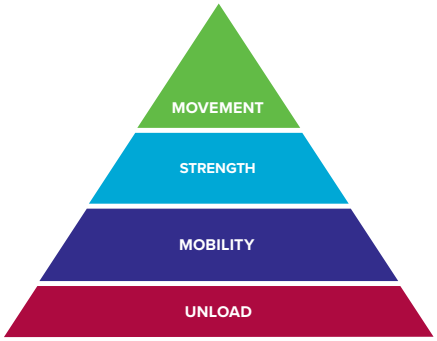
PULLEY SPRAIN REHAB PROTOCOL



This protocol is a companion to the online Pulley Sprain Rock Rehab Protocol and the pulley sprain chapter in the book Climb Injury-Free, written by Dr. Jared Vagy DPT. The step-by-step protocol will take a climber through a four-phase system to unload, gain full mobility, improve strength and eventually return to pain-free climbing movement. Timelines are provided as recommendations based on stages of tissue healing and may vary based on the individual.

The information in this protocol is not intended to diagnose or treat any medical condition. Always consult your physician or physical therapist before beginning any rehabilitation program. If you experience pain or difficulty with the recommended exercises, stop and consult your healthcare provider. Your use of this protocol indicates your assumption of the risk of injury and is an acknowledgment of your own sole responsibility for your health and safety. The author assumes no liability for injuries sustained by readers who engage in exercises or recommendations described in this protocol.

1-3 DAYS AND UP TO 6-8 WEEKS: PROTECTION

The goal of this phase is to protect the healing process of the pulley

- Immobilization of the finger into extension is optional and should be splinted for less than 5 days
- A pulley protection splint should be worn continuously for 6-8 weeks throughout the day and during therapy
- Mobility Level 1: Circulatory Massage

4-20 DAYS (WEEK 1 TO 3): INITIAL ROM AND ANTAGONIST STRENGTH

The goal of this phase is to prevent range of motion loss and increase antagonist strength

- Unload Level 1, 2, 3 or 4: While performing tendon glides
- Mobility Level 1: Circulatory Massage and Mobility Flossing
- Mobility Level 2: Finger Tendon Glides
- Supplementary Strengthening: Shoulder blade stabilizers, wrist extensors, and finger intrinsic muscles
  - To be continued during every phase throughout the rehabilitation program

21-41 DAYS (WEEK 3 TO 6): PROGRESSIVE ROM AND AGONIST STRENGTH

The goal of this phase is to increase range of motion and agonist strength

- PPS while performing tendon glide progression, fingertip rolls and no pain hangs. May limit range of motion.
- Mobility Level 1: Circulatory Massage and Mobility Flossing (PPS can be removed)
- Mobility Level 2: Finger Tendon Glides and Progression
- Mobility Level 3: Lumbrical and Claw Stretch (PPS can be removed)
- Strength Level 1: Resisted or Rice Bucket Finger Expansions (PPS can be removed)
- Strength Level 2: Fingertip Rolls
- Strength Level 3: No Pain Hang Stage 1
  - Open Hand: 3x per week, 3 sets of 7 reps, 7 seconds on, 3 seconds off, 3-minute rest between sets

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42-62 DAYS (WEEK 6 TO 9): RETURN TO CLIMBING

The goal of this phase is to return to climbing with a low volume and intensity

- Unload Level 1, 2 or 3: Tape during tendon glide progression, fingertip rolls, no pain hangs and climbing
- Allow adequate rest between climbing days: One day on and two days off
- Mobility Level 1: Circulatory Massage and Mobility Flossing
- Mobility Level 2: Finger Tendon Glides and Progression
- Mobility Level 3: Lumbrical, Claw and Extension Stretch
- Strength Level 1: Resisted or Rice Bucket Finger Expansions
- Strength Level 2: Fingertip Rolls
- Strength Level 3: No Pain Hang Stage 2
  - Open Hand: 3x per week, 3 sets of 7 reps, 7 seconds on, 3 seconds off, 3-minute rest between sets
  - Half Crimp: 3x per week, 3 sets of 7 reps, 7 seconds on, 3 seconds off, 3-minute rest between sets
- Easy climbing avoiding half and full crimp using large holds on faces not angled beyond vertical

