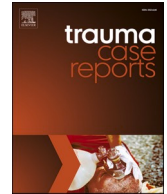




ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

# Trauma Case Reports

journal homepage: [www.elsevier.com/locate/tcr](http://www.elsevier.com/locate/tcr)

## A jersey finger diagnostic trap: Rupture of the flexor digitorum profundus tendon and the flexor digitorum superficialis tendon

Jean-Baptiste de Villeneuve Bargemon<sup>\*</sup>, Charlotte Jaloux,  
Sébastien Viaud-Ambrosino, Najib Kachouh

*Hand surgery and limb reconstructive surgery Department, Timone Adultes, Aix Marseille University, 264 rue Saint Pierre, 13005 Marseille, France*

### ARTICLE INFO

#### Keywords:

Flexor tendon  
Hand finger  
Jersey finger  
Trauma

### ABSTRACT

Management of a 30-year-old man with a rarely described form of jersey finger: simultaneous rupture of the flexor digitorum profundus and flexor digitorum superficialis on the middle finger. Excision of the superficial tendon and anchoring of the flexor digitorum profundus tendon was performed. After 6 months of follow-up, the patient did not present any complaint and reported a complete return to his daily activities. Although very rare, these lesions could be easily detected upstream by ultrasound to avoid 'surprise' during surgical exploration and allow better operative planning.

### Introduction

Jersey finger (or 'rugby finger') is a rare condition in current practice and occurs mainly during football and rugby. Tempelaere et al. noticed only 32 cases in 10 years in their monocentric review [1]. This pathology consists of avulsion of the distal insertion of the flexor digitorum profundus (FDP), most frequently affecting the ring finger. As explained by Lunn and Lamb, the fourth finger is attached to the radial and ulnar edge by the lumbrical bipennate muscles, which makes it more vulnerable to hyperextension injury [2]. Almost all lesions during jersey finger are in zone 1 of flexor injury (Verdan), which is the site of the distal insertion of the FDP tendons and the weakest zone physiologically [3]. The first case of jersey finger was described by Boyes et al. in 1960 [4] and Smith described a classification with four stages based on Leddy and Packer's classification [5].

The diagnosis is clinical: inability to flex the distal interphalangeal (DIP) joint with the proximal interphalangeal (PIP) joint manually blocked. However, it can be confirmed by using ultrasound in doubtful or atypical forms, which also allows the proximal stump of the avulsed tendon to be located. The use of magnetic resonance imaging (MRI) can be useful in the preoperative assessment but it should not delay treatment [6] because studies show good results if the lesion is fixed within 10 days [7].

The simultaneous traumatic rupture of two tendons on the same finger is very rarely described in the literature [8] and this association of tendon rupture on a finger other than the ring finger is even rarer [9]. In our case, primary repair of the FDP and excision of the FDS was performed and we report our experience and results at 6 months.

### Case report

A 30-year-old right-handed man with no medical history was assaulted on the street. He gripped his wallet, trying to save it, with

<sup>\*</sup> Corresponding author.

*E-mail address:* [jbdevilleneuvebargemon@gmail.com](mailto:jbdevilleneuvebargemon@gmail.com) (J.-B. de Villeneuve Bargemon).

<https://doi.org/10.1016/j.tcr.2021.100476>

Accepted 17 April 2021

Available online 21 April 2021

2352-6440/© 2021 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

the middle finger of his left hand. Brutal pain occurred and he was referred immediately to our centre. Clinical examination revealed a swollen middle finger. He was unable to flex the DIP or the PIP joints but he had full passive range of motion in both joints. X-rays did not find any bone damage. Closed rupture of both flexor tendons was clinically diagnosed and a surgical exploration was immediately performed under regional anaesthesia with pneumatic tourniquet inflated at 250 mmHg. Initially a Brunner approach was performed distally on the finger. The flexor tendons were not found in the digital sheaths and it was difficult to milk the retracted tendons, which is why a cut back was necessary in the distal palm crease next to the A1 pulley where the tendons were identified and delivered (Fig. 1). The FDS was resected proximally. With all the pulleys preserved, the FDP was introduced into the sheath using a steel wire and anchored to the base of the distal phalanx. The recovery of the tenodesis effect was then checked. A Duran splint was performed post-operatively and rehabilitation was started immediately following the Duran technique. Unprotected movement was permitted at 6 weeks after surgery. At 6-month follow-up, the patient presented good functional results with complete flexion and complete extension of the finger (Fig. 2). However, there was a slight flexion of the PIP, corresponding to residual stiffness. He had no functional discomfort or complaints and no cold hypersensitivity or pain. He returned to work and the resumption of daily activities and sports quickly followed.

