TWO STAGE FLEXOR TENDON RECONSTRUCTION AFTER OVER FIVE DECADES OF DISABILITY USING SILICONE FOLEY

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Abstract

Introduction: Surgical reconstruction of flexor tendon injuries, particularly old injuries, in the digital flexor sheath area (Zone II) are very difficult to perform, presenting significant challenges to both patients and treating surgeons. The healing tendons tend to adhere to the fibro-osseous canal, the proximal and distal ends of tendons are mostly retracted, and in worst cases, the fibro-osseous canal is already collapsed.

Case Presentation: We report in detail how we employed the silicone foley catheter SFC instead of Hunter's rod, to achieve a magnificent functional outcome in a two-staged reconstruction of a five-decade old flexor tendon injury in Zone II of the right ring finger (RRF).

Conclusion: Surgical correction is still an option for flexor tendon injury even decades after injury. The utility of one's hand can still be restored regardless of the age of the patient and the period of injury.

Keywords: *hand injuries, two-stage tendon reconstruction, Silicon Foleys Catheter, Tendon graft*

Introduction

Surgical reconstruction of flexor tendon injuries, particularly old injuries, in the digital flexor sheath area (Zone II) are very difficult to perform, presenting significant challenges to both patients and treating surgeons.[1–5] The healing tendons tend to adhere to the fibro-osseous canal, the proximal and distal ends of tendons are mostly retracted, and in worst cases, the fibro-osseous canal is already collapsed.[4,6,7]

We report in detail, how we employed the SFC instead of Hunter's rod, to achieve a magnificent functional outcome in a two-staged reconstruction of a five-decade old flexor tendon injury in Zone II of the right ring finger (RRF).

Cases Presentation

Our patient is a 63year old Ghanaian female, MAA, with no known chronic illness or family illness. At the age of 10years she suffered an accidental cutlass injury to the right hand by Her elder sister. Resulting In a deep laceration of the palmar aspect of her RRF and an amputation of her right little finger at Zone II. Her wounds were cleaned and sutured and managed on antibiotics, tetanus prophylaxis and analgesics at a peripheral center. The injury left her right hand with only three functioning digits and a flexion deficient RRF. Being right-handed, she temporarily lost the ability to write, which greatly deterred her education.

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50years following her injury, she reported to our team. We examined a stable middle-aged woman with a healed amputation site of the fifth finger. She was unable to flex her right ring finger, RRF, Figure 1. A diagnosis of flexor tendon injury of the RRF was made.

Figure 1

She consented to a staged reconstruction. The patient was positioned supine, with her right upper limb placed supine on a working table, after regional anaesthesia and sterile preparation. Access was through Bruner zigzag incision was made on the palmar side of the right ring finger, extending into the proximal palmar crease. Subcutaneous tissues and fibrosis dissected, Figure 2.

Figure 2

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A new fibro-osseous canal created and a 14fr SFC, implanted, Figure 3.

Figure 3

An artificial finger pulley system was then constructed over the silicone implant. Finger closed in layers, embedding the implant, in situ. Figure 4

Figure 4

Two weeks after the initial surgery, the patient developed a septic reaction to the foreign body, Figure 5.

Figure 5

This was treated with antibiotics and analgesics. The infective process resolved, patient recovered remarkably and the rest of the recovery period was uneventful.

Ten weeks post first stage surgery, the second stage was performed. Anaesthesia, sterile preparations and patient positioning was just as the first stage surgery. A 4cm oblique palmer incision was made over the middle phalanx of the right middle finger (RMF). The middle finger's flexor Digitorium superficialis (FDS) tendon was harvested from its insertion at the middle phalanx. 5cm 'V' shaped palmer incision was then made just above the distal palmer crease straddling the right middle and ring fingers. The FDS tendons of the RMF was harvested from its insertion at the. The FDS tendon was extruded from this new incision. Figure 6

Figure 6

The SFC was extracted partially, through the foreign body reaction wound at the distal phalangeal region of the ring finger, to deliver its proximal part into the incised wound, Figure 7.

Figure 7

The distal tip of the harvested FDS tendon was then sutured to the proximal part of the SFC. The extraction of the SFC is completed ushering along the tendons of the FDS of the middle finger, thus transferring the FDS tendons through the pseudo sheath of the RRF. Using the modified Kessler technique, the transferred FDS tendon was then sutured through the periosteum of the distal phalanx with a non-absorbable suture. A tuft of gauze was placed between the finger and a button to serve as a cushion and the knot was tied over the button, Figure 8.

