

CASE REPORT

Open dislocation of the proximal interphalangeal joint of the little finger subsequent to chronic radial collateral ligament injury : a case report of primary ligament reconstruction with a half-slip of the flexor digitorum superficialis : Case Report

Kazuma Wada^{1,3}, Naohito Hibino², Kenji Kondo², Shinji Yoshioka², Tomoya Terai², Tatsuhiko Henmi², and Koichi Sairyo³

¹Department of Orthopedics, Kaminaka Hospital, Tokushima, Japan, ²Department of Orthopedics, Tokushima Prefecture Naruto Hospital, Tokushima, Japan, ³Department of Orthopedics, the University of Tokushima, Tokushima, Japan

Abstract : Open dislocation of the proximal interphalangeal (PIP) joint is relatively rare. We report a case of a 32-year-old man who had open dislocation of the PIP joint of the little finger while playing American football. He had a history of chronic radial collateral ligament injury. We reconstructed the radial collateral ligament with a half-slip of the flexor digitorum superficialis tendon. *J. Med. Invest.* 62 : 258-260, August, 2015

Keywords : open dislocation, chronic collateral ligament injury, proximal interphalangeal joint, ligament reconstruction

INTRODUCTION

Open dislocation of the proximal interphalangeal (PIP) joint is a relatively rare injury, for which primary ligament repair after reduction of the dislocation is generally performed. Open dislocation subsequent to PIP joint instability due to chronic ligament injury needs ligament reconstruction to restore stability of the PIP joint, if primary repair is impossible. We encountered a case of open dislocation of the PIP joint of the little finger subsequent to chronic radial collateral ligament injury and performed the primary ligament reconstruction using a half-slip of flexor digitorum superficialis.

CASE PRESENTATION

A 32-year-old man had an open dislocation of the left little finger while playing American football after his little finger was forced into hyperextension and abduction. He had radial collateral ligament injury 1 year earlier, which had been treated conservatively by a local doctor. Radiographs taken at our hospital revealed an open dislocation of the PIP joint and dorsal dislocation of the little finger without fractures (Figure 1, 2).

An emergency operation was performed under an axillary block. The head of the proximal phalanx of the little finger had perforated the volar plate and was dislocated between the radial neurovascular bundle and flexor tendon. We added a Bruner skin incision and protected the neurovascular bundle, as well as reduced the dislocated head of proximal phalanx. Since the PIP joint had gross instability, ligament repairs on both the radial and ulnar sides were essential. At the ulnar side, we added a mid-lateral incision and found the remnant of the ulnar collateral ligament detached from the proximal phalanx insertion, so we performed primary repair using Mitek micro suture anchor. The radial collateral ligament was detached at the proximal phalanx insertion, and shrunken and



Figure 1 : Preoperative photograph showing open dislocation of the proximal interphalangeal joint of the little finger.

dense scar tissue occupied the space between the remnant of the ligament and insertion of the proximal phalanx due to previous ligament injury. Primary repair of the ligament was tried but it failed. Reconstruction of the radial collateral ligament was needed and radial half-slip of the flexor digitorum superficialis (FDS), the Curtis method (1), was selected rather than the free tendon graft. The radial half-slip of the FDS was elevated by preserving the middle phalanx insertion and pulling out the distal end of the A3 pulley (Figure 3). We preserved the remnant of the left collateral ligament on which we overlaid the transferred FDS. We seated a Mitek micro suture anchor on the proximal phalanx insertion and sutured the transferred tendon.

He underwent early active motion exercise with an extension block cast for 4 weeks (Figure 4a, b) to minimize adhesion formation.

Received for publication April 3, 2015 ; accepted May 29, 2015.

Address correspondence and reprint requests to Koichi Sairyo, MD and PhD Professor, Department of Orthopedics Institute of Biomedical Sciences Tokushima University Graduate School 3-18-15 Kuramoto, Tokushima 770-8503, Japan and Fax : +81-88-633-0178.



Figure 2 : Preoperative (a) anteroposterior and (b) lateral radiographs showing dorsal dislocation with the absence of fractures.

