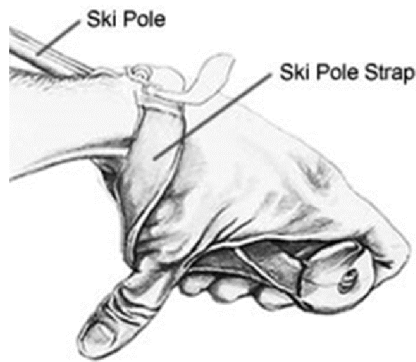


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242

Cause

- ◉ The pole gets fixed in the snow and acts as a lever and forces the thumb into an extended position, resulting in high stress forces through the Ulnar Collateral Ligament.



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243

Sprained Thumb Signs & Symptoms

- ◉ Pain
- ◉ Tenderness
- ◉ Swelling
- ◉ The ability to pinch grip small objects between the thumb and the index finger is often severely impaired because of the resultant instability in the MCP joint

244

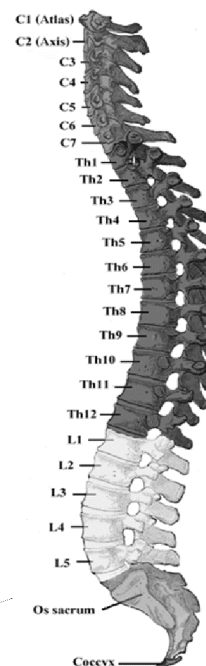
Sprained Thumb Treatment

- ⦿ Ice Packs and compression
- ⦿ Anti Inflammatory Drugs
- ⦿ Sprains tend to resolve in around four to six weeks and can be aided by physiotherapy treatment.
- ⦿ Ruptured Ulnar Collateral Ligaments, without Stener lesions, have a good capacity to heal without the need for surgery. For this reason, many doctors simply immobilize the thumb in a plaster cast called a 'Thumb Spica', for six weeks.

245

vertebral column

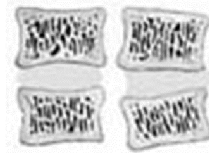
- ⦿ 33 individual vertebrae comprise the spinal column, although not all 33 provide movement as some are fused. The vertebrae are segregated into various sections for clarity based on location and function. These separations include the 7 cervical vertebrae, 12 thoracic vertebrae, 5 lumbar vertebrae, the fused 3 to 5 sacral vertebrae, and the fused 4 to 5 coccygeal vertebrae.



246

The Intervertebral Disk

- ⦿ Blood vessels supply the disks until about the second year of life, after which the disks make do with a much slower metabolism. Essential minerals and fluids required for regeneration enter the disks passively during the night. Each disk loses a little bit of fluid each day, resulting in a loss of height at the end of the day of approximately three centimeters.



247

What function does an intervertebral disk serve?

- ⦿ Intervertebral disks, vertebrae and ligaments are all passive elements of the musculoskeletal system.
- ⦿ Vertical pressure such as exerted by gravity is absorbed by the disks. The disks are, in fact, the perfect shock absorbers, capable of snapping back into place and adjusting to various kinds of movement.

248

Role of vertebral column

- ⊙ حمایت کننده
- ⊙ حفاظت کننده
- ⊙ نقش حرکتی
- ⊙ ناحیه سینه ای به دلیل اتصال به دنده ها دارای تحرک کمی است.
- ⊙ تحرک در ناحیه گردنی و کمری زیادتر است.
- L5-S1** ⊙

249

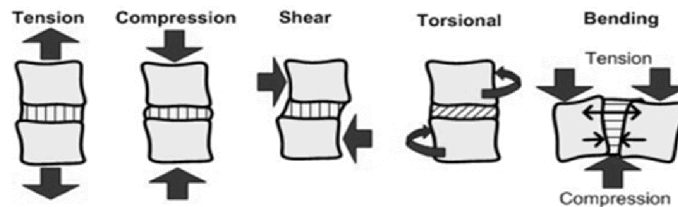
پایداری ستون مهره ها

- ⊙ سیستم رباطی وظیفه حفظ و پایداری غیر فعال ستون مهره ها را بر عهده دارند (رباط های قدامی، خلفی و جانبی).
- ⊙ سیستم عضلانی وظیفه حفظ و پایداری فعال ستون مهره ها را بر عهده دارند (قدامی و خلفی).

250

آسیب های گردن

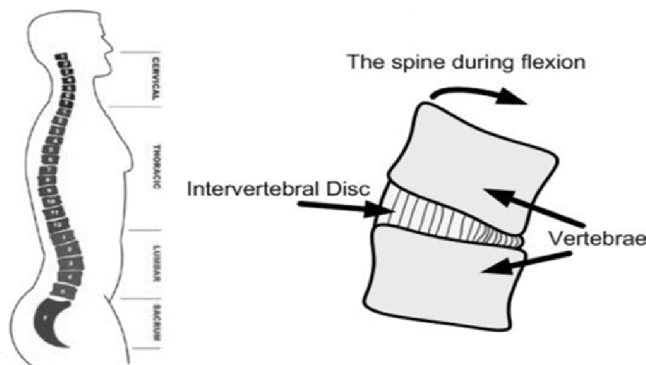
- مهره ۱ و ۲ فشار ناشی از چرخش را تحمل می کنند.
- مهره ۴، ۵ و ۶ حرکات خم و راست شدن را تحمل می کنند.
- آسیب های این ناحیه شامل شکستگی، دررفتگی و آسیب های رباطی است.
- شایع ترین علل آسیب های گردنی، خم کردن سر به عقب یا جلو، چرخش و ضربه شدید است.



