

Closed Mallet Thumb Injury-A Rare Case Report

Pranam Sumeeth¹, Harshitha S Reddy², Avinash Alva^{1,3}

Learning Point of the Article:

Management of closed mallet thumb injury
Comparison between the outcomes of various studies of mallet thumb injuries.

Abstract

Introduction: Mallet thumb injuries are uncommon. Traumatic avulsion injury of the extensor pollicis longus leads to significant difficulty.

Case Report: A 55-year-old male patient presented with a closed hyper flexion injury to the thumb, resulting in pain and loss of active extension. Clinical examination and x-rays confirmed a soft-tissue mallet injury. The patient was treated non-operatively by immobilizing the interphalangeal joint of the thumb. The patient regained full range of motion.

Conclusion: Non-operative treatment for acute closed mallet injury of the thumb provides satisfactory outcomes. It is suitable when a patient presents acutely.

Keywords: Mallet thumb injury, closed thumb injury, Extensor pollicis longus rupture, mallet finger injury.

Introduction

Traumatic avulsion injury of the extensor pollicis longus (EPL) leads to significant disability. Very few cases of closed soft tissue mallet thumb injuries have been reported in the literature. About 2% of all mallet injuries occur in the thumb [1]. Both surgical and non-surgical management have been reported for this injury. Due to the rarity of the injury, standardized protocol for treatment is unavailable, and despite the course of treatment, the patient must be educated on the failure of conservative treatment [2].

Case Report

A 55-year-old, dominant right-hand male patient presented to the outpatient clinic with pain and an inability to extend his right

thumb 2 days post-injury. The patient sustained a hyper flexion injury while helping his daughter finish a do-it-yourself project. The patient's chief complaint was loss of active extension and pain.

On examination, the injury was closed, and the thumb was in 30° of flexion at the interphalangeal joint (IPJ). The patient had moderate swelling and tenderness around the IPJ. While the patient was able to flex at the IPJ, he was unable to actively extend the thumbs. The X-ray showed no fractures or osseous defects. Based on the clinical examination and no evidence of bony injuries, it was deemed to be a closed mallet thumb injury.

The injury was managed conservatively. A malleable aluminum splint was used to immobilize the IPJ. The splint was placed full-time for a period of 8 weeks and was followed by 4 weeks of night-

Access this article online

Website:
www.jocr.co.in

DOI:
<https://doi.org/10.13107/jocr.2023.v13.i11.4014>

Author's Photo Gallery



Dr. Pranam Sumeeth



Dr. Harshitha S Reddy



Dr. Avinash Alva

¹Orthosport Clinic, Vijaya Bank Layout, Bengaluru, Karnataka, India,

²Department of Orthopaedic Surgery, MS Ramaiah Medical College, Bengaluru, Karnataka, India,

³Bangalore Hospital, Southend Circle, Bengaluru, India.

Address of Correspondence:

Dr. Harshitha S Reddy,
Department of Orthopaedic Surgery, MS Ramaiah Medical College, Bengaluru - 560 054, Karnataka, India.
E-mail: harshitha7reddy@gmail.com

Submitted: 15/08/2023; Review: 06/09/2023; Accepted: October 2023; Published: November 2023

DOI: <https://doi.org/10.13107/jocr.2023.v13.i11.4014>

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License <https://creativecommons.org/licenses/by-nc-sa/4.0/>, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms

Series In order of reference	Authors	Non-operative		Operative	
		No. of cases	Reported outcome	No. of cases	Reported outcome
[1]	Tabbal et al.	-	N/A	1	Patient regained excellent function
[2]	Norrie and Jebson	-	N/A	1	Patient regained full range of motion of his thumb.
[3]	Miura et al.	5	Results in closed injuries not clarified	-	N/A
[4]	Patel et al.	2	6 month follow-up revealed excellent ROM	-	N/A
[5]	Primiano	2	Both patients had satisfactory result	-	N/A
[6]	McCarten et al.	1	Full ROM and excellent function	1	Full ROM and excellent function
[7]	De Smet and Van Ransbeeck	1	Near normal function	-	N/A
[8]	Aerts et al.	1	Complete recovery of active extension.	-	N/A
[9]	Uemura et al.	1	Full IP joint range of motion was noted	-	N/A
[10]	Din and Meggit	-	N/A	3	Post 8 weeks all the patients had strong active extension at the IPJ
[11]	Arvanitakis et al.	-	N/A	1	Kapandji-score of 9
[12]	Abe et al.	-	N/A	10	QuickDASH score=3.8(mean)+7.5(SD)
	Total	13		17	

Table 1: Previously reported cases of closed mallet thumb injuries. (Search was limited to studies in English.)

only splinting. The patient was advised to maintain the position of the thumb when the splint was taken off.

A 12-week follow-up had positive outcomes as the normal range of movement of his right thumb was restored. During the final follow-up at 12 months, examination of the EPL showed normal power. The patient showed no extension lag. The patient was confirmed to have an excellent Crawford's score.