Figure 8

Physiotherapy commenced on the second day post-surgery. This involved controlled passive flexion and active extension exercises, throughout the day. Two

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weeks post-surgery review, the patient regained full flexion of the RRF, Figure9.

Figure 9

Incision wounds sutures were removed at two weeks but the button was removed at 6weeks, when tendon attachment was achieved, Figure 10.

Figure 10

The patient's right hand over the past three years has shown marked increase on function, with no sign of decline. The patient was very satisfied with the outcome, aesthetically and functionally, Figure 11.

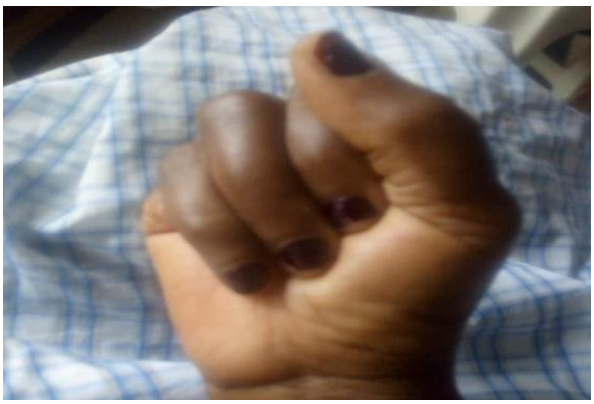

Figure 11

Discussion

The concept of tendon reconstruction using implantation was first published by hunter in 1965. Paired with Salisbury in 1971, they published a decade of experience with staged Flexor Tendon reconstruction using an implant reinforced with silicone and Dacron. This has led to remarkable advancement in the restoration of flexor function in severely scarred fingers.

The primary surgery involves finger exploration, including debridement, release of contractures, removal of scar tissues and adhesiolysis.[8] In addition, a silicone rod is implanted in the same surgery to reconstruct the pulleys and allow the formation of a pseudo sheath around it. The second surgery as described by Hunter and Salisbury, entails tendon grafting through the pseudosheath, six to twelve weeks after the primary surgery.[6,8,9]

The uniqueness of our case report stems from the fact that we did not come across any report of this surgery done for a patient after five decades of injury. A myriad of plaques tends to occur with lengthening of injury to repair duration such as; poor muscle compliance, fibrosis, retraction of both proximal and distal ends of the tendons, atrophy of the tendons and muscle and collapse of the fibro-osseous canal.[4,6,7] Longstanding disabilities affects not only the physical appearance of the patient but also the mental and socioeconomical wellbeing of the patient. The lives of the people around the patient are also dented.[10–12]

We performed two key steps differently from the described staged surgery. A SFC was used instead of a hunter's rod and a tendon transfer instead of a tendon graft. The Hunter's rod is expensive and not readily available,[6] worse so in Ghana. In 2006, Ahmad T, Bashir SA, Zaroo MI, Wani AH, Rashid S and Jan S concluded from their study that, SFC is an effective alternate to the Hunter's rod.[6] Due to the effects of the longstanding nature of our patient's injury, a tendon graft of any nature would have been extremely ambitious. There would not be any significant remnant of the FDS or FDP tendons or muscles of the RRF to attach a graft to. To counter this, the FDS tendon of the RMF was transferred to be used as the FDP of the RRF. This was permissible because whereas the FDS flexes the finger with the exception of the distal inter phalangeal joints, the FDP by its attachment to the distal phalanx, flexes the entire finger. Hence while the RRF gains flexion the RMF does not loss flexion either.

After the index surgery, our patient suffered a surgical site infection with a rupture at the distal end at the finger. While this was an undesired outcome, it is a recognized post first stage complication.[5,7] Resolution was attained with antibiotics, analgesics, wound care and rest. Employing a tendon transfer also enabled early physiotherapy, hence reducing recovery time. Post Stage II surgery, recovery was free of complications. The patient was followed till three years post-surgery, Function and cosmetic value has since been fully restored without evidence of deterioration.

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Prognostically our patient favored poorly.[7] The success of the surgery was dependent on the two staged FTR and making modifications to suit our patient.

Conclusions

Surgical correction is still an option for flexor tendon injury even decades after injury. The utility of one's hand can still be restored regardless of the age of the patient and the period of injury.

Informed Consent

Written Informed consent was obtained from the patient before writing of this report.

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