251

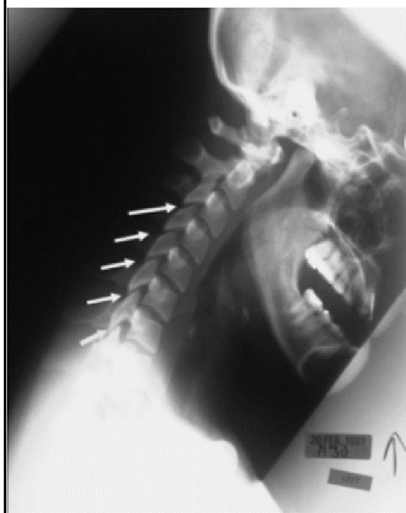
آسیب گردنی

- خم کردن سر به جلو:
- آسیب رباطی خلفی و شکستگی مهره ها در قدامی
- اکستنشن گردن:
- آسیب دیسک و رباط قدامی و مهره ها در قسمت خلفی
- ضربات شلاقی رانندگی



252

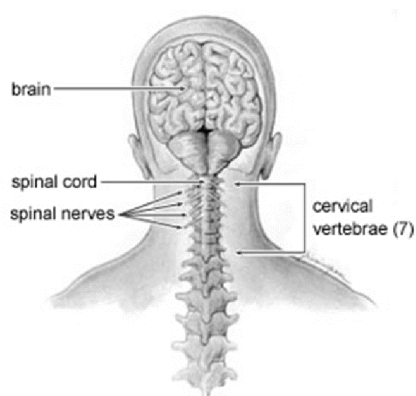
علائم



- ⊙ درد به ویژه در موقع حرکت گردن
- ⊙ انتشار درد و کرختی در بازوها
- ⊙ اختلال حسی و حرکتی اندام پایین محل آسیب دیده

253

انتشار درد از گردن



- ⊙ درد های ناحیه گردن می تواند در اثر تخریب دیسک و تشکیل زائده استخوانی به وجود آید. این تغییرات بر ریشه های عصبی تاثیر گذاشته و باعث ایجاد درد می شود.

254

علائم و تشخیص

- انتشار درد از ناحیه پشت گردن به شانه، بازو و انگشتان
- این نوع درد بر اثر اختلال در عصب آسیب دیده ایجاد می شود.
- انتشار درد به طرف بالا و سر، سر درد، بی خوابی، تهوع، سرگیجه
- کرختی و ضعف در دست و انگشتان

255

درمان

- استراحت
- استفاده از کرست گردن و حفظ گرمای بدن
- داروهای ضد التهاب
- فیزیوتراپی با کشش

256

آسیب های مهره های پشتی و کمری

● شکستگی ستون فقرات در ناحیه پشت و کمر چندان معمول نیست.

● **علائم:**

● درد شدید در محل شکستگی

● اگر درد به پاها انتشار یابد باید اینگونه در نظر گرفت که به طناب نخاعی یا ریشه های عصبی آسیب وارده شده است.

● از دست دادن حس یا حرکت نشانه آسیب جدی است.

● **درمان:**

● فیکس کردن برای مدت ۲-۳ ماه

● جراحی

257

پارگی عضله های ناحیه کمر و پشت

● در رشته های پرتابی، وزنه برداری، فوتبال و هندبال و ...

● **علائم:**

● درد ناخوشایند در هنگام خم و راست شدن ستون مهره ها و چرخش

● التهاب موضعی در محدوده پارگی

● **درمان:**

● بعد از چند روز، تمرینات کنترل شده عضلانی

● استراحت فعال به مدت ۳-۴ هفته تا رفع درد

● گرمای موضعی (۲-۳ روز بعد از آسیب مجاز است).

● داروهای مسکن و ضد التهاب

258

التهاب در محل اتصال تاندون عضله

- به دلیل پرکاری، عضله های ناحیه پشت و کمر در محل اتصال دچار التهاب می شوند.
- **علائم:**
- درد در زمان و بعد از حرکت
- **درمان:**
- استراحت
- گر مای موضعی
- داروهای ضد التهاب
- چنانچه بعد از ۲ هفته استراحت درد وجود داشته باشد از استروئید تزریقی استفاده می شود.

259

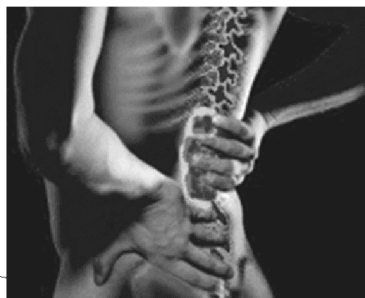
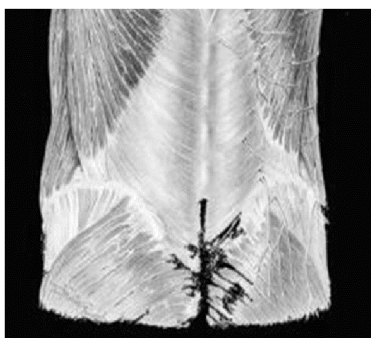
کمر درد



- بیشتر در ۳۰-۴۰ سالگی رخ می دهد
- بعد از ۵۰ سالگی کمتر است.

260

علائم



- معمولاً درد در ناحیه پایین کمر بوده و به پاها سرایت نمی کند.
- سفتی عضلانی در ناحیه کمر است.
- اسپاسم عضلانی ناحیه کمر از حرکات جلوگیری کرده و درد را کاهش می دهد.

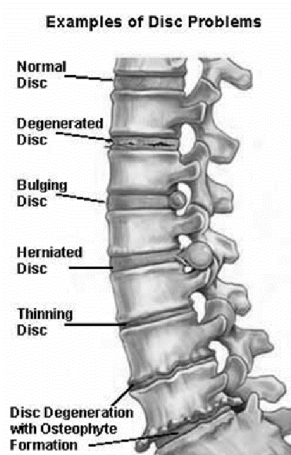
261

درمان

- استراحت ۱ تا ۳ روز و تارفع درد
- گرمای موضعی
- خودداری از حرکات خم شدن و چرخشی ستون مهره ها
- داروهای ترمیم بافت
- بازتاب اسپاسم عضلانی سبب نقص در جریان گردش و در نتیجه درد عضلانی می شود.
- درد باعث افزایش بازتاب اسپاسم و نقص جریان خون شده و چرخه ادامه می یابد.
- شل کننده عضلات
- افرادی که از کمر درد شکایت دارند باید زندگی جسمانی فعالی داشته باشند. هرچند فعالیت آنان باید مناسب با علائم و عوارض مورد نظر باشد.

262

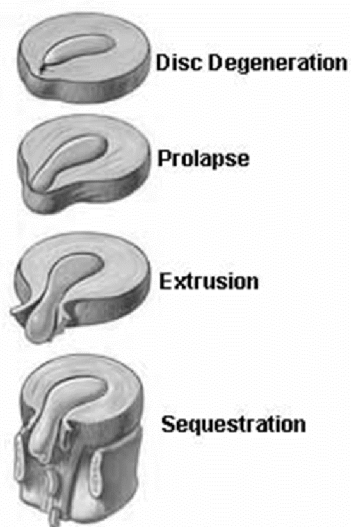
سیاتیک



- دردی که از ناحیه کمر به طرف یک یا هر دو پا سرایت می کند به عنوان سیاتیک شناخته شده است.
- یکی از شایع ترین دلایل کمر درد، سر خوردن دیسک بین مهره ای است که در نتیجه بر یکی از ریشه های عصب سیاتیک فشار وارد می کند. (فتق دیسک)
- گیر افتادن ریشه عصب
- تومورها
- زوائد استخوانی
- عفونت ها

263

فتق دیسک



- فتق دیسک، (مواد نرم داخل هسته دیسک به طرف بیرون نفوذ کرده و باعث فشار به عصب می گردد) به دلیل خم شدن به جلو و برداشتن جسم سنگین است.