## Discussion

Jersey finger trauma is an uncommon injury, particularly in the third finger, and the association of subcutaneous rupture of the FDS and FDP is a rare condition in the scientific literature. Although simultaneous, spontaneous and subcutaneous ruptures of the FDS and FDP have already been described in the scientific literature [10–12], only one case concerned the middle finger during a jersey finger injury [9]. Diagnosis remains clinical but imaging tests such as MRI and ultrasound, which are increasingly prescribed, allow us to assess the lesions preoperatively, allowing us better surgical planning and sometimes avoiding an unforeseen situation during surgery [6,13,14]. Indeed, an accurate preoperative localization makes it possible to decrease the morbidity of the surgical treatment by avoiding unnecessary extensive dissection and any surprises during operation [15]. X-rays of the finger and hand should always be performed to look for bone fragments and to detect any underlying bone pathology (e.g. wrist osteoarthritis, carpal instability or, more anecdotally, Kienböck's disease) that can lead to spontaneous rupture of the deep flexor tendon. The treatment of jersey finger is necessarily surgery and many techniques have been described, depending on the presence or absence of a fracture. Although studies provide excellent mobility and pain outcomes, treatment is not easy. Many surgical techniques have been described, such as pull-out and the use of anchor, plate or screw if there is an associated fracture. The most widely used method remains the pull-out technique. Brustein et al. published a cadaveric study in 2001 showing no superiority between the different treatments [16], but Lee et al. found that anchor-button repair might give better results than the pull-out technique [17]. The repair of the two tendons still remains controversial. Tang explains that the results are similar whether the FDS is repaired or not, but that the risk of complication and adhesions is greater if the FDS is repaired in zone 2C [18]. In our case and in view of the lack of data in the literature on this surgical

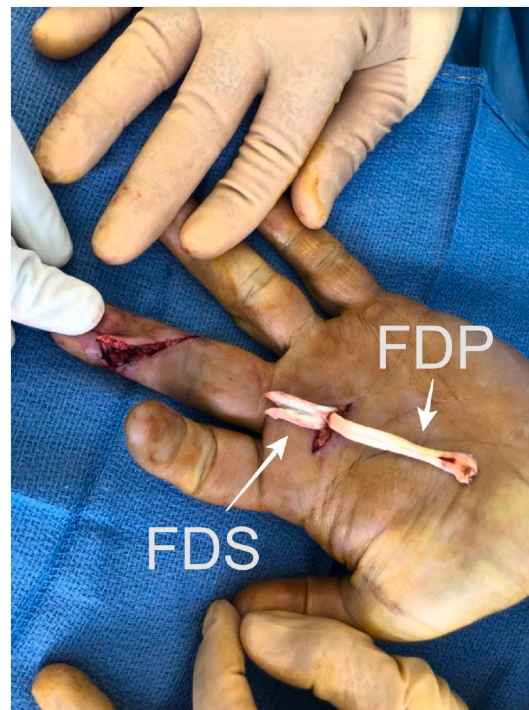


Fig. 1. Preoperative picture showing flexor digitorum superficialis (FDS) and flexor digitorum profundus (FDP) distal avulsion (Verdan zone 1).



Fig. 2. Range of motion at 4-month follow-up.

situation, we provide additional confirmation to Jordan et al. [9] that this lesion should not be overlooked and that reintegration of the FDP alone is sufficient for effective rehabilitation and good outcomes.

### Conclusion

This rare presentation of jersey -finger can therefore surprise the surgeon intraoperatively if it is unknown to him. The advent of portable ultrasound, as well as surgeons having training in ultrasound, could help to avoid this kind of diagnostic trap and improve preoperative jersey finger planning.

