Elbow, Wrist, and Hand Injuries in Rock Climbers:

Common Problems in Uncommon People

Jake Veigel, MD

www.cayugamed.org/sportsmedicine
Objectives

• Discuss elbow, wrist, hand and finger injuries
• Causes—biomechanics and other
• What to look for and when to seek help
• How we diagnose
• Treatment
• Prevention strategies
Breakdown of all COE injuries and illnesses

Sprains and Strains by location at COE

<table>
<thead>
<tr>
<th>Activity</th>
<th>Evacuation Rate (95% CI)</th>
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<tr>
<td>Mountain biking</td>
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<td>Mountaineering</td>
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<td>Caving</td>
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<td>Climbing, natural surfaces</td>
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<td>Cross-country skiing</td>
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<td>Trail running</td>
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<td>River kayaking</td>
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<td>Wilderness medicine</td>
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<td>Climbing, constructed walls</td>
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<td>Telemark skiing, ice climbing</td>
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<tr>
<td>Sea kayaking, canoeing</td>
<td>0 (0-4.1, 0-3.5)</td>
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<tr>
<td>Day hiking, snowshoeing</td>
<td>0 (0-2.3, 0-7.8)</td>
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Evacuation rate per 1000 participant-days (95% CI)
Elbow Injuries

- Most common complaint in female climbers, 3rd in males
- Anterior (cubital fossa)
  - Brachialis strain (climber’s elbow)
  - Biceps strain
  - Compression of posterior interosseus nerve
- Medial
  - Medial epicondylitis (golfer’s elbow)
  - Pronator teres strain
- Lateral epicondylitis (tennis elbow)
Climber’s Elbow—Brachialis Muscle Strain

- Muscle involved in elbow flexion when hand is pronated
- A strain is graded 1-3
  - 1 is microscopic tears
  - 2 is a partial tear
  - 3 is a complete tear
Brachialis Muscle Strain--Diagnosis

• Pain on resisted elbow flexion with the hand supinated—Biceps strain
• Pain on resisted elbow flexion with the hand pronated—Brachialis strain
• Graded by palpable defect, weakness or
• MRI or US
Brachialis Tear--MRI
Brachialis Strain—Treatment

- Rest, 2-6 weeks depending on severity
- Ice, anti-inflammatories
- Physical therapy
- Graduated return to climbing
Prevention of Climber’s Elbow

- Graduated climbing program
- Strength training
  - Pull-ups with hand pronated-palm facing away from you
  - Excessive pull-ups in this position may predispose to lateral epicondylitis
Lateral Epicondylitis

- Pain, soreness along outside of elbow, muscles that extend the wrist
- Gradually worsening with wrist motion
- Weak grasp
- Chronic degeneration and tears of the tendon
Lateral Epicondylitis—Causes

• Overload and Overuse
  – Short intense burst
  – Long term repetition

• Failure of inflammatory pathways resulting in small tears and degeneration--epicondylosis

• Training errors
Lateral Epicondylitis—Diagnosis

- Tenderness at the lateral epicondyle
- Pain with resisted wrist extension
- Ultrasound may be helpful
Lateral Epicondylitis—Treatment

- Rest, ice, anti-inflammatory agents
- Physical therapy—focus on eccentric exercises
- Elbow straps may help
- Injections
  - Corticosteroids
  - Proliferants, platelet-rich plasma
Medial Epicondylitis

- Pain, soreness along inside of elbow, muscles that flex the wrist
- Gradually worsening with wrist motion
- Weak grasp
- Chronic degeneration and tears of the tendon
Medial Epicondylitis--Causes

• Same as lateral epicondylitis
• In climbers with natural joint laxity there may be a predisposition as instability may place a great strain on the common flexor origin
Medial and Lateral Epicondylosis—Prevention

• Proper training
  – Not too much too soon for too long and too hard
  – Increase by 10% per week

• Strength training
  – Pulls up with modifications
  – Eccentric strengthening
Pronator Teres Strain

• Can also present as medial elbow pain
• Treated with rest, ice, anti-inflammatories, physical therapy
Forearm and Wrist

- Chronic exertional compartment syndrome
- Intersection syndrome
Chronic Exertional Compartment Syndrome—Forearm

- Most common in leg muscle in running sports

Frober R. Anatomic Basis of forearm compartment syndrome Surg Rad Anat 1994
Pressure Measurements

Figure 1  Rotating climbing wall used for climbing ergometric test.