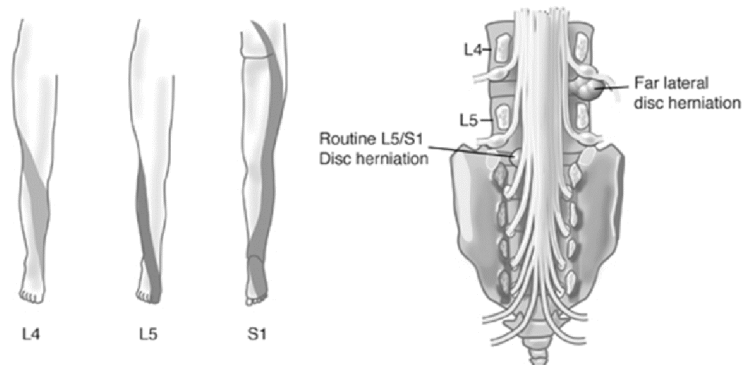
264

انواع فتق دیسک

- ⊙ عارضه L₄ (مهره چهارم کمری):
- ⊙ ریشه عصب مجاور دیسک مهره سوم و چهارم آسیب می بیند (تا پایین ساق و روی زانو درد منتشر می شود)
- ⊙ عارضه L₅ (مهره پنجم کمری):
- ⊙ ریشه بین دیسک مهره چهارم و پنجم آسیب دیده و درد تا پایین زانو انتشار می یابد.
- ⊙ عارضه S₁ (مهره اول خاجی):
- ⊙ S₁ - L₅ در کل پا درد منتشر می شود. در ۴۰-۳۵ سال دیده می شود.

265

انواع فتق دیسک



266

علائم

- تشخیص درد با توجه به سابقه درد که شناخته شده است.
- ممکن است معاینه ستون مهره ها کج پستی را نشان دهد.
- حرکت ناقص و دستگاه عضلانی سفت و حساس می شود.

267

درمان

- استراحت در رختخواب و وضعیت مناسب .
- به کارگیری موضعی
- فعالیت بعد از ۸-۱۲ هفته
- داروهای شل کننده عضلات، ضد التهاب و مسکن
- بعد از دوره حاد، کشش نرم تحت نظر فیزیوتراپ
- استفاده از دستگاه تحریک زیر جلدی عصب (TNS)
- در مواقع آسیب عملکرد مثانه، عمل جراحی تجویز می شود.

268

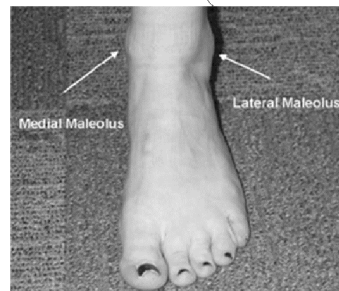
بهبودی و عوارض

- ⊙ استراحت تدریجی
- ⊙ ۴-۸ روز و زمان نقاهت آن ۸-۴ هفته
- ⊙ شروع ورزش از ۳-۴ ماه بعد
- ⊙ ۹۵٪ جراحی جواب مثبت می دهد.

269

Ankle Sprain

- ⊙ Most people have twisted an ankle at some point in their life. But if your ankle gets swollen and painful after you twist it, you have most likely sprained it. This means you have stretched and possibly torn the ligaments in your ankle.



270

Overview

- ◉ Even though ankle sprains are common, they are not always minor injuries. Some people with repeated or severe sprains can develop long-term joint pain and weakness. Treating a sprained ankle can help prevent ongoing ankle problems.

271

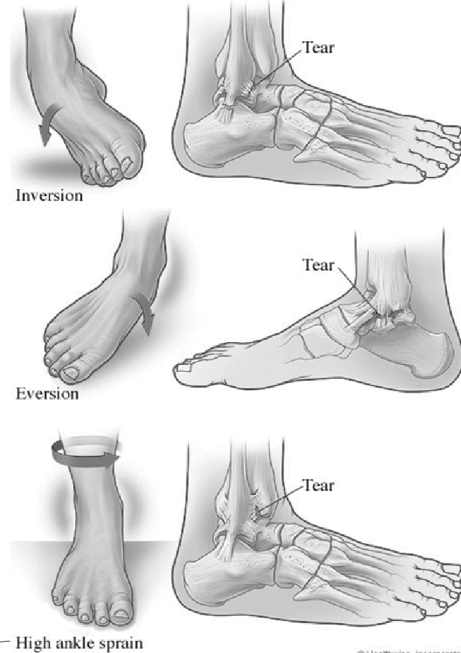
What causes ankle sprains?

- ◉ Most ankle sprains happen when you make a rapid shifting movement with your foot planted, such as when you play soccer or get tackled in football. Often the ankle rolls outward and the foot turns inward.
- ◉ This causes the ligaments on the outside of the ankle to stretch and tear. Less often, the ankle rolls inward and the foot turns outward. This damages the ligaments on the inside of the ankle.

272

types of ankle sprains

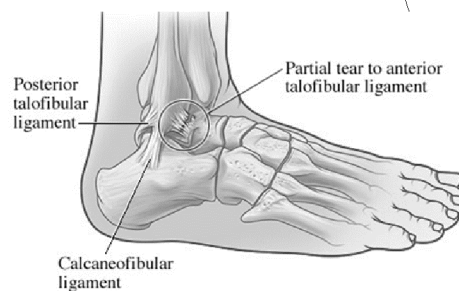
An ankle sprain can range from mild to severe, depending on how badly the ligament is damaged and how many ligaments are injured.



273

types of ankle sprains

- ◉ With a mild sprain, the ankle may be tender, swollen, and stiff. But it usually feels stable, and you can walk with little pain. A more serious sprain might include bruising and tenderness around the ankle, and walking is painful.



274

What are the symptoms?

- ◉ With most sprains, you feel pain right away at the site of the tear. Often the ankle starts to swell immediately and may bruise. The ankle area is usually tender to touch, and it hurts to move it.