### Funding

The authors declare no conflict of interest related to this work.

### Declaration of competing interest

The authors declare no funding of interest related to this work.

### References

- [1] C. Tempelaere, M. Brun, L. Doursounian, J.-M. Feron, Traumatic avulsion of the flexor digitorum profundus tendon. Jersey finger: a 29 case report, *Hand Surg. Rehabil.* 36 (5) (2017) 368–372.
- [2] P.G. Lunn, D.W. Lamb, "Rugby finger": avulsion of profundus of ring finger, *J. Hand Surg.* 9 (1) (1984) 69–71.
- [3] H.E. Kleinert, C. Verdan, Report of the committee on tendon injuries, *J. Hand Surg.* 8 (5) (1983) 794–798.
- [4] J.H. Boyes, J.N. Wilson, J.W. Smith, Flexor-tendon ruptures in the forearm and hand, *J. Bone Joint Surg. Am. Version 42-A* (1960) 637–646.
- [5] J.H. Smith, Avulsion of a profundus tendon with simultaneous intraarticular fracture of the distal phalanx: case report, *J. Hand Surg.* 6 (6) (1981) 600–601.
- [6] E. Cockenpot, G. Lefebvre, X. Demondion, C. Chantelot, A. Cotten, Imaging of sports-related hand and wrist injuries: sports imaging series, *Radiology* 279 (3) (2016) 674–692.
- [7] H.G. Tuttle, S.P. Olvey, P.J. Stern, Tendon avulsion injuries of the distal phalanx, *Clin. Orthop. Relat. Res.* 445 (2006) 157–168.

- [8] M. Lanzetta, W.B. Conolly, Closed rupture of both flexor tendons in the same digit, *J. Hand Surg.* 17 (4) (1992) 479–480.
- [9] R.W. Jordan, N. Lotfi, G. Shyamalan, Simultaneous closed rupture of flexor digitorum superficialis and flexor digitorum profundus tendons in the middle finger: a case report, *Case Rep. Plast. Surg. Hand Surg.* 2 (1) (2015) 1–3.
- [10] T. El Zahran, K. Collins, M.R. Terk, Bilateral spontaneous rupture of the flexor digitorum superficialis and the flexor digitorum profundus in a diabetic patient, *Skelet. Radiol.* 42 (2) (2013) 297–301.
- [11] C.-J. Lin, M.-J. Lin, C.-H. Tsai, Simultaneous spontaneous ruptures of both flexor tendons in the little finger, *J. Hand Surg. Eur. Vol.* 35 (3) (2010) 236.
- [12] J.T. Jose Jerome, Closed ruptures of both flexor tendons of the little finger, *J. Hand Surg. Eur. Vol.* 35 (3) (2010) 238–239.
- [13] D.H. Lee, M.L. Robbin, R. Galliot, V.A. Graveman, Ultrasound evaluation of flexor tendon lacerations, *J. Hand Surg.* 25 (2) (2000) 236–241.
- [14] A. Goodson, M. Morgan, G. Rajeswaran, J. Lee, E. Katsarma, Current management of jersey finger in rugby players: case series and literature review, *J. Hand Surg.* 15 (02) (2010) 103–107.
- [15] A.J. Bois, G. Johnston, D. Classen, Spontaneous flexor tendon ruptures of the hand: case series and review of the literature, *J. Hand Surg.* 32 (7) (2007) 1061–1071.
- [16] M. Brustein, J. Pellegrini, J. Choueka, H. Heminger, D. Mass, Bone suture anchors versus the pullout button for repair of distal profundus tendon injuries: a comparison of strength in human cadaveric hands, *J. Hand Surg.* 26 (3) (2001) 489–496.
- [17] S.K. Lee, M. Fajardo, G. Kardashian, J. Klein, P. Tsai, D. Christoforou, Repair of flexor digitorum profundus to distal phalanx: a biomechanical evaluation of four techniques, *J. Hand Surg.* 36 (10) (2011) 1604–1609.
- [18] J.B. Tang, Flexor tendon repair in zone 2C, *J. Hand Surg.* 19 (1) (1994) 72–75.