Figure 2  Insertion of slit catheter for measurement of pressure.

Table 2  Compartment pressure (mm Hg) in 10 climbers during ergometric test

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Schoffl V Evaluation of physiological standard pressures of the forearm flexor muscles during sport specific ergometry in sport climbers. BJSM 2004
CECS—Forearm, Treatment

- Activity modification
- Fasciotomy
Intersection syndrome

- Friction point where muscle bellies of 1\textsuperscript{st} compartment-Abductor Pollicis Longus and Extensor Pollicis Brevis cross 2\textsuperscript{nd} and 3\textsuperscript{rd} dorsal compartments
- Inflammatory peritendinitis
- Common with rowers due to clenched fist and thumb abduction
- Friction and crepitus felt 4-5cm proximal to radial styloid with rest flexion and extension and radial deviation
Intersection Syndrome Diagnosis

- Pain and swelling about 2-3 finger breadths proximal to dorsal wrist joint
- Palpable crepitus ("squeaker’s wrist")
Intersection Syndrome Treatment

- Splinting
- Activity modification
- Icing
- Nsaisds
- Corticosteroid injection
Intersection Syndrome Surgery

- Failure of conservative measures
- Tenosynovectomy and fasciotomy of abductor pollicis longus can be performed
# Hand and Wrist injuries

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Adapted from Logan AJ, Acute hand and wrist injuries in experienced climbers. BJSM 2004
Wrist

- Carpal Tunnel Syndrome (25% of top European climbers)
- Tendinitis or peritendinitis
  - Flexor capri ulnaris
  - Flexor digitorum superficialis
  - Flexor digitorum profundus
- Important Fractures
  - Schaphoid
Carpal Tunnel Syndrome

- Most common nerve entrapment disorder
- Pain and parasthesias from high pressures in the carpal tunnel causing compression and inflammation of the median nerve
- Carpal bones dorsally and transverse carpal ligament (flexor retinaculum) ventrally
Carpal tunnel syndrome
Hand Diagrams

Sn = 0.64; Sp = 0.73
NPV = 0.91
Tinel + hand diagram – PPV = 0.71

Carpal Tunnel Syndrome

**Figure 6.** (A) Tinel’s sign. (Redrawn from Seidel HM, Ball JW, Dains JE, Benedict GW, editors. Mosby’s guide to physical examination. 4th ed. St. Louis [MO]: Mosby; 1999:719, with permission from Elsevier Science.) (B) Phalen’s test.
Sensitivity and Specificity

• For both Phalen’s and Tinel’s is LOW
  – Phalen’s – Sn= 0.75 ; Sp = 0.47
  – Tinel’s – Sn= 0.60; Sp = 0.67


• Combine with hand diagram and history
Nerve Conduction Study

• Can be painful and costly
• Reserve for patients who
  – have failed conservative therapy
  – diagnosis is uncertain
  – late presentation with thenar wasting and motor dysfunction
• False negative rates as high as 10%

Carpal Tunnel Syndrome Diagnosis

- Pain involves thumb, first two fingers and radial half of the fourth finger
- Palpation: thenar eminence wasting
- ROM: thumb weakness and difficulty pincher grasping
- Diagnostic Tests or special maneuvers
  - Nerve conduction studies
  - Tinel’s
  - Phalen’s
Carpal Tunnel Syndrome Treatment

- Ice
- Activity modification
- Workspace modification
- Splinting
- Injection
- Surgery
Carpal Tunnel Injection

- Short term efficacy: RCT, 70% vs 34% at 2 weeks (steroid vs sham)
  - NNT = 2.8
  - Long-term benefits are more variable
  - 43% of patients above required referral to surgery

Injection technique: 23-25g needle; 1-2 cc of lidocaine plus 20-40mg Methylprednisolone. Injected radial side of palmaris longus tendon

Muscle Nerve 2004 Jan;29(1):82-8
Carpal Tunnel Syndrome Surgery

- Constant numbness and tingling
- Thenar eminence wasting
- If get EMG, moderate to severe carpal tunnel or denervation
Wrist Tendinitis

- Flexor capri ulnaris
- Flexor digitorum superficialis
- Flexor digitorum profundus
- De Quervain’s Tenosynovitis
Wrist Tendinitis

- Anterior Forearm into wrist
- Pain, tightness
- Fullness or some swelling
- Like Compartment syndrome but doesn’t resolve when you stop activity
Wrist Tendinitis—Treatment