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275

What are the symptoms?

- ◉ In more severe sprains, you may hear and/or feel something tear, along with a pop or snap. You will probably have extreme pain at first and will not be able to walk or even put weight on your foot.
- ◉ **How is an ankle sprain diagnosed?**
- ◉ If the sprain is mild, your doctor may not order X-rays. But with more severe sprains, you may need X-rays to rule out a broken bone in the ankle or the foot. It is possible to break a bone in your foot or ankle at the same time as a sprain.

276

How is an ankle sprain diagnosed?

- ◉ In most cases, doctors order X-rays in children with symptoms of an ankle sprain. This is because it is important to find and treat any damage to the growth plates in bones that support the ankle.

277

How is it treated?

- ◉ In many cases you can first use the PRINCE approach to treat your ankle:
- ◉ **P**rotection. Use a protective brace, such a brace with a built-in air cushion or another form of ankle support.
- ◉ **R**est. Use crutches until you can walk without pain.
- ◉ **I**ce. For at least the first 24 to 72 hours or until the swelling goes down, apply an ice pack for 10 to 20 minutes every hour or two during the day.
- ◉ **NSAIDs** or acetaminophen. NSAIDs (such as Advil and Motrin) are medicines that reduce swelling and pain. Acetaminophen (such as Tylenol) reduces pain.

278

- ◎ **Compression.** An elastic compression wrap, such as an ACE bandage, will help reduce swelling. You wear it for the first 24 to 36 hours. Compression wraps do not offer protection. So you also need a brace to protect your ankle if you try to put weight on it.
- ◎ **Elevation.** Raise your ankle above the level of your heart for 2 to 3 hours a day if possible. This helps to reduce swelling and bruising.

279

Proper treatment and rehabilitation

- ◎ Proper treatment and rehabilitation (rehab) exercises are very important for ankle sprains.
- ◎ If an ankle sprain does not heal right, the joint may become unstable and may develop chronic pain.
- ◎ This can make your ankle weak and more likely to be reinjured. Before you return to sports and other activities that put stress on your ankle, it's a good idea to wait until you can hop on your ankle with no pain.

280

- ⦿ Taping your ankle or wearing a brace during exercise can help protect your ankle.
- ⦿ Wearing hiking boots or other high-top, lace-up shoes for support may also help.
- ⦿ If your ankle is still unstable after rehab, or if the ligament damage is severe, your doctor may recommend surgery to repair the torn ligaments.

281

What kind of rehabilitation program should you follow?

- ⦿ **Range-of-motion exercises for ankle sprains**

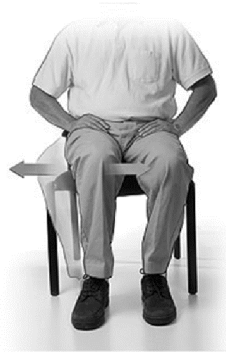
Rehab exercises can begin soon after the injury. You can try to walk or put weight on your foot while using crutches if it doesn't hurt too much. Depending on your pain,



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282

Side-to-side knee swing exercise



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283

Type of ankle sprain

- The amount of force determines the grade of the sprain. A mild sprain is a Grade 1. A moderate sprain is a Grade 2. A severe strain is a Grade 3.
- **Grade 1 sprain:** Slight stretching and some damage to the fibers (fibrils) of the ligament.
- **Grade 2 sprain:** Partial tearing of the ligament. If the ankle joint is examined and moved in certain ways, abnormal looseness (laxity) of the ankle joint occurs.
- **Grade 3 sprain:** Complete tear of the ligament. If the examiner pulls or pushes on the ankle joint in certain movements, gross instability occurs.

284

Severity	Physical Examination Findings	Impairment	Pathophysiology	Typical Treatment*
Grade 1	Minimal tenderness and swelling	Minimal	Microscopic tearing of collagen fibers	Weight bearing as tolerated No splinting/casting Isometric exercises Full range-of-motion and stretching/ strengthening exercises as tolerated
Grade 2	Moderated tenderness and swelling Decreased range of motion Possible instability	Moderated	Complete tears of some but not all collagen fibers in the ligament	Immobilization with air splint Physical therapy with range-of-motion and stretching/ strengthening exercises
Grade 3	Significant swelling and tenderness Instability	Severe	Complete tear/ rupture of ligament	Immobilization Physical therapy similar to that for grade 2 sprains but over a longer period Possible surgical reconstruction

285

Shin Splints (Tibial Stress Syndrome)

- Many athletes get shin splints -- also called tibial stress syndrome -- at one time or another.
- Whether you jog daily or just had to sprint to catch a bus one day, you may have shin splints when you feel throbbing and aching in your shins.
- While they often heal on their own, severe shin splints can ruin your game.



286

What are shin splints?

- ◉ Shin splints are injuries to the front of the outer leg. While the exact injury is not known, shin splints seem to result from inflammation due to injury of the tendon (posterior peroneal tendon) and adjacent tissues in the front of the outer leg.
- ◉ Shin splints are a member of a group of injuries called "overuse injuries." Shin splints occur most commonly in runners or aggressive walkers.

287

What are shin splints symptoms?

- ◉ Shin splints cause pain in the front of the outer leg below the knee. The pain of shin splints is characteristically located on the outer edge of the mid region of the leg next to the shinbone (tibia).
- ◉ An area of discomfort measuring 4-6 inches (10-15 cm) in length is frequently present.

288

What are shin splints symptoms?

- ⦿ Pain is often noted at the early portion of the workout, then lessens, only to reappear near the end of the training session.
- ⦿ However, with continuing trauma, the pain can become so extreme as to cause the athlete to stop workouts altogether.

289

What causes shin splints?

- ⦿ A primary culprit causing shin splints is a sudden increase in distance or intensity of a workout schedule.
- ⦿ This increase in muscle work can be associated with inflammation of the lower leg muscles, those muscles used in lifting the foot.
- ⦿ Such a situation can be aggravated by a tendency to pronate the foot (roll it excessively inward onto the arch).
- ⦿ Similarly, a tight Achilles tendon or weak ankle muscles are also often implicated in the development of shin splints.

290

How are shin splints diagnosed?

- ⦿ The diagnosis of shin splints is usually made during examination. It depends upon a careful review of the patient's history and a focused physical exam (on the examination of the shins and legs where local tenderness is noted).
- ⦿ Specialized (and costly) tests (for example, bone scans) are generally only necessary if the diagnosis is unclear. Radiology tests, such as X-rays, bone scan, or MRI scan, can be helpful in this setting to detect stress fracture of the tibia bone.