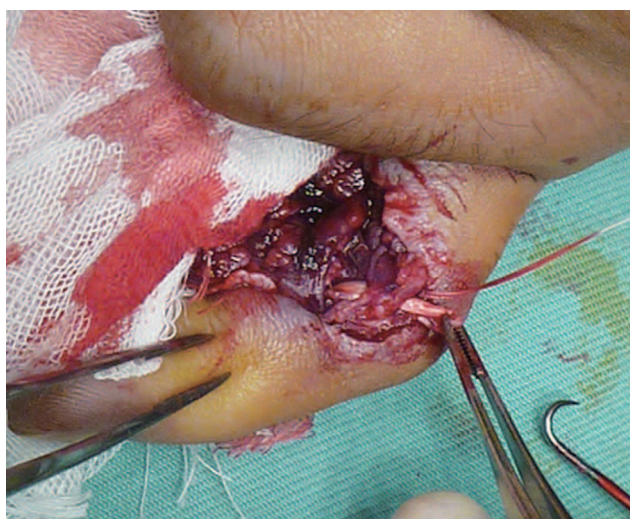


Figure 3 : Intraoperative photograph showing the pulling out of the distal side of the A3 pulley and covering the superficial part of the shortened ligament.

His PIP joint was kept in an extended position at night to prevent flexion contracture. However, flexion contracture of the PIP joint was observed 16 weeks after the operation, so we applied a safety pin splint to correct the contracture. Twenty weeks after the operation, he had no gross instability of the PIP joint and achieved a good range of motion with extension/flexion being -10/85. We allowed return to full activity and sports participation at 4 months.

DISCUSSION

There is continuing controversy as to whether ligament rupture should be treated surgically or conservatively (2, 3). However, the joint may be more susceptible to open dislocation in the setting of persistent instability subsequent to ligament rupture-as was seen in the present case-or lead to joint degeneration. We believe that young sports players should undergo ligament repair and start early active range of motion exercise so that gross instability of the joint does not persist and lead to restriction of the range of motion.

We did not use a free tendon graft involving palmaris longus but



Figure 4 : Photographs of early kinesitherapy. (a) Extension and (b) flexion.

used the radial half-slip of FDS for reconstruction of the ruptured collateral ligament. Since our case had open dislocation that has a high risk of infection, we chose to use living tissue rather than free graft tissue. We preserved the remnant of the ruptured ligament, on which the transferred tendon was overlaid. This is based on the observation that patients with preserved anterior cruciate ligament (ACL) remnant during reconstruction had better stability and terminal stiffness than patients with resected ACL remnant (4, 5). If ACL remnants could be preserved, the mechanoreceptors of the remnants might also be preserved to some extent, which may help maintain proprioception after reconstruction.

Some papers reported that repair of the volar plate resulted in flexion contracture (6-10). Therefore, we did not perform repair of the volar plate. Since open dislocation of the PIP joint damaged the bilateral collateral ligaments and volar plate, flexion contracture due to dense scarring on the volar and lateral side must have occurred in the progress of healing, despite our effort to prevent postoperative flexion contracture of the PIP joint.

CONFLICT OF INTEREST

No funds were received in support of this study.

REFERENCES

1. Curtis RM : Treatment of injuries of proximal interphalangeal joints of fingers. *Curr Pract Orthop Surg* 2 : 125-135, 1964
2. Kiefhaber TR, Stern PJ, Grood ES : Lateral stability of the proximal interphalangeal joint. *J Hand Surg Am* 11 : 661-669,

- 1986
3. Lutz M, Fritz D, Arora R, Kathrein A, Gabl M, Pechlaner S, Del Frari B, Poisel S : Anatomical basis for functional treatment of dorsolateral dislocation of the proximal interphalangeal joint. *Clin Anat* 17(4) : 303-7, 2004
 4. Adachi N, Ochi M, Uchio Y, Iwasa J, Ryoike K, Kuriwaka M : Mechanoreceptors in the anterior cruciate ligament contribute to the joint position sense. *Acta Orthop Scand* 73 (3) : 330-334, 2002
 5. Ochi M, Iwasa J, Uchio Y, Adachi N, Kawasaki K : Induction of somatosensory evoked potentials by mechanical stimulation in reconstructed anterior cruciate ligaments. *J Bone Joint Surg B* 84(5) : 761-766, 2002
 6. Vicar AJ : Proximal interphalangeal joint dislocation without fractures. *Hand Clinics* 4(1) : 5-13, 1988
 7. Stern PJ, Lee AF : Open dorsal dislocation of the proximal interphalangeal joint. *J Hand Surg* 10A : 364-370, 1985
 8. McCue FC, Honner R, Johnson MC, Gieck JH : Athletic injuries of the proximal interphalangeal joint requiring surgical treatment. *J Bone Joint Surg Am* 52(5) : 937-956, 1970
 9. Green SM, Posner MA : Irreducible dorsal dislocation of the proximal interphalangeal joint. *J Hand Surg Am* 10 : 85-7, 1985
 10. Eaton RG : *Joint Injuries of the Hand*. Charles C Thomas Publishers, Springfield 15-32, 1971