63-83 DAYS (WEEK 9 TO 12): PROGRESSIVE LOADING 1

The goal of this phase is to begin to progressively load the pulley with both climbing and fingerboarding

- Tape while rock climbing and decrease rest time between climbing days: One day on and one day off
- Mobility Level 1: Circulatory Massage and Mobility Flossing
- Mobility Level 2: Finger Tendon Glides and Progression
- Mobility Level 3: Lumbrical, Claw and Extension Stretch
- Strength Level 1: Resisted or Rice Bucket Finger Expansions
- Strength Level 2: Fingertip Rolls
- Strength Level 3: Low Pain Hang Stage 1
  - Open Hand: 2x per week, 1 set of 4 reps, 7 seconds on, 3 seconds off, 3-minute rest between sets
  - Half Crimp: 2x per week, 1 set of 4 reps, 7 seconds on, 3 seconds off, 3-minute rest between sets
  - 3 Finger Pocket: 2x per week, 1 set of 4 reps, 7 seconds on, 3 seconds off, 3-minute rest between sets
- Moderate climbing beginning to use half crimp on routes with mild angle beyond vertical

84-104 DAYS (WEEK 12 TO 15): PROGRESSIVE LOADING 2

The goal of this phase is to begin to further load the pulley with both climbing and fingerboarding

- Tape while rock climbing and return to regular climbing schedule: Two days on and one day off
- Mobility Level 1: Circulatory Massage and Mobility Flossing
- Mobility Level 2: Finger Tendon Glides and Progression
- Mobility Level 3: Lumbrical, Claw and Extension Stretch
- Strength Level 1: Resisted or Rice Bucket Finger Expansions
- Strength Level 2: Fingertip Rolls
- Strength Level 3: Low Pain Hang Stage 2
  - Open Hand: 2x per week, 1 set of 4 reps, 7 seconds on, 3 seconds off, 3-minute rest between sets
  - Half Crimp: 2x per week, 1 set of 4 reps, 7 seconds on, 3 seconds off, 3-minute rest between sets
  - 3 Finger Pocket: 2x per week, 1 set of 4 reps, 7 seconds on, 3 seconds off, 3-minute rest between sets
  - 2 Finger Pocket: 2x per week, 1 set of 4 reps, 7 seconds on, 3 seconds off, 3-minute rest between sets
- Hard climbing using crimps on routes with angle beyond vertical

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104 DAYS AND BEYOND (WEEK 15 AND BEYOND): PROPHYLACTIC PHASE

The goal of this phase is to prevent the recurrence of a pulley sprain

Unload Tip 1: Wean off taping
- Decrease your reliance on tape by systematically weaning off of it.

Mobility Tip 1: Maintain your range of motion
- Continue to stretch up to three times per day if you still have restricted range of motion.

Mobility Tip 2: Warm-up your pulleys prior to climbing
- Research done by Dr. Andreas Schweizer shows it takes approximately 120 climbing moves of progressive difficulty to warm-up the pulleys. So start with an easy grade, and climb at least three routes with 40 moves, or a dozen boulder problems, as your warm-up.

Strength Tip 1: Return to normal fingerboard training and isolate loads to your affected finger (if applicable)
- Progressively load the affected finger with mono training under the guidance of a medical practitioner.

Strength Tip 2: Continue to perform strengthening exercises of surrounding muscles
- Strengthen your shoulder blade stabilizers, wrist extensors, and finger intrinsic muscles.

Movement Tip 1: Have your climbing analyzed
- A climbing coach or a Doctor of Physical Therapy can analyze your climbing movement to determine contributing factors to developing pulley injuries.

Movement Tip 2: Listen to your body
- If you have finger soreness after hard climbing, take 1-3 rest days to allow for adequate tissue healing

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PEER REVIEWERS

- Julien Descheneaux PT, Matt DeStefano DPT, Jennifer Sauers DPT, and James Walker BSc.