- Rest
- NSAIDs
- Splinting
- Corticosteroid injection
DeQuervain’s Tenosynovitis

- Pain due to inflammation of the short extensor and abductor tendons of the thumb
- Repetitive or unaccustomed gripping and grasping causes friction over the distal radial styloid
DeQuervain’s Tenosynovitis: Diagnosis

- Swelling and pain over 1\textsuperscript{st} dorsal compartment
- +Finkelstein’s test
DeQuervain’s Tenosynovitis: Treatment

- Splint
- Injection - 1\textsuperscript{st} line
  - up to 90% are pain free if injected within 6 months
- Splinting performs poorly in comparison to steroid injection

DeQuervain’s Tenosynovitis--Surgery

• Recurrence despite repeated injections
Scaphoid Fracture

• Most common fractured bone in the wrist
• Peanut shaped bone that spans both rows of carpal bones
• Does not require excessive force and often not extremely painful so can be delayed presentation
Scaphoid Fracture Presentation

• Pain over the anatomic snuff box
• Pain is not usually severe
• Often present late
Scaphoid Fracture Pathoanatomy

- Blood supplied from distal pole
- In children, 87% involve distal pole
- In adults, 80% involve waist
- Treatment depends on location of fracture
Imaging

- AP, lateral, oblique and scaphoid view
- Radiographs can be delayed for up to 4 weeks
- MRI, bone scan, or treat and repeat film
Scaphoid Fracture Treatment

- Cast 6-12 weeks
- Short arm vs. long arm
- Follow patient every 2 weeks with x-ray
- CT and clinical evaluation to determine healing
- Consider screwing early
Non Operative Treatment - Disadvantages

- Nonunion rate 5-55%
- Delayed union
- Malunion
- “cast disease”- joint stiffness
- Prolonged immobilization- sometimes >12 weeks
- Loss of time from employment and avocations
Scaphoid Fracture - Surgery

- Angulated or displaced (1mm)
- Non-union or AVN
- Proximal fractures
- Late presentation
- Early return to play desired
## Outcome of Percutaneous Fixation of Scaphoid Fracture

<table>
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<tr>
<th>Study</th>
<th>Approach</th>
<th>Implant</th>
<th>No. of Fractures, Type</th>
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<td>Headed cannulated screw</td>
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Hand and Fingers

- Anatomy
- Biomechanics
- Related injuries
- Prevention
- Training
Finger Anatomy

Figure 10.3 Finger Anatomy

Bones: Proximal Phalanx, Middle Phalanx, Distal Phalanx

Joints: PIP, DIP

Collateral Ligament

FDP Tendon

FDS Tendon

Annular Pulleys: A1, A2, A3, A4, A5

Cruciform Pulleys: C0, C1, C2, C3

THE CENTER IS YOU

Cayuga Medical Center
Sports Medicine and Athletic Performance
Biomechanics

- Nearly infinite number of handholds and grips
- Crimp Grip
- Open hand grip
- Pocket grip
- Wedge
- Pushing
- Pinch
Crimp Grip

- Most common
- Climber’s weight on the distal phalanges
- DIP joint hyper-extended
- PIP joint flexed
- High loads by DIP joint, FDS

Open Hand Grip

- Flat protrusion
- Force distribution along DIP and PIP
- Force distribution along FDS and FDP
Crimp Grip Vs Slope Grip

- The largest amount of bowstringing was caused by the FDP tendon in the crimp grip position being less using slope grip position (PIP joint extended).

# The Finger

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Schoffl’s Work

Pulley rupture 74
Pulley strain 48
Tendovaginitis 42
Joint capsular damage 37
Arthritis (acute) 13
Ganglion 11
Flexor tendon strain 7
Fracture 7
Arthritis (chronic) 7
Dupuytren contracture 5
Soft tissue injury, contusion 5
Flexor tendon partial tear 4
Collateral ligament injury 3
Osseous tear, fibrocartilage palmaris 2
Epiphyscal fracture 2
Lumbrical shift syndrome 2
Abscess 1
Finger amputation 1

Finger injuries

- Mallet Finger
- Extensor tendon slip injuries
- Jersey Finger
- Collateral ligament injuries
- Volar plate injuries
- Extensor Hood Syndrome
- Osteoarthritis
- Pulley Injuries
Acute Finger Injuries in Rock Climbers

- Often from slipping a foothold
- Jamming finger into wall during falls
Mallet Finger (Baseball Finger)

