

Common Hand Injuries in Climbing

By Jeremy Johnson MD, MPH and Aunaly Palmer Medical Student

Climbing has seen huge growth in popularity since the first indoor facility opened in Seattle, WA in 1987, and this growth is expected to continue after the debut of climbing at the 2020 Tokyo Olympics.

Climbing is a full-body workout, and steep rock and wall faces place higher stresses and torque on the fingers than normal. That said, indoor climbing is a safe sport with a low risk of serious injury. According to one study, however, 75% of all climbers will encounter an upper extremity injury at some point. Of those, 50-60% will involve either the wrist or hand with the majority involving the fingers. Three of the most common type of finger injuries involve either the annular pulleys, flexor tendons or collateral ligaments.



Flexor tendon Injuries:

Each finger has two flexor tendons, the Flexor Digitorum Superficialis (FDS) and Flexor Digitorum Profundus (FDP), which originate in the forearm. Types of tendon injuries include:

1. Tendon Strains: Stretch or partial tear
2. Tenosynovitis: Inflammation and swelling of the tendon and surrounding sheath
3. Tendinopathy: Chronic break-down of the tendon caused by overuse
4. Tendon ruptures: Complete tendon tear
5. Avulsions: Bone is pulled away by tendon at its insertion

These injuries tend to have similar presentation, but all except tendinopathy

and tenosynovitis, occur after an acute injury. The majority of the acute injuries occur while the hand is again in a crimp position and the climber slips.

Most injuries can be treated by taking a rest from climbing and other exacerbating movements, applying ice and taking anti-inflammatories. Bracing may be needed initially, and ongoing taping may provide additional support. Then, active range of motion and strengthening exercises should be introduced as tolerated.

Avulsions and complete tendon ruptures are more serious injuries. These injuries can lead to permanent disability and require surgery. Injuries present with localized pain where these tendon inserts just above each joint of the finger. Often the torn tendon is pulled toward your palm (proximally), and pain can be present closer to or even in the palm of the hand.

flexion. Typical injuries occur when the fingers are crimped in a grip and a foot slips, placing an acute increased load on the fingers. Climbers often report an audible “pop” and experience immediate pain, followed by swelling and bruising. Pain is typically located at the base of the finger and bowstringing is sometimes present with resisted flexion. Sprains and partial tears of any single pulley can usually be managed conservatively with pain control, rest from climbing and splinting for 2 to 3 months. Complete tear or injuries of two consecutive pulleys often require a surgery.

Rupture or tear of the tendons or pulleys can be visualized using ultrasound or MRI. If your doctor has concerns for serious injury, he or she may order further imaging.

Collateral Ligament Injuries.

Each finger has 3 joints: the DIP, PIP and MCP, each with collateral ligaments on either side that stabilize the joint from movements other than the normal flexion and extension. The Distal Interphalangeal (DIP) is located at the end of the finger. The Metacarpal Phalangeal joint (MCP) is

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Annual Pulley Injuries:

The tendons that flex the fingers slide through a series of annular pulleys composed of fibrous bands holding the tendons against the finger. Without these pulleys, the tendons would “bowstring,” or come away from the finger with

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located where the finger meets the palm and the Proximal Interphalangeal joint (PIP) is located between them.

The most common joint injured is the Proximal Interphalangeal joint (PIP). Ligament injuries typically occur with the finger is trapped in a rock or hold and bent to either side. This motion can stretch or even tear the ligament. These injuries present with pain and swelling at the effected joint. Complete tears may be unstable.

X-rays are usually ordered to rule out fracture, but typically further imaging is not needed. Most PIP collateral ligament

sprains and partial tears can be treated with buddy taping to the adjacent finger, as well as ice, compression and gentle range-of-motion exercises as tolerated. Swelling and pain are commonly present for months. If pain is not present, you can resume climbing. Complete tears should be referred to a hand surgeon for management.

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4 Things To Ask Your Doctor About Skier's Thumb

By Shane L. Larson, MD

Skier's thumb involves an injury to the main supporting ligament on the inside of the thumb where it meets the palm, known as the ulnar collateral ligament (UCL). This injury typically occurs when the thumb is forced up and outward after falling on your ski pole.