291

Symptoms of shin splints:

- ⦿ Pain over the inside lower half of the shin.
- ⦿ Pain at the start of exercise which often eases as the session continues
- ⦿ Pain often returns after activity and may be at its worse the next morning.
- ⦿ Sometimes some swelling.
- ⦿ Lumps and bumps may be felt when feeling the inside of the shin bone.
- ⦿ Pain when the toes or foot are bent downwards.
- ⦿ A redness over the inside of the shin (not always present).

292

Shin Splints Treatment

- ⦿ Treatment for shin splints is as simple as reducing pain and inflammation, identifying training and biomechanical problems which may have helped cause the injury initially, restoring muscles to their original condition and gradually returning to training.

293

What can the athlete do about shin splints?

- ⦿ Rest to allow the injury to heal.
- ⦿ Apply ice or cold therapy in the early stages, particularly when it is very painful. Cold therapy reduces pain and inflammation.
- ⦿ Stretch the muscles of the lower leg. In particular the tibialis posterior which is associated with shin splints.
- ⦿ Wear shock absorbing insoles in shoes. This helps reduce the shock on the lower leg.

294

What can the athlete do about shin splints?

- ⦿ Maintain fitness with other non weight bearing exercises such as swimming, cycling or running in water.
- ⦿ Apply heat and use a heat retainer or shin and calf support after the initial acute stage and particularly before training. This can provide support and compression to the lower leg helping to reduce the strain on the muscles. It will also retain the natural heat which causes blood vessels to dilate and increases the flow of blood to the tissues to aid healing.
- ⦿ Visit a sports injury clinic for treatment and rehabilitation.

295

What can a sports injury clinic or doctor do?

- ⦿ Prescribe anti-inflammatory medication e.g. ibuprofen (always consult a doctor before taking medication).
- ⦿ Tape the shin for support - A taping worn all day will allow the shin to rest properly by taking the pressure off the muscle attachments.
- ⦿ Perform gait analysis to determine if you overpronate or oversupinate.
- ⦿ Use sports massage techniques on the posterior deep muscle compartment but avoid the inflamed periosteum close to the bone.
- ⦿ Operate (this is rare).

296

Causes

- ◉ Shin splints can be caused by a number of factors which are mainly biomechanical (abnormal movement patterns) and errors in training. Here are the most common causes:
- ◉ Overpronation of the feet
- ◉ Oversupination of the feet
- ◉ Inadequate footwear
- ◉ Increasing training too quickly
- ◉ Running on hard surfaces
- ◉ Decreased flexibility at the ankle joint

297

Prevention

- ◉ Biomechanical problems such as overpronation and supination can be corrected using running shoes or insoles (or orthotics). Ensuring shoes/trainers are suitable your foot type and for the activity in question.
- ◉ As a rule of thumb with running, distances should not increase by more than 10% per week. For example, if you complete a total of 10 miles one week, do not increase above 11 miles the next week. This helps to ensure the muscles are not overworked.

298

Prevention

- ⦿ For runners, try to avoid always running on hard pavements as they provide no shock absorption. Try running some of the time on tarmac, grass or even sand to reduce the shock passed through the legs.
- ⦿ Shin splints can be caused by overly tight muscles in the lower leg, including the calf muscles (gastrocnemius and soleus) and the shin muscles. Stretching on a daily basis and even receiving sports massage can help improve flexibility.

299

Compartment Syndrome

- ⦿ Compartment syndrome is a painful condition that occurs when pressure within the muscles builds to dangerous levels.
- ⦿ This pressure can decrease blood flow, which prevents nourishment and oxygen from reaching nerve and muscle cells.
- ⦿ Acute compartment syndrome is a medical emergency. It is usually caused by a severe injury. Without treatment, it can lead to permanent muscle damage.

300

Compartment Syndrome

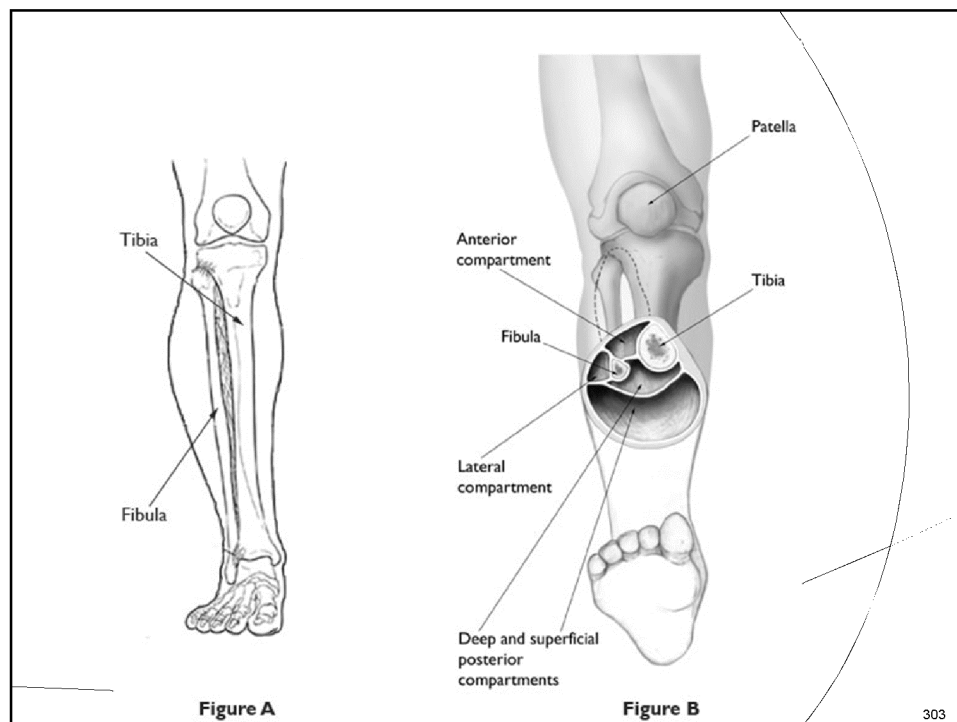
- ⦿ Chronic compartment syndrome, also known as exertional compartment syndrome, is usually not a medical emergency. It is most often caused by athletic exertion.