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CLASSIFICATION CRITERIA

Diagnostic ultrasound, an imaging technique that uses high-frequency sound waves to visualize structures within the body, is the most effective tool to diagnosis and grade a pulley sprain. It allows medical practitioners to view the flexor tendons in the finger, and measure the distance between the tendons and the bone. Pulley sprains are classified into four grades using diagnostic ultrasound (see the table below) according to severity, based on research by Dr. Volker Schöffl and Dr. Isabelle Schöffl. The A2 pulley is the most commonly injured in climbers because it's subject to greater outward forces than the others.

	Grade I	Grade II	Grade III	Grade IV
Injury	Stretching or Slight Tearing	A2 or A3 Partial Rupture A4 Complete Rupture	A2 or A3 Complete Rupture	Multiple Complete Ruptures

Table modified from Schöffl & Schöffl, 2006

If you don't have access to diagnostic ultrasound, other criteria exist. A paper by Dr. Carrie Cooper et al., published in the Journal of Hand Therapy, presented a classification schema to assist in determining the severity of a pulley sprain without diagnostic imaging. This method uses clinical findings such as range of motion, muscle contraction, and palpation to classify whether the degree of injury is mild, moderate, or severe (see the table below).

	Mild	Moderate	Severe
Pain	Daily Living: 0/10 does not limit activity Climbing: ≤ 2/10 after climbing only crimp grip is painful	Daily Living: 3-5/10 does not limit activity Climbing: ≥ 5/10 that limits climbing in all grip positions	Daily Living: 5/10 limits activity Climbing: > 5/10 that severely limits climbing
Active Range of Motion (AROM)	Pain at end range finger flexion with no AROM loss	Pain at end range finger flexion with ≤ 25% AROM loss	Pain and >50% limited ROM with finger bending and straightening
Pain with Resisted Tests	Sloper: 0/10 Half crimp: ≤ 2/10 Full crimp: ≤ 2/10	Sloper: ≤ 2/10 Half crimp: 2-5/10 Full crimp: 6-8/10	Pain and weakness with any resisted flexor muscle test or "grip" hand position
Palpation	Minimal pain with full blanching palpation (maximal pressure)	Pain with mild blanching palpation (moderate pressure)	Pain with no blanching palpation (minimal pressure)

Table modified from Cooper et al. 2019

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RETURN TO CLIMB REFERENCE TABLE

Below is a table that outlines the No Pain Hang, Low Pain Hang, and Return to Climbing timetables for various degrees and severities of pulley sprains. There are many individual differences when it comes to starting to progressively load the pulley and returning to climb, so it is recommended that you consult a medical provider to outline your specific timelines.

	Mild or Grade 1	Moderate or Grade 2	Severe or Grade 3
No Pain Hang Stage 1	Week 1-2	Week 2-4	Week 3-6
Easy Climbing	Week 2-3	Week 4-6	Week 6-9
No Pain Hang Stage 2	Week 2-3	Week 4-6	Week 6-9
Moderate Climbing	Week 3-4	Week 6-9	Week 9-12
Low Pain Hang Stage 1	Week 3-4	Week 6-9	Week 9-12
Hard Climbing	Week 5-6	Week 9-12	Week 12-15
Low Pain Hang Stage 2	Week 5-6	Week 9-12	Week 12-15

*Easy climbing timelines vary ≈ 2 weeks < from Lutter et al. 2021 Return to hard climbing is ≈ the same as Lutter et al. 2021
*Timeline for grade 3 is ≈ 2 weeks > for easy climbing and the same for hard climbing. Schneeberger et al. 2016

CLIMBING INTENSITY DEFINED

Below is a table that outlines the parameters for easy, moderate and hard climbing. The intensity of climbing is defined by the angle of the wall, the selection of holds and the grade of the climb.

	Mild
Easy Climbing	Avoiding half and full crimp using large holds on faces not angled beyond vertical 2 full grades below onsight (5.12 -> 5.10, V8 -> V6)
Moderate Climbing	Beginning to use half crimp on routes with mild angle beyond vertical 1 full grades below onsight (5.12 -> 5.11, V8 -> V7)
Hard Climbing	Using crimps on routes with angle beyond vertical Can climb up to onsight level (5.12 -> 5.12, V8 -> V8)

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