The severity of the ligament injury can vary from a stretch of the ligament, to a partial or complete tear. In addition, this injury can sometimes cause the bone to be pulled off where the ligament attaches (avulsion fracture). Historically, this was known as "gamekeeper's thumb" and resulted from repetitive motions used in twisting the necks of poultry and caused chronic degeneration of the ligament. Today, an acute injury from traumatic falls is much more common.

If left untreated or undiagnosed, skier's thumb can lead to chronic instability, pain and a weakened grip. Therefore, proper diagnosis and management is critical.

What are the typical symptoms?

Symptoms of skier's thumb often include thumb pain, instability and weakness. Acute injuries also have swelling and bruising. Grabbing, holding or pinching an object makes symptoms worse. Pain localizes to the inside of the knuckle where your thumb meets your palm.

Do I need imaging?

X-rays are typically necessary in most cases. Three images are usually taken to

evaluate for associated fractures. S-rays are typically normal if the only the ligament is injured and no fracture is present.

Your sports medicine physician may elect to further evaluate the injury with special x-rays known as stress views. This involves applying gentle outward pressure and motion to the thumb during the x-ray to evaluate for instability.

If the x-rays are normal and there is a high suspicion for a more serious injury, your sports medicine physician might want an ultrasound and/or MRI to evaluate the ligament. These studies allow for better visualization of the ligament and other associated injuries that are not well visualized with x-rays.

Do I need surgery?

The need for surgical referral and treatment is generally made after discussing your injury, doing a physical examination, and getting imaging. Surgical treatment is recommended for complete ligament tears, avulsion fractures and if patients develop chronic instability.

Incomplete tears of the ligament and cases with only mild stretching of the UCL ligament generally do not require surgery, but do require immobilization with a cast or rigid splint for 6 weeks or longer, followed by hand therapy (also known as occupational therapists). After treatment with surgery or a period of



casting/splinting, occupational therapy is used to build range of motion and strength in a controlled manner and further treat your injury. This treatment continues to focus on thumb stability and grip strength.

When can I return to play or competition?

The return to play decision is individualized and should be discussed with your sports medicine physician. Considerations include whether or not you had surgical or non-surgical treatment, your sport/activity, and other factors. Time for return varies widely and can range from 4 to 12 weeks. After immobilization is complete, a protective splint should be used for 3 months during sporting activities.

Ramping up for Marathon Season

By Michael Swartzon, MD and Thomas San Giovanni, MD

Proper preparation is the key to avoiding injuries before and during any endurance event. Here are six areas worth careful consideration when training.

1: Fully address previous injuries:

Runners should take care to rehab their injuries properly before training. You should not be experiencing pain while training. This can sometimes be difficult to do on your own. Consulting with a sports medicine physician is a wise precaution to get the right diagnosis and treatment. Continuing a formal physical therapy and/or a regular home exercise program is important to fully recover and stay healthy.

2: Know your limits! Your experience and fitness level will determine your starting point and training schedule. It's important not to push too hard or too soon. When your legs start to feel heavy and fatigued, you are meeting the "Lactic Acid threshold," or the point at which lactate starts accumulating in your muscles. At this point, muscles lose their ability to react to the demands placed on them, putting you at risk for injury. It's okay to push yourself, but be smart about it. The Lactic Acid threshold will improve with gradual increases in your training load (including your total distance, pace, cross-training and strength-training). The maximum increase should be about 10-15% per week.

3: Choose your race event and develop a plan: Whether you choose a marathon, triathlon or 10K as your goal, it is important to train for several months prior to the event. Running shorter races is a great way to nudge your motivation and prepare for a longer event. Consider joining a local running club and following a well-thought-out, progressive training program. Training regimens should start easy and progress slowly. Any sudden increase in speed or distance places you at high risk for injury.

4: Rest! Sometimes less is more. Rest means having off days and good sleep habits (*see the above article). Recovery is one of the best protections against injury. As runners increase their distance, the risk of overuse and preventable injuries increases. Without rest, overtraining and burnout can set in. Depending on your training and cross-training volumes, you will need 1-3 days off per week. Listen to your body, and do not push through pain. Other examples of early warning signs of injury are swelling, prolonged stiffness, weakness and decreased performance.

