Use of the transverse carpal ligament for soft tissue reconstruction of a Mannerfelt lesion

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Introduction

In 1969, Mannerfelt described the “critical corner” where the flexor pollicis longus (FPL) tendon tends to rupture from abrasion against osteophytes from the scaphotrapezoidal joint in patients with rheumatoid arthritis [2]. He further suggested that removal “of the spur and covering of the floor...may have saved these tendons from later attritional rupture.” Since then, it has been recognized that debridement of osteophytes and soft tissue reconstruction, to separate the arthritic wrist joint from the carpal canal, are important to avoid recurrent rupture following tendon reconstruction.

The currently accepted method of soft tissue reconstruction uses the adjacent capsulo-ligamentous transposition flap to cover the exposed bone (Fig. 1) [1]. Although the transposition flap appears simple in illustration, we have found this approach to be difficult. The flap is limited in size and does not transpose easily, the donor site is difficult to close, and the soft tissue tends to be of poor quality. In the

case of a large defect, a local transposition flap is inadequate to reline the carpal canal.

We have utilized an alternative to the traditional approach of a local transposition flap. A large, radially based flap of the transverse carpal ligament can be used to resurface and reconstruct the volar soft tissues of the wrist along the carpal canal. Given the technical ease of this alternative approach, we report a case and revisit the management of the Mannerfelt lesion.

Case Report

A 60-year-old right hand-dominant woman with long-standing rheumatoid arthritis was referred with loss of right thumb flexion 3 months previously. On history, she had progressively worsening symptoms of carpal tunnel syndrome that resolved soon after she lost thumb flexion. Passive wrist motion failed to demonstrate tenodesis of the FPL, thus suggesting a tendon rupture. She was brought to the operating room for exploration and reconstruction.

An extended carpal tunnel release was designed along the inter-thenar groove and was extended into the volar forearm. The transverse carpal ligament was exposed, and care was taken to avoid injury to the palmar cutaneous nerve and the recurrent motor branch of the median nerve. The transverse carpal ligament was then released along its ulnar border to expose the contents of the carpal canal. An alternative to using the entire transverse carpal ligament as a flap is to split it. Stepwise incision allows one half to be used as a flap and the other half to be used to reconstitute the transverse carpal ligament (Fig. 1).

The carpal canal was explored. The contents of the carpal canal were mobilized ulnarly taking care to avoid traction on

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Fig. 1 The recommended reconstruction for Mannerfelt lesions from *Green's Operative Hand Surgery* (reproduced with permission from Wolfe SW, Hotchkiss RN, Pederson WC, et al., editors, *Green's Operative Hand Surgery*, 6th edition

the median nerve and the recurrent motor branch. The offending osteophyte was identified and débrided. Due to

the large size of the defect, closure by direct suture of the volar wrist ligaments was not possible. The quality of adjacent soft tissues was also poor, and local transposition flap was not

Fig. 2 The carpal canal is approached through a standard open carpal tunnel release incision, along the inter-thenar groove. The transverse carpal ligament is then opened in a stepwise manner so that the proximal one half of the ligament may be used as a radially based flap

Fig. 3 The radially based flap is transposed for inset along the floor of the carpal canal

Fig. 4 Cross-sectional view of the carpal canal. The contents of the carpal canal are retracted ulnarly so that the flap can be transposed to line the floor of the carpal canal after the offending osteophyte has been removed

Fig. 5 **a** The flap is inset to resurface the canal. **b** Intraoperative view. In this case, the entire transverse carpal ligament was used to resurface the floor of the carpal canal in preparation for tendon reconstruction

possible. We therefore used the radially and proximally based flap of the transverse carpal ligament to close and resurface the defect (Fig. 2).

Finger flexor tenosynovectomy was performed. The flexor digitorum superficialis of the long finger was used as a tendon transfer to reconstruct the FPL tendon as the remaining FPL tendon was of poor quality (Figs. 3, 4, 5).

The patient was seen over 1 year after surgery with good restoration of hand function and 80° of flexion at the interphalangeal joint of the thumb. There was no flexor tendon bowstringing.

Discussion

Although surgical reconstruction of the rheumatoid hand has become less common, patients still present with Mannerfelt lesions. The approach to soft tissue management in *Green's Operative Hand Surgery* has been perpetuated over

numerous editions, but may not be the ideal strategy [1]. This case report illustrates an approach that is simple and was conceived independent of previously forgotten descriptions. Review of the literature revealed that Mannerfelt and Norman [2] and Regan et al. [3] have previously mentioned using the transverse carpal ligament for soft tissue reconstruction. Their approaches were never illustrated and have been forgotten.

The transverse carpal ligament can be used for robust closure and resurfacing of the carpal canal when reconstructing ruptured flexor tendons in patients with rheumatoid arthritis. The approach is simple, safe, and effective.

Given the simplicity in design, the abundant robust tissue provided, and the effectiveness, we recommend the use of the transverse carpal ligament for soft tissue reconstruction

as a primary option in FPL rupture due to a Mannerfelt lesion.

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