

Title:

Conservative treatment of triple finger flexor pulley disruption.

Introduction:

Flexor tendon pulley disruption of the finger is one of the most common injury in rock climbers and is observed very rarely in non-climbers (Schöffl and Jüngert, 2006). While single (A2 or A4) and double (A2-A3, A3-A3) pulley lesions can be treated conservatively in the vast majority of cases, triple pulley injuries (A2-A3-A4) are still mostly handled with surgical reconstruction (Schöffl and Schöffl, 2006). Before the pathology has been described by Bollen and Tropet independently (1990) the climbers treated the disrupted pulley by themselves by wrapping tape around the phalanx. We present a case series of conservatively treated triple pulley lesions, treatment options and results.

Material and methods:

Six climbing patients (5 males) with an average age of 45 y (25-55y) were seen with 7 complete triple-pulley disruptions (diagnosed ultrasonographically) of the third (3), fourth (3) or the index (1) finger. All were experienced climbers (average grade UIAA dec. 8.8, range 7.5-10) who underwent the injury while doing a hard move holding a small ledge in the crimp grip position. Three patients were seen acutely (<2 weeks) and were treated with a pulley protection splint at the center of the middle and proximal phalanx for 2 months. The splint consists of thermoplastic ring with free spaces at the ulnar and radial border of the finger (Fig. 1) as described by Schneeberger and Schweizer (2016). This ensures not to compress or compromise the neurovascular bundles and perfusion of the finger but still applying enough pressure to relocate and approach the flexor tendons to the bone. Patients were allowed to move their fingers immediately and the splint for hygiene reasons. This was followed by a pulley protection tape for another 2 months. Climbers were allowed to start climbing after 2 months, crimp grip position was allowed after 5-6 months. The treatment for the climber presented at 4 weeks was similarly. Two patients were seen late (5 months, several years after trauma), the first had an extension splint for PIP joint the last (bilateral lesions) did not have any therapy. All had ultrasonographic investigation after 6 months.

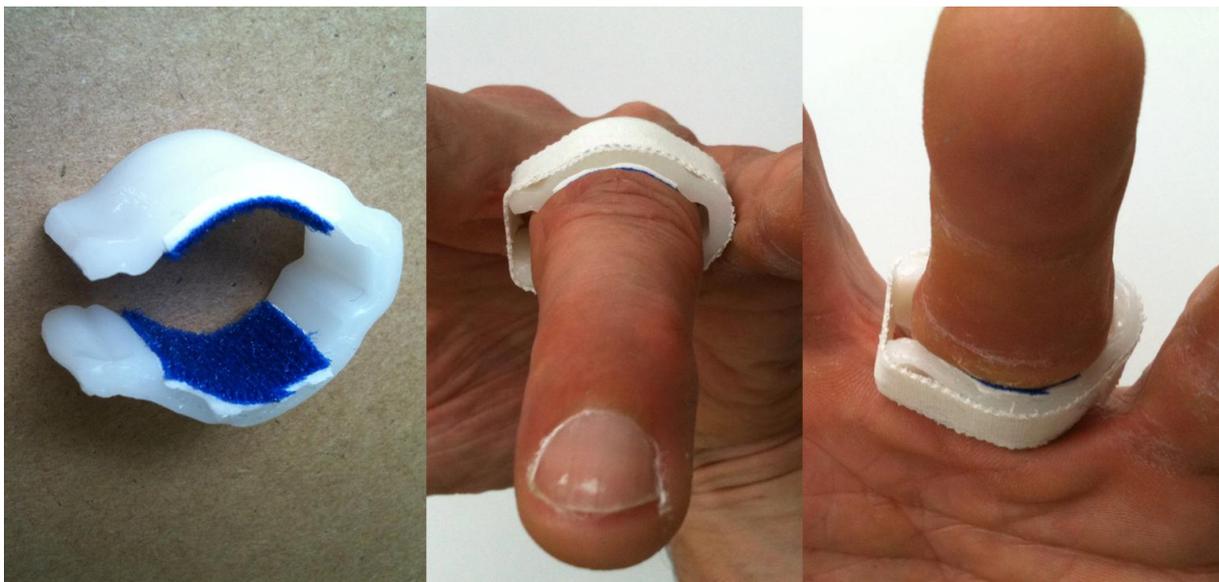


Fig. 1: Pulley protection splint for the treatment of an injured A2 pulley. Spaces are left free laterally to not compress the neurovascular bundle

Results:

At six month all 3 acute injuries were back climbing at the same level as before the injury, no pain and no restriction in daily activities or profession (1 carpenter, level UIAA 10, Fig. 2) was left. All had a slight extension deficit of 10° at the PIP joint but full/complete flexion. The patient seen at four weeks increased the initial extension deficit in the PIP joint of 5° to up to 25° but had full flexion, no pain, was back to same level of climbing and had no restriction in daily activities. A proposed pulley reconstruction was refused due to no complaint. The one patient (index finger) had an extension deficit of 30° at PIP joint of the index finger, but no pain and full flexion. The extension splint did not change his active and passive extension deficit. Surgery (pulley reconstruction) was discussed but finally not performed because there was no lack of pain and no functional deficit. One patient presented because of another problem when the bilateral triple pulley disruption was diagnosed by chance, he had no restriction, no pain, an extension deficit of 15° at both PIP joints and full flexion and was climbing at level 9.75. The patients treated with pulley protection splints reduced the amount of bowstringing (measured ultrasonographically) from 5-7mm to 2-4mm whereas the not treated patients showed unchanged bowstringing of 5-7mm (all measured at the center of the phalanx).