5: Intake. Become familiar with recommendations for fluid intake. During your training, you can monitor your hydration by checking your weights pre- and post-exercise weight. Alternatively, look at the color of your urine, which should be mostly clear. Runners should

also be careful about drinking too much water, as this can lead to a dangerous sodium imbalance.

Water is only part of the planning. Carbohydrates are also essential for high-endurance athletes. Muscles use glycogen (a form of carbohydrates) for energy. Without it, your muscles lack the fuel they need to exercise. Consume small amounts of carbohydrates (about 60 grams per hour) to fuel your body during the race. Part of your training is practicing fueling your body. Expensive bars or gels are not necessary, so be creative. You can even make your own!

6: Train Mentally as well. You chose to run a marathon. Marathons are supposed to be fun but quite challenging. Whatever your motive for running is, remind yourself of it during training and during the race. Find ways to focus your mind while you are training. Some use their breath, some listen to music, and some meditate while running. Try out different methods and find one or more that work for you.

Lastly, although you are running the marathon alone, know you have a support system at the race. All races have a volunteer team of medical professionals there to help you. On race day, a team of physicians, athletic trainers, physician assistants, nurses and paramedics are there to give you a hand if you need it and just cheer you on if you don't!



Choosing Wisely®: The Importance of Sleep for Athletic Recovery

By Jacob Miller, MD



An initiative of the ABIM Foundation

Educate patients regarding appropriate sleep practices to support optimal recovery.

The *No Fear*® clothing brand once released a shirt that read “(We) are bigger, stronger, faster and practice while you sleep.” As our understanding of the importance of sleep in athletic performance and recovery has expanded, an appropriate alteration to this statement might read: “We sleep while you over-train.” Along with exercise and nutrition, sleep is one of the most critical components of performance in athletes of all ages and is essential for recovery. Unfortunately, this is often under-recognized by athletes and coaches.

The American Academy of Pediatrics recommends that adolescents get at least 8 hours of sleep; adults are encouraged to sleep at least 7 hours. This varies by individual, though, and some may need more. Sleep is involved in many factors that predict athletic performance. Adequate sleep quality and quantity is associated with improved accuracy, endurance, muscle power, regeneration and development, as well as improving sprinting speed and stimulating muscle memory. Brain function is also benefited, facilitating nerve cell recuperation, psychological and emotional regulation, and decision-making capacity.

Inadequate sleep carries many detriments that hinder athletic performance, such as decreased reaction time and processing speed. Athletes not getting enough sleep report greater fatigue and sense increased exertion while training. Sleep deficits increase stress hormones, which decrease the available energy for muscle repair. Increased fatigue contributes to poor decision-making and higher propensity for errors and risk-taking behaviors,

which can influence injury risk. One study reported that athletes were twice as likely to suffer an injury if they slept less than 8 hours per night, independent of all other risk factors.

Athletes experience many barriers to adequate sleep. Team sport participants frequently struggle with late night games, early morning practices and travel schedules that decrease available time for sleep. Youth and adolescent student-athletes often contend with early school start times, illogically scheduled when adolescent brains are least functional. Travel between time zones or to higher altitudes without providing an opportunity for acclimatization decreases sleep quality. Sporting event organizers, coaches and athletic directors should make a conscious effort to optimize sleep in athletes when planning competitions and practices.

Athletes who practice good sleep hygiene can improve their sleep quantity and quality. The following methods can have a meaningful impact on recovery following exercise:

- Set aside 15-30 minutes before going to bed to relieve stress. This may include mindfulness, meditation or journaling activities.
- Maintain a consistent sleep schedule throughout the week, and avoid sleeping in on weekends.
- Keep the sleeping environment dark, cool and quiet.
- Reserve the bed for sleep rather than for reading, watching television or using a smart phone, as these train the brain that the bed is not for sleep.
- Avoid using electronic devices with bright screens immediately before sleep. This will decrease the quality and quantity of sleep.

Keeping a sleep diary noting when you go to sleep, when you wake up during the night and in the morning. Also note how refreshed you feel upon awakening, which can help identify areas for improvement. Concerns about sleep habits should be discussed with a physician. Following these practices and optimizing travel, training and competition schedules can promote adequate sleep, decrease injury risk and bring about maximal recovery in athletes.

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