301

Anatomy

- ⦿ Compartments are groupings of muscles, nerves, and blood vessels in your arms and legs.
- ⦿ Covering these tissues is a tough membrane called a fascia. The role of the fascia is to keep the tissues in place, and, therefore, the fascia does not stretch or expand easily.

302



303

Description

- ⦿ Compartment syndrome develops when swelling or bleeding occurs within a compartment. Because the fascia does not stretch, this can cause increased pressure on the capillaries, nerves, and muscles in the compartment.
- ⦿ Blood flow to muscle and nerve cells is disrupted. Without a steady supply of oxygen and nutrients, nerve and muscle cells can be damaged.

304

Description

- ⦿ In acute compartment syndrome, unless the pressure is relieved quickly, permanent disability and tissue death may result. This does not usually happen in chronic (exertional) compartment syndrome.
- ⦿ Compartment syndrome most often occurs in the anterior (front) compartment of the lower leg (calf). It can also occur in other compartments in the leg, as well as in the arms, hands, feet, and buttocks.

305

Cause

- ⦿ ***Acute Compartment Syndrome***
- ⦿ Acute compartment syndrome usually develops after a severe injury, such as a car accident or a broken bone. Rarely, it develops after a relatively minor injury.

306

Cause

- ⦿ **A fracture.**
- ⦿ **A badly bruised muscle.** This type of injury can occur when a motorcycle falls on the leg of the rider, or a football player is hit in the leg with another player's helmet.
- ⦿ **Reestablished blood flow after blocked circulation.** This may occur after a surgeon repairs a damaged blood vessel that has been blocked for several hours. A blood vessel can also be blocked during sleep. Lying for too long in a position that blocks a blood vessel, then moving or waking up can cause this condition. Most healthy people will naturally move when blood flow to a limb is blocked during sleep. The development of compartment syndrome in this manner usually occurs in people who are neurologically compromised. This can happen after severe intoxication with alcohol or other drugs.

307

Cause

- ⦿ **Crush injuries.**
- ⦿ **Anabolic steroid use.** Taking steroids is a possible factor in compartment syndrome.
- ⦿ **Constricting bandages.** Casts and tight bandages may lead to compartment syndrome. If symptoms of compartment syndrome develop, remove or loosen any constricting bandages. If you have a cast, contact your doctor immediately.

308

Chronic (Exertional) Compartment Syndrome

- ⦿ The pain and swelling of chronic compartment syndrome is caused by exercise. Athletes who participate in activities with repetitive motions, such as running, biking, or swimming, are more likely to develop chronic compartment syndrome. This is usually relieved by discontinuing the exercise, and is usually not dangerous.

309

Symptoms

- ⦿ The pain is more intense than what would be expected from the injury itself. Using or stretching the involved muscles increases the pain.
- ⦿ There may also be tingling or burning sensations (paresthesias) in the skin.
- ⦿ The muscle may feel tight or full.
- ⦿ Numbness or paralysis are late signs of compartment syndrome. They usually indicate permanent tissue injury.

310

Chronic (Exertional) Compartment Syndrome

- ⦿ Chronic compartment syndrome causes pain or cramping during exercise. This pain subsides when activity stops. It most often occurs in the leg.
- ⦿ Symptoms may also include:
- ⦿ Numbness
- ⦿ Difficulty moving the foot
- ⦿ Visible muscle bulging

311

Treatment

- ⦿ ***Chronic (Exertional) Compartment Syndrome***
- ⦿ **Nonsurgical treatment.** Physical therapy, orthotics (inserts for shoes), and anti-inflammatory medicines are sometimes suggested. They have had questionable results for relieving symptoms.

312

Treatment

- ◎ Your symptoms may subside if you avoid the activity that caused the condition. Cross-training with low-impact activities may be an option. Some athletes have symptoms that are worse on certain surfaces (concrete vs. running track, or artificial turf vs. grass). Symptoms may be relieved by switching surfaces.

313

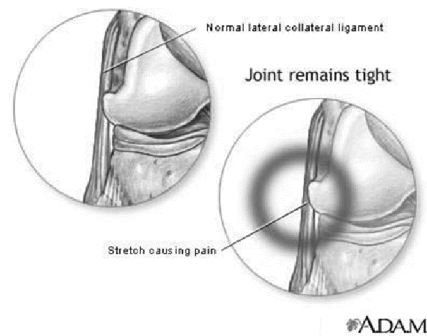
Lateral collateral ligament (LCL) injury

- ◎ Lateral collateral ligament (LCL) injury is an injury to the ligament on the outer side of the knee.
- ◎ It can be a stretch, partial tear, or complete tear of the ligament.

314

Considerations

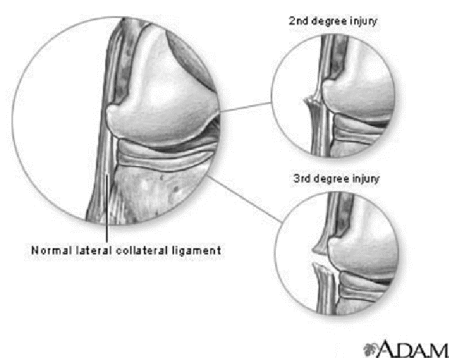
- The lateral collateral ligament (LCL) goes from the top part of the fibula (the bone on the outside of the lower leg) to the outside part of the lower thigh bone.
- The ligament helps keep the outer side of the knee joint stable.



315

Causes

- The LCL is usually injured by pressure or an injury that pushes the knee joint from the inside, which results in stress on the outside part of the joint.



316

Symptoms

- ⦿ Symptoms of a tear in the lateral collateral ligament are:
- ⦿ Knee swelling
- ⦿ Locking or catching of the knee with movement
- ⦿ Pain or tenderness along the outside of the knee
- ⦿ Knee gives way, or feels like it is going to give way, when it is active or stressed in a certain way

317

First Aid

- ⦿ A lateral collateral ligament test may reveal looseness in the ligament. This involves bending the knee to 25 degrees and placing pressure on the inside surface of the knee.
- ⦿ Other tests may include:
- ⦿ Knee joint x-rays
- ⦿ Knee MRI
- ⦿ Treatment includes:
- ⦿ Applying ice to the area
- ⦿ Nonsteroidal anti-inflammatory drugs (NSAIDs)
- ⦿ Raising the knee above heart level

318

First Aid

- ◎ You should limit physical activity until the pain and swelling go away. The doctor may put you on crutches and in a brace to protect the ligament. You may also be told not to put any weight on your knee when you walk.
- ◎ After a period of keeping the knee still, you should do exercises to strengthen and stretch the knee. Physical therapy may help you regain knee and leg strength.