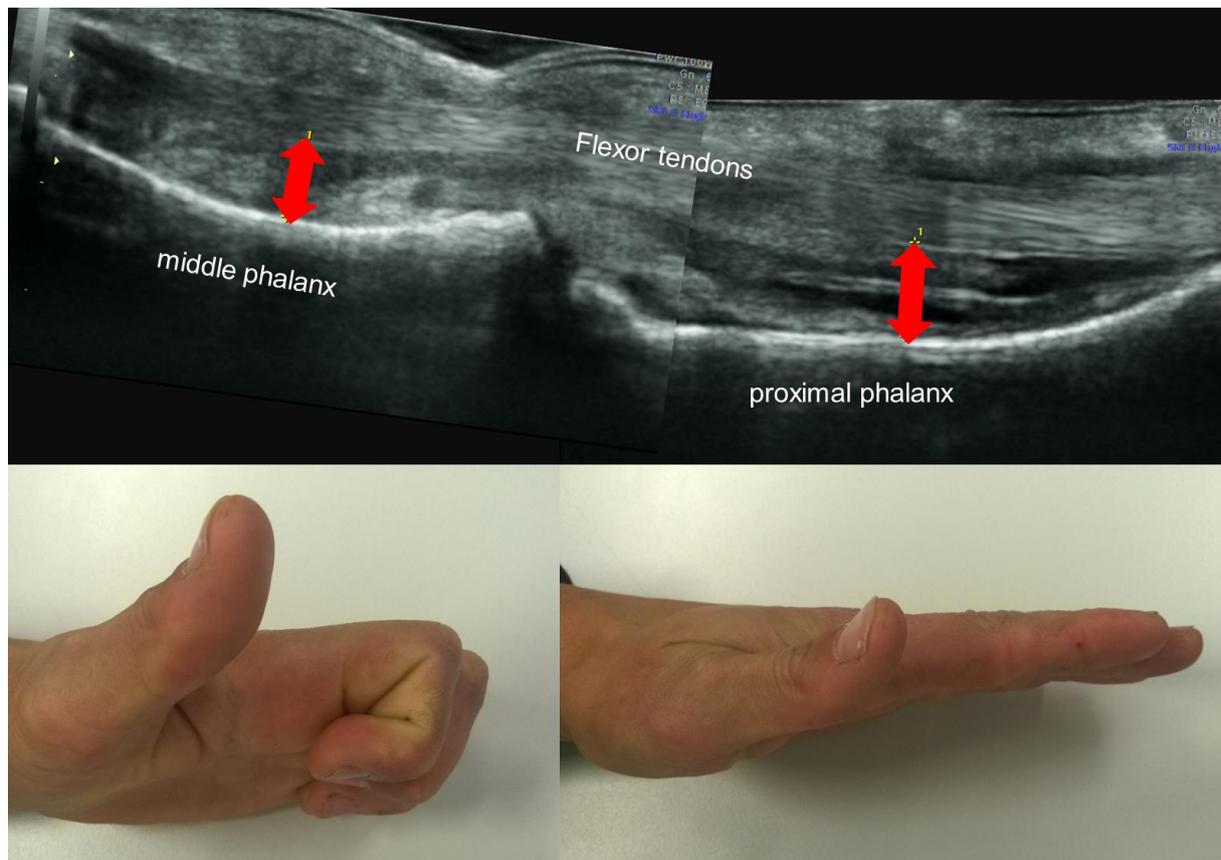


Fig 2: Ultrasound depicts A2 – A4 pulley disruption of the middle finger with spontaneous bowstringing at the proximal and middle phalanx (red arrows). Range of motion after 6 months. The climber went back to level UIAA 10 and worked as a carpenter.

Discussion:

Treatment recommendations for multiple pulley injuries (A2-A3-A4) is recommended to be surgical reconstruction (Schoffl and Schoffl, 2006; Bouyer et al 2016) but is still disputed by others (King and

Lien, 2017) where good results are obtained conservatively as well. Conservative treatment of triple pulley disruption with two pulley protection splints in sport climbers is an option with good clinical results if patients are seen acutely (<2 weeks after trauma). The treatment is less complex, a full flexion and return to the similar level of climbing is can be expected at the expense of an extension deficit of the PIP joint of 10-20°. The extension deficit can be approached by an additional extension splint which has to be worn all night to prevent contracting scar formation along the disrupted flexor tendon sheet which has not yet been applied in the discussed cases. Conservative treatment has to be weigh up with reconstruction of pulleys with higher risks of surgery and more complicated and longer rehabilitation.

The natural course of pulley injuries is still not clear being climbers with triple pulley injuries who do not present to the clinic because of lack of symptoms and function as shown for the last case in our series. If a patient has ongoing symptoms surgery can be performed still months after trauma without disadvantages.

References:

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