- Injury to the extensor tendon at the DIP joint
- Most common closed tendon injury of the finger
- Mechanism: object striking finger, creating forced flexion, not as common in climbing
- Tendon may be stretched, partially torn, or completely separated by a distal phalanx avulsion fracture
Mallet Finger Presentation

- Pain at dorsal DIP joint
- Inability to actively extend the joint
- Characteristic flexion deformity
- On exam, very important to isolate the DIP joint to ensure extension from DIP and not the central slip
- If can’t passively extend consider bony entrapment
- All of these need x-rays
Mallet Finger Treatment

- Splint DIP in neutral or slight hyperextension for 6 weeks
- Cochrane review- all splints same results
- Surgical wiring does not improve outcome
- Office visit every 2 weeks
- If not extension lag at 6 weeks, splint at night and for activity for 6 weeks.
- Conservative treatment effective up to 3 months delayed presentation

Handoll. Interventions for treating mallet finger injuries. Cochrane Database 2004
Mallet Finger—Surgery

- Bony avulsion >30% of joint space
- Inability to achieve passive extension
- Despite proper treatment permanent flexion of the fingertip is possible
- No fracture reduction in the splint
Central Slip Extensor Tendon Injury-Boutonnière deformity

- PIP joint is forcibly flexed while actively extended
- Not as common in climbers
- Volar dislocation of the PIP joint
- Examine with PIP joint in 15-30 degrees of flexion, can’t active extend but can passively extend
- Tenderness over dorsal aspect of the middle phalanx
Central Slip Extensor Tendon Injury Treatment

- A delay in proper treatment will cause boutonniere deformity
- Deformity can develop over several weeks or occasionally acutely
- Splint PIP in extension for 6 weeks
Central Slip Extensor Tendon Injury Surgery

• Avulsion fracture involving more than 30 percent of the joint
• Inability to achieve full passive extension
Flexor Digitorum Profundus Tendon Injury (Jersey finger)

• Slipping a foothold
• Forced extension of the DIP joint during active flexion
• 75% occur in the ring finger
• Force can be concentrated at the middle or distal phalanx
Jersey Finger Presentation

- Pain and swelling at the volar aspect of DIP joint
- Can often feel fullness proximally if tendon retracted
- Need to isolate the DIP to properly test
Jersey Finger Physical Exam
Jersey Finger Treatment—Surgery

All need to be referred for surgery immediately
Collateral Ligament Injuries

- Forced ulnar or radial deviation
- Can cause partial or complete tear
- PIP is usually involved- ask about my finger, “jammed finger”
- Present with pain at the affected ligament
- Evaluate with involved joint at 30 degrees of flexion and MCP at 90 degrees of flexion
Collateral Ligament Injuries - Treatment

- If joint stable and no large fracture - can buddy tape
- Never leave the pinky alone
- Physical Therapy - if joint stiff
Collateral Ligament Injuries - Surgery

- Unstable joint
- Large associated fracture
- Injury in a child
Volar Plate Injury

- Hyperextension, such as dorsal dislocation
- PIP is usually affected
- Collateral damage is often present
- The loss of joint stability can cause hyperextension deformity
Volar Plate Injury - Diagnosis

- Maximal tenderness at volar aspect of affected joint
- Bruising, swelling
- Full extension and flexion possible if joint stable
- Collaterals should be tested
- Radiographs may show an avulsion fracture at the base of involved phalanx
Volar Plate Injury- Treatment

• Progressive splinting starting at 30 degrees flexion
• Followed by buddy taping
• If less severe, can buddy tape immediately
Volar Plate Injuries - Surgery

- Unstable joint
- Large avulsion fragment
Chronic Finger Problems in Rock Climbers

Figure 2. Obvious bowstringing of the flexor tendons across the PIP joint, in a climber not at the competition. This sign is usually more subtle and may only be palpable as opposed to visible. It should always be compared with the opposite hand.

Figure 3. Fixed flexion deformities of the PIP joints.

Bollen SR hand injuries in competition climbers BJSM 1990
Chronic Finger Problems in Rock Climbers

Figure 2. Detached ‘spurs’ were a common finding as the age of the climber increased.

Figure 3. ‘Scalloping’ of the necks of the proximal phalanges is due to cortical thickening at the attachment of the A2 pulley of the flexor sheath.

