

CASE REPORT

Addressing Triggering Post Zancolli Lasso Procedure

MOHD ZAIM MR, SHALIMAR A, PARMINDER SINGH GILL NS,
NUR AZUATUL AK

Hand and Microsurgery Unit, Department of Orthopaedics and Traumatology, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia.

ABSTRAK

Tangan cakar menyebabkan ketidakupayaan sebagai kinematik lanjutan dan lekukan terjejas akibat hiperekstensi pada sendi metacarpophalangeal. Prosedur lasso Zancolli adalah prosedur tenodesis mudah yang berkesan mengurangkan cakar untuk membolehkan cengkaman yang lebih baik. Kami membentangkan seorang wanita berusia 56 tahun yang mempunyai sejarah trauma dengan cakar progresif tangan kirinya. Dia telah didiagnosis dengan kecederaan plexus brachial plexus yang tidak lengkap. Beliau menjalani prosedur Zancolli lasso yang berjaya untuk semua jarinya tetapi 8 bulan kemudian mengembangkan pemicu indeks dan jari tengah. Kami bereksperimen dengan melepaskan pelekatan dalam satu jari dan melepaskan seluruh kepingan A1 bersama-sama dengan flexor digitorum superficialis (FDS) lasso-ed dalam jari yang lain dan yang terakhir berfungsi. Kami mengulangi prosedur di jari telunjuk dan pengembangan diselesaikan. Walaupun kedua-dua indeks dan jari tengahnya kini mempunyai flexor digitorum profundus (FDP) sahaja (FDS yang telah ditarik balik secara proksimal), dia tidak mempunyai pengulangan cakarnya. Kami mengaitkan pencetus disebabkan oleh peningkatan jumlah kepingan A1 serta kontrak yang menyebabkan kedudukan fungsi selepas pelepasan.

Kata kunci: digitorum flexor, jari, kinematik, sendi metacarpophalangeal, tenodesis

ABSTRACT

A claw hand causes disability as kinematics are affected due to hyperextension at the metacarpophalangeal joints. Zancolli lasso procedure is a simple tenodesis procedure which effectively lessens clawing to allow better grip. We present a

Address for correspondence and reprint requests: Mohd Zaim Mohd Rashid. Department of Orthopedics and Traumatology, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia. Tel: +6012-4763012 Email: mohdzaimrashid@gmail.com

56-year-old lady who had a history of trauma with progressive clawing of her left hand. She has been diagnosed with partially recovered incomplete lower trunk brachial plexus injury. She underwent successful Zancolli lasso procedures for all of her fingers but 8 months later, the patient developed triggering of the index and middle fingers. We experimented by releasing the adhesions in one finger and releasing the whole A1 pulley together with the lasso-ed flexor digitorum superficialis (FDS) in the other finger and the latter worked. We repeated the procedure in the index finger and the triggering resolved. Although both her index and middle fingers now have a flexor digitorum profundus (FDP) only (the FDS having retracted proximally), she did not have a recurrence of her clawing. We attributed the triggering due to increasing A1 pulley volume as well as contractures causing post-release functional positions.

Keywords: finger, flexor digitorum, kinematics, metacarpophalangeal joints, tenodesis

INTRODUCTION

A clawed hand is due to an imbalance between the flexor and extensor musculatures. The commonest symptom is the inability to grasp due to poor intrinsic coordination. Many techniques have been advocated but the Zancolli-lasso procedure remains popular. It involves FDS plication over the A1 pulley creating a loop. A pre-operative positive Bouviers maneuver is essential (Goldfarb & Stern 2003). Complications include injury to the neurovascular bundle, swan neck deformity, and contracture. There are less reports of trigger finger occurring after the Zancolli procedure. We report a case where triggering of the index and middle finger occurred after Zancolli lasso procedure in the index, middle, ring and little fingers.

CASE REPORT

A 56-year-old housewife presented

with a left claw hand involving her index, middle, ring and small fingers. She had a history of falling off a motorbike 30 years ago when the clawing of the hand began insidiously and gradually. However, she lived in a rural farming community and did not seek any medical treatment since she was able to do her daily activities. She is right hand dominant and therefore not severely affecting her daily activities.

A year prior to presentation, the clawing had worsened until she had difficulty with hygiene in the flexor creases of her fingers and she developed ulceration over her interphalangeal joints. She was not keen for further investigations as to her pathology but requested only surgery to improve her clawed hand. Examination revealed severe clawing of her left index, middle, ring and small fingers with reduced sensation over the C8-T1 region. Her nerve conduction studies revealed left ulnar and median neuropathy. We



Figure 1: Pre-operative picture showing a claw hand involving the index, middle, ring and little fingers.



Figure 2: Post Zancolli-Lasso procedure to the index, middle, ring and little fingers. Metacarpophalangeal joint appears in flexion about 30, whereas PIPJ flexion at about 30-45.

provisionally diagnosed her with a partially recovered incomplete lower trunk brachial plexus injury (Figure 1).

She underwent a Zancolli lasso procedure (Figure 2) and was gradually allowed passive and active motions. Her grip, ulceration, and hygiene in the flexor creases improved. However, eight months postoperatively, she began having triggering over her left index and middle fingers. As we were unsure of the best operative treatment, we opted to try two different procedure on each finger. On her index finger, we performed an adhesiolysis of the lasso-ed FDS and on her middle finger, we released the A1 pulley, which resulted in the lasso and sutured FDS to retract proximally. Post-operatively the triggering over the middle finger resolved but remained in the index finger. The surgery was performed under general anesthesia as we were uncertain neither of the wound size nor of the possible surgical complications. Six months later, she returned for an A1 pulley release of her index finger,

which we did this time under local anesthesia. Intraoperatively there were fibrotic tissue adhesions between the flexor digitorum profundus and flexor digitorum superficialis, with adhesions over an A1 pulley (Figure 3). The lasso region was identified by the presence of non-absorbable sutures.