319

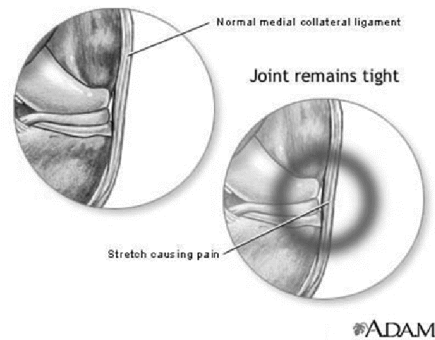
First Aid

- ◎ Surgery is often not needed when only the LCL has been torn. However, this ligament is often injured during significant trauma, including knee dislocations.

320

Medial collateral ligament (MCL) injury of the knee

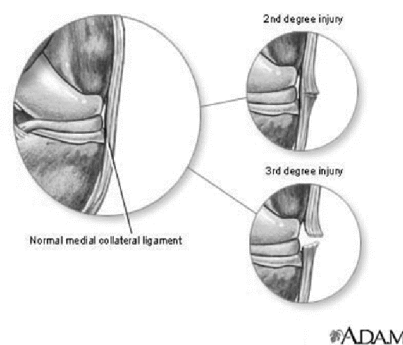
- Medial collateral ligament (MCL) injury is an injury to the ligament on the inner part of the knee. This ligament keeps your shin bone (tibia) in place.
- It can be a stretch, partial tear, or complete tear of the ligament.



321

Considerations

- The medial collateral ligament (MCL) goes from the inside surface of the upper shin bone to the inner surface of the bottom thigh bone.
- The ligament helps keep the inside portion of the knee joint stable.



322

Causes

- ⦿ The MCL is usually injured by pressure or stress on the outside part of the knee. A block to the outside part of the knee during football is a common way for this ligament to be injured.
- ⦿ It is often injured at the same time as an anterior cruciate ligament (ACL) injury occurs.

323

Symptoms

- ⦿ Symptoms of a tear in the medial collateral ligament are:
- ⦿ Knee swelling
- ⦿ Locking or catching of the knee with movement
- ⦿ Pain and tenderness along the inside of the joint
- ⦿ The knee gives way or feels like it is going to give way when it is active or stressed in a certain way

324

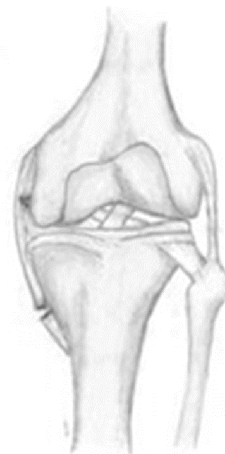
First Aid

- ⦿ A lateral collateral ligament test may reveal looseness in the ligament. This involves bending the knee to 25 degrees and placing pressure on the inside surface of the knee.
- ⦿ Other tests may include:
- ⦿ Knee joint x-rays
- ⦿ Knee MRI
- ⦿ Treatment includes:
- ⦿ Applying ice to the area
- ⦿ Nonsteroidal anti-inflammatory drugs (NSAIDs)
- ⦿ Raising the knee above heart level

325

Medial Ligament Sprain

- ⦿ The medial knee ligament has two parts to it - a deep, inner section that attaches to the cartilage meniscus and joint margins and a superficial band that attaches from higher up on the femur to an area, lower down, on the inner surface of the tibia.



326

What is a medial ligament injury?

- ⦿ Injury to the MCL often occurs after an impact to the outside of the knee when the knee is slightly bent.
- ⦿ The MCL on the inside of the knee becomes stretched and if the force is great enough, some or even all of the fibres will tear. The deep part of ligament is prone to becoming damaged first and this may lead to medial meniscal damage also.

327

Type of injury

- ⦿ As with all ligament injuries, medial collateral ligament injuries are graded 1, 2 or 3 depending on the degree of damage sustained. A grade one tear consists of fewer than 10% of the fibres being torn. a grade 3 is a complete rupture and grade two sits inbetween!

328

Grade 1 symptoms:

- ⦿ Mild tenderness on the inside of the knee over the ligament.
- ⦿ Usually no swelling.
- ⦿ When the knee is bent to 30 degrees and an outward force applied to the lower leg to stress the medial ligament, pain is felt but there is no joint laxity (looseness)

329

Grade 2 symptoms:

- ⦿ Significant tenderness on the inside of the knee on the medial ligament.
- ⦿ Some swelling seen over the ligament.
- ⦿ When the knee is stressed as for grade 1 symptoms, there is pain and mild to moderate laxity in the joint, although there is a definite end point (the knee cannot be bent sideways completely).

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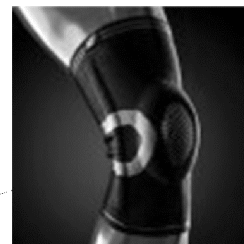
Grade 3 symptoms:

- ⦿ This is a complete tear of the ligament.
- ⦿ Pain can vary and is sometimes not as bad as that of a grade 2 sprain.
- ⦿ When stressing the knee as described above there is significant joint laxity.
- ⦿ The athlete may complain of having a very wobbly or unstable knee.

331

What can the athlete do?

- ⦿ Apply R.I.C.E. (Rest, Ice, Compression, Elevation) to the injured knee.
- ⦿ Rest from training.
- ⦿ Wear a knee brace to support the joint, particularly for grade 2 and 3 injuries.
- ⦿ Wear a heat retainer after the acute phase for minor injuries.
- ⦿ Try to keep the knee mobile.
- ⦿ Consult a Sports Injury Professional.



332

Treatment

- ◉ If you have a Grade I or Grade II knee sprain, treat with rest, ice, compression, elevation, nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, and wearing a knee brace for a short period of time.
- ◉ A Grade III MCL sprain is usually treated conservatively with rest, ice, compression, elevation, NSAIDs, and physical therapy. In certain cases, surgery may be used to repair a torn MCL. A Grade III LCL sprain is treated just as an MCL. With a severe LCL sprain, the torn ligament often is repaired surgically.

333

Prevention

- ◉ Warm up and stretch before you participate in athletic activities.
- ◉ Perform exercises to strengthen the leg muscles around the knee, especially the quadriceps.
- ◉ Avoid sudden increases in the intensity of training programs. Never push yourself too hard, too fast. Increase the intensity gradually.
- ◉ Wear comfortable, supportive shoes that fit your feet and fit your sport.