Bollen, SR Radiographic changes in the hands of rock climbers. BJSM 1994
Extensor Hood Syndrome

- progressive osteoarthritic changes
- Large bone spurs
- Crimp grip
- Long history of climbing
Imaging

- Climber with 30 years of climbing with stage 4 osteoarthritis in DIP and PIP joints and extensor hood irritation in the PIP joint.
- US shows fluid and effusion around extensor hood

Extensor Hood Syndrome

- Rest—Reduction of stress to joint 3-4 weeks
  - 2 level below highest ability
- Sulfur hand baths
- Ichtholan ointment
- NSAIDs
- Local corticosteroid
Extensor Hood Syndrome—Surgery

- The broken-off osteophyte at the PIP joint was surgically removed.
Epiphyseal Injuries in Young Climbers

- Epiphysis in the end of all long bones
- Allows growth
- “Weak Link”

Hochholzer Epiphyseal fractures of the Finger Middle Joints in young Sports Climbers Wild Env Med. 2005
Epiphyseal Injuries in Young Climbers

- Usually no acute event
- Pain usually insidious
- Swelling
- continue maximum intense training despite pain.
- Stress injury to the epiphysis
Fifteen-year-old climber with a Salter-Harris III lesion.

**Figure 2.** Clinical picture of the patient in Figure 3. Note the axial deviation.

**Figures 3 and 4.** Magnetic resonance images (T1 and T2) of an early stage of epiphysiolyisis. The conventional radiographs demonstrated no pathology. The T1 sequence clearly demonstrates a reduced signal of the epiphysis of the proximal interphalangeal joint in comparison with the MCP joint. The T2 image shows intra-articular effusion in the proximal interphalangeal joint.

**Figure 5.** Devastating result of 1 of the 2 climbers who continued climbing despite our advice.
Salter-Harris Scheme

Salter-Harris fracture types

- Normal
- Type 1 - 5%
- Type 2 - 75%
- Type 3 - 10%
- Type 4 - 10%
- Type 5 - uncommon
Fifteen-year-old climber with a Salter-Harris III lesion
Epiphysiolysis
Epiphyseal Injuries in Young Climbers

Treatment

• Rest
• Avoid intense, maximum training
• Must evaluate with X-Ray consider MRI
Epiphyseal Injuries--Surgery

- Any displacement
- Malalignment
- Severe growth plate injury
Pulley Injuries

Figure 2. Obvious bowstringing of the flexor tendons across the PIP joint, in a climber not at the competition. This sign is usually more subtle and may only be palpable as opposed to visible. It should always be compared with the opposite hand.
### Grading of Pulley Injuries

<table>
<thead>
<tr>
<th>Grade</th>
<th>Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pulley strain</td>
</tr>
<tr>
<td>2</td>
<td>Complete rupture of A4 or partial rupture of A2 or A3</td>
</tr>
<tr>
<td>3</td>
<td>Complete rupture A2 or A3</td>
</tr>
<tr>
<td>4</td>
<td>Multiple ruptures (as A2/A3, A2/A3/A4) or single rupture (as A2 or A3) combined with lumbricalis muscle or collateral ligament trauma</td>
</tr>
</tbody>
</table>

Pulley Injuries—Diagnosis

- Acute onset hard move or slipping off foothold
- Sometimes a “pop”
- Swelling with Hematoma

- suspected pulley rupture
  - X-Ray
  - fracture
    - yes
      - management as appropriate
    - no
      - ultrasound
  - dehiscence of tendon from bone
    - < 2 mm
      - strain
    - > 2 mm
      - single rupture
    - questionable
      - MRI
      - multiple ruptures
  - symptomatic therapy
  - conservative therapy
  - surgical repair
A2 Pulley Rupture