DISCUSSION

A clawed hand is essentially due to an imbalance of tones in intrinsic and extrinsic musculatures. The metacarpophalangeal joint (MCPJ) hyperextends due to normal function of the extensor digitorum communis unopposed by the intrinsic flexors of the joint while the proximal interphalangeal joint (PIP) joint falls into flexion under the pull of the FDS, creating a claw deformity (Dell & Sforzo 2005; Lane & Nallamothu 2018). Loss of intrinsic power also produces aberrant flexion movements (Dell & Sforzo 2005). Lumbricals and interossei



Figure 3: Intraoperative picture showing FDS tendon and A1 pulley adhesions with surrounding tissue fibrosis attached to it. The FDP tendon was intact.

muscles work in tandem to produce grasping motion. A deficit of these muscles results in a weakened grasp due to the extrinsic musculature flexing the fingers only at the interphalangeal joints (Kozin et al. 1999). Weakness over the metacarpophalangeal joint causes the over pulling of the extensor tendon resulting in hyperextension of the MCPJ. Restoring the MCPJ flexion remains key to correction of claw hand.

A static technique utilizing fasciodesis, capsulodesis, and the dorsal metacarpal-osseous bone block does not improve the functionality of the hand (Tse et al. 2007). The Zancolli-lasso technique is principally a dynamic transfer technique where the tendon insertion is moved to a more proximal point, which presents the conventional technique.

A midline incision is made over distal proximal palmar crease exposing the flexor tendon and A1 pulley. The

FDS tendon is cut just 2 cm proximal to its insertion and reattached by looping itself proximal to the A1 pulley. This will provide a flexion force over the MCPJ at the expense of weakened flexor proximal interphalangeal joint (PIPJ). This technique is excellent in global paralysis of intrinsic muscles. It provides additional flexion to metacarpophalangeal joint. It relaxes the PIPJ, hence providing a more natural position of the hand.

Our patient's claw hand was successfully treated with the Zancolli lasso procedure. Post-operatively (Figure 2) the metacarpophalangeal joints were at 30° flexion and the proximal interphalangeal joints at 30°-45° respectively. This provides better hygiene care and better grip strength. Our results are similar to Gupta and co-workers (Gupta et al. 2015) where the findings were the transverse metacarpal arch (compared to the normal hand) was increased/reversed (mean, 23.2°) in seven patients and decreased in 13 patients. The normal angle in the open hand position was 20° to 30°.

We were unable to find any documented or reported case of triggering post-Zancolli lasso procedure. Our patient presented eight months after the initial surgery complaining of triggering of her fingers. There was no history of trauma. This could be attributed to the increase of volume within the A1 pulley. The distal stump attached proximally to the A1 pulley can cause adhesions in between the pulley and the tendon. In our case, there were adhesions not only between the tendon and the

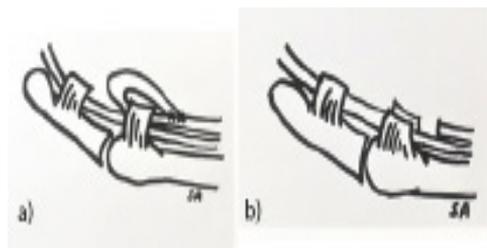


Figure 4: a) Illustrations showing Zancolli-lasso FDS loop over A1 pulley. b) A1 release together with FDS loop. FDP tendon remained free for gliding.

pulley but also between the FDS and FDP. It is possible that the disruption of the vincula and its blood supply elicits an inflammatory cascade and inevitably resulted in scarring and adhesions between the two tendons.

In our case, we detached the FDS tendon at its insertion and mobilized it proximally onto itself. North et al. described a different technique where the FDS be cut between A1 and A2 pulley. The remnant of FDS stump will heal itself within the tendon sheath (North & Littler 1980). Only after releasing the A1 pulley together with excising the FDS loop did the trigger finger get resolved (Figure 3 and Figure 4). We attributed the cause of locking due to adhesion between those two tendons and soft tissue adhesion causing disruption in FDP tendon excursion. Interestingly, once the A1 pulley was released, the FDS retracted proximally but the finger did not return to its clawed state. Despite the unopposed extension of the MCPJ, the patient had an acceptable hand cascade (Figure 5). We failed to explain such.

North and co-worker (North & Littler 1980) reported seven patients



Figure 5: Post-operative one month after release of the A1 pulley of the index finger and 4 months for the middle finger. The initial clawing has not returned.

with a loss of 8° of PIPJ extension after FDS procedure. Author postulated that damage to volar capsule and vincula were the cause of the contracture. Much of the same can be said for our patient where the hand appears to be retained in better functional positioned even though the FDS does not provide additional flexion capacity to the MCPJ. There is a possibility that this case is an undiagnosed trigger finger in a claw hand since this lady is a 56-year-old lady where trigger finger is a common occurrence. However, it is difficult to diagnose, as she is unable to flex her fingers in normal positions. It is imperative surgeon needs to familiarize with the technique. Even though Zancolli lasso is the commonest salvage procedure for ulnar claw hands, it is not to be taken lightly. Adhesion and scarring may occur and cause the triggering. We believe this is a new complication after a Zancolli lasso procedure, which has never been reported before,

and thus we were unable to find a recommended procedure to solve it. We therefore suggest releasing the A1 pulley together with the lasso itself should the triggering occur.

CONCLUSION

Triggering post-Zancolli lasso remains a rare complication and it could be due to soft tissue adhesions. Nonetheless, a skilled hand surgeon is vital in identifying important structures and technique.

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