334

Rehabilitation Exercises

- ◉ Quad sets: Sit with legs extended and fully contract the muscles of the front thighs. Hold contractions for 10 seconds. Repeat 10 times for three sets.
- ◉ Straight leg raises (hip flexion): Lie with one leg extended and the other bent at the knee. Lift the entire leg from the hip so that the heel is about five inches above the floor. Hold this position for five to 10 seconds and then slowly lower the leg. Repeat 10 times for three sets.

335

Rehabilitation Exercises

- ◉ Backward leg raise (hip extension): Lie on stomach with legs straight. Lift one leg as high as possible and hold for five to 10 seconds, then slowly lower the leg. Repeat 10 times for three sets.
- ◉ Hip abduction: Lie on side of uninjured leg, so that the injured leg is on top of the uninjured leg. Lift the injured leg at the hip away from the body. Lift the leg as high as possible and hold for five to 10 seconds, then slowly lower the leg. Repeat 10 times for three sets.

336

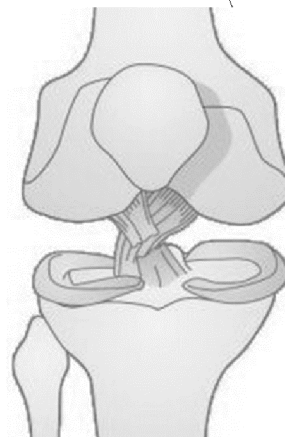
Rehabilitation Exercises

- ⦿ Hip adduction: Lie on side of injured leg, with uninjured leg bent at the knee and foot flat on the floor. Lift the injured leg at the hip toward the other leg. Hold for five to 10 seconds and then slowly lower the leg. Repeat 10 times for three three sets.
- ⦿ Half-knee bends: Stand with feet shoulder width apart. Slowly lower the body weight by bending the knees. Do not perform a full squat, but rather stop at about half of the full squat position and then fully extend the knees. If there is pain before achieving the half-squat position, stop downward travel at that point. Repeat 10 times for three sets.

337

Torn Anterior Cruciate Ligament / ACL Knee Injury

- ⦿ The ACL is one of the four main stabilising ligaments of the knee, the others being the Posterior Cruciate Ligament (PCL), Medial Collateral Ligament (MCL) and Lateral Collateral Ligament (LCL).
- ⦿ The ACL attaches to the knee end of the Femur (thigh bone), at the back of the joint and passes down through the knee joint to the front of the flat upper surface of the Tibia (shin bone).



338

Anterior Cruciate Ligament

- ◉ The role of the Anterior Cruciate Ligament is to prevent forward movement of the Tibia from underneath the femur. The Posterior Cruciate Ligament prevents movement of the Tibia in a backwards direction.
- ◉ Together these two ligaments are vitally important to the stability of the knee joint, especially in contact sports and those that involve fast changes in direction and twisting and pivoting movements.

339

How does a torn ACL occur?

- ◉ A torn ACL usually occurs through a twisting force being applied to the knee whilst the foot is firmly planted on the ground or upon landing. A torn ACL can also result from a direct blow to the knee, usually the outside, as may occur during a football or rugby tackle.
- ◉ This injury is sometimes seen in combination with a medial meniscus tear and MCL injury, which is termed O'Donohue's triad.

340

Symptoms of a torn ACL

- ⦿ There may be an audible pop or crack at the time of injury
- ⦿ A feeling of initial instability, may be masked later by extensive swelling.
- ⦿ A torn ACL is extremely painful, in particular immediately after sustaining the injury.
- ⦿ Swelling of the knee, usually immediate and extensive, but can be minimal or delayed.
- ⦿ Restricted movement, especially an inability to fully straighten the leg
- ⦿ Possible widespread mild tenderness
- ⦿ Positive signs in the anterior drawer test and Lachman's test .
- ⦿ Tenderness at the medial side of the joint which may indicate

341

Treatment for an Anterior Cruciate Rupture

- ⦿ Immediately stop play or competition
- ⦿ Apply RICE (Rest, Ice, Compression, Elevation) to the knee immediately
- ⦿ Seek medical attention as soon as possible.
- ⦿ **What does surgery involve?**
- ⦿ Surgery involves either repairing or reconstructing the torn ACL.

342

Medial Cartilage Meniscus Injury

- Each knee joint has two crescent-shaped cartilage menisci. These lie on the medial (inside) and lateral (outside) of the upper surface of the tibia (shin) bone.
- They are essential components of the knee, acting as shock absorbers as well as allowing for the proper interaction and weight distribution between the tibia and the femur.



343

What is a Medial Meniscus Injury?

- The medial meniscus is more prone to injury than the lateral meniscus as it is connected to the medial collateral ligament and the joint capsule and so is less mobile.
- Hence, any forces impacting from the outer surface of the knee, such as a rugby tackle, can severely damage the medial meniscus.
- In addition, medial meniscal injuries are often also associated with injuries to the anterior cruciate ligament.

344

What are the Symptoms?

- ⦿ A history of trauma or twisting of the knee.
- ⦿ Pain on the inner surface of the knee joint.
- ⦿ Swelling of the knee within 48 hours of injury.
- ⦿ Inability to bend knee fully- this may be associated with pain or a clicking noise.
- ⦿ A positive sign (pain and/or clicking noise) during a "McMurrays test".
- ⦿ Pain when rotating and pressing down on the knee in prone position - "Apley's test"
- ⦿ "Locking" or "giving way" of the knee.
- ⦿ Inability to weight bear on the affected side.

345

Types of Meniscal Tear:

- ⦿ **Longitudinal Tears:** This is a tear that occurs along the length of the meniscus and can vary in length
- ⦿ **Radial Tears:** These tear from the edge of the cartilage inwards.
- ⦿ **Bucket-Handle Tears:** This is an exaggerated form of a longitudinal tear where a portion of the meniscus becomes detached from the tibia forming a flap that looks like a bucket handle
- ⦿ **Degenerative Changes:** This may lead to edges of the menisci becoming frayed and jagged

346

Treatment for medial cartilage injury

- ⦿ Apply RICE to the injured knee.
- ⦿ Wear a knee compression support.
- ⦿ Try to keep the knee moving using our mobility exercises.
- ⦿ Gentle exercises to maintain quadriceps strength, although care should be taken not to aggravate the symptoms.
- ⦿ Take a glucosamine / joint healing supplement.
- ⦿ Consult a Sports Injury Specialist.

347