## Pulley Finger--Treatment

<table>
<thead>
<tr>
<th></th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Injury</strong></td>
<td>Pulley strain</td>
<td>Complete rupture of A4 or partial rupture of A2 or A3</td>
<td>Complete rupture A2 or A3</td>
<td>Multiple ruptures, as A2/A3, A2/A3/A4 or single rupture (A2 or A3) combined with lumbricalis muscle or ligament damage</td>
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<tr>
<td><strong>Therapy</strong></td>
<td>保守治疗</td>
<td>保守治疗</td>
<td>保守治疗</td>
<td>外科手术治疗</td>
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<tr>
<td>Immobilisation</td>
<td>无</td>
<td>10天</td>
<td>10–14天</td>
<td>手术修复</td>
</tr>
<tr>
<td>Functional therapy</td>
<td>2–4周</td>
<td>2–4周</td>
<td>4周</td>
<td>术后14天</td>
</tr>
<tr>
<td>Pulley protection</td>
<td>胶带</td>
<td>胶带</td>
<td>热塑材料或软性绷带</td>
<td>热塑材料或软性绷带</td>
</tr>
<tr>
<td>Easy sport-specific</td>
<td>After 4周</td>
<td>After 4周</td>
<td>After 6–8周</td>
<td>4个月</td>
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<tr>
<td>activities</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Full sport-specific</td>
<td>6周</td>
<td>6–8周</td>
<td>3个月</td>
<td>6个月</td>
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<td>activities</td>
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</tr>
<tr>
<td>Taping through</td>
<td>3个月</td>
<td>3个月</td>
<td>6个月</td>
<td>&gt;12个月</td>
</tr>
<tr>
<td>climbing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Rope Entanglement

• Instinctively grab the ascending rope
• Catch the fall
• Skin and soft tissue injury
• Tangle with belay point
• Unclip
• Tangle the rope around hands and fingers

Schoffl Rope Tangling Injuries—How Should a Climber Fall. Wild Env Med. 2008
Rope Tangling Injuries

Schoffl Rope Tangling Injuries—How Should a Climber Fall. Wild Env Med. 2008
Rope Tangling

Schoffl Rope Tangling Injuries—How Should a Climber Fall. Wild Env Med. 2008
How Should a Climber Fall?

• Extend arms forward at shoulder level
• Put feet forward just before contact with rock
• Protect head and chest with arms/hands
• Immediately after contact (no slack) grab rope
Prevention Tips

• What’s out there
• Warm-up
• Stretching
• Training strategies
• Exercises
What’s in the Literature?

- No specific study done for injury prevention for Rock Climbers
- Lots of internet hits
Google Hits

- [http://pages.uoregon.edu/opp/climbing/topics/injuries.html](http://pages.uoregon.edu/opp/climbing/topics/injuries.html) by Ryan Ojerio
- [http://www.metoliusclimbing.com/training_guide.html](http://www.metoliusclimbing.com/training_guide.html)
Basic Training Rules

- Endurance
- Strength
Warm-Up

• Focus on active (dynamic) components:
  – Generally improve performance
  – May lessen injury rates
Warm-up

• To enhance performance:
  – Raise body temperature (avoid excessive thermoregulatory strain)
  – Elevate VO$_2$
  – Include brief task-specific bursts
Warm-Up

• To prevent acute sport specific injuries:
  – Warm up exercises – about 5 min
  – Technique alignment exercises – about 5 minutes
  – Balance exercises – about 5 minutes
  – Strength & Power exercises – about 2 minutes
Stretching

• Limited and conflicting evidence that stretching PRIOR to exercise decreases injury rates
  – Pre-participation stretching is
    • Ineffective in reducing over use injuries (military, running, team sports)
    • Only somewhat effective in reducing muscle strains
Stretching

• Stretching **PRIOR** to performance decreases force production of muscles
  • Pre-participation stretching:
    – Decreases strength output
    – Can decrease power output
Finger Stretching

- Performance?
- Injury prevention?

Fingeryoga.com
Training Non-muscle?

- Muscles and bone
- Tendons, ligaments, connective tissue
Core Exercises for Climbers
Core Exercises

Single Leg Exercises

- Single leg squat
- Single leg dead lifts
Exercises for Climbers

- Pull-ups
  - Flat bar
  - Rock rings
  - Looped towel
- Excessive pull-ups can lead to elbow tendinopathy
- Adjust load
Exercises For Climbers

• Grip Strength
  – Metolius grip saver
  – Carry stuff
    • Weights-dumbbells or plates
    • Rocks

• Limit crimping
Rest

• Consecutive daily intense climbs can lead to fatigue and injury
• Should start each/day workout refreshed
• Alternated with rest days or low load days
• Get enough sleep
Training Guidelines

• Start low and increase gradually
• Incorporate adequate rest and nutrition
• Crosstrain
• Develop a plan, but be flexible
• Work on both power and endurance
Dr. Veigel’s Wish List

• Warm-up
• Listen to your body—train smarter not harder
• Seek out help early
• Increase gradually 10% week
• Years of climbing experience prior to one or two finger pocket holds
• Prepare for climbing season in advance
• <4 days/week of intense climbing