Discussion

A literature review (in English) on Mallet thumb over the last 40 years has been summarized in Table 1 [1-12]. A total of seven [3-9] studies (Table 1) had satisfactory results with non-operative treatment. Miura et al. [3] reported that patients who received treatment within 2 weeks of the reported injury had better outcomes compared to those treated after the initial 2 week period. The study noted perfect extension in 84% of cases where the splint was placed for the entire day for 4–6 weeks and later reduced to 8–12 h for the following 3–6 months. Patel et al. [4] successfully managed to achieve a satisfactory outcome with a Stack splint, immobilizing only the IPJ for 8 weeks, followed by 2 weeks of night splinting. At the 6-month follow-up, all

patients in their series had a satisfactory outcome. These case reports agree with the remaining articles about the efficacy of non-operative treatment for closed mallet thumb injuries [3-9].

Differential diagnoses of closed soft tissue mallet injury include

- Seymour fracture
- Osteoarthritis
- Rheumatoid arthritis is a swan-neck deformity.

We found six [1, 2, 6, 10-12] studies (Table 1) where surgery was the preferred mode of treatment. Two were due to tendinous gaps [1, 11], and two were due to delayed presentation [2, 6]. A systematic review by Abe et al. [12] reported a shorter duration of immobilization for surgically treated mallet thumb injuries (4.9 weeks for surgery vs. 9.5 weeks non-surgical). Surgical methods include placing sutures on the EPL with various kinds of core sutures and epitendinous sutures. In cases where the EPL tendon detaches from the distal phalangeal bone, it is reattached with suture anchors and epitendinous sutures. After the incision is closed, the IPJ is immobilized by either a splint or Kirschner wire (K-wire) for a period of 4–6 weeks. Parameters like QuickDASH score, range of motion, and immobilization method did not show significant

Type I	Closed injury, with or without small dorsal avulsion fracture
Type II	Open injury, laceration of tendon
Type III	Open injury with loss of skin, subcutaneous cover, and tendon
	Substance
Type IV	Mallet fracture
A	Transepiphyseal plate fracture in children
B	Hyper flexion injury with fracture of articular surface of 20–50%
C	Hyperextension injury with fracture of the articular surface >50% and with early or late volar subluxation of distal phalanx

Table 2: Classification of mallet finger.

differences between different treatment modalities. Doyle [14] classified mallet injuries into four types, as explained in Table 2.

Our report discusses the management of a type 1 mallet injury and a literature review of closed injuries without bony avulsion.

Tabbal et al. [1] recommend a routine MRI to enable early identification of cases with large tendinous gaps. Imaging may help in making better decisions for treatment. Platelet-rich

plasma (PRP) and stem cells are being increasingly utilized in the management of tendon pathology. A meta-analysis and systematic review by Chen et al. [13] looked at the efficacy of PRP on tendon healing. The review shows it may provide both short-term and long-term pain relief for tendon and ligament injuries. We recommend further studies to look at the role of PRP and other biologics in the treatment of this uncommon injury.

Conclusion

Non-operative treatment for an acute closed mallet injury of the thumb provides satisfactory outcomes. It is suitable when a patient presents acutely.

Clinical Message

Soft-tissue mallet thumb is an uncommon condition. Clinical examination and X-ray evaluation can confirm the difference between soft tissue and bony mallet injuries. When detected early, this condition may be successfully treated conservatively with good outcomes.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

1. Tabbal GN, Bastidas N, Sharma S. Closed mallet thumb injury: A review of the literature and case study of the use of magnetic resonance imaging in deciding treatment. *Plast Reconstr Surg* 2009;124:222-6.
2. Norrie BA, Jebson PJ. Mallet thumb. *J Hand Surg Am* 2013;38:1219-21.
3. Miura T, Nakamura R, Torii S. Conservative treatment for a ruptured extensor tendon on the dorsum of the proximal phalanges of the thumb (mallet thumb). *J Hand Surg Am* 1986;11:229-33.
4. Patel MR, Lipson LB, Desai SS. Conservative treatment of mallet thumb. *J Hand Surg Am* 1986;11:45-7.
5. Primiano GA. Conservative treatment of two cases of mallet thumb. *J Hand Surg Am* 1986;11:233-5.
6. McCarten GM, Bennett CS, Marshall DR. Treatment of mallet thumb. *Aust N Z J Surg* 1986;56:285-6.
7. De Smet L, Van Ransbeeck H. Mallet thumb. *Acta Orthop Belg* 2003;69:77-8.
8. Aerts BR, Somford MP, Beumer A. Mallet thumb: Report of a case. *OA Case Rep* 2014;2:156.
9. Uemura T, Kazuki K, Hashimoto Y, Takaoka K. Skiing-induced rupture of the extensor pollicis longus tendon: A report of three cases. *Clin J Sport Med* 2008;18:292-4.
10. Din KM, Meggitt BF. Mallet thumb. *J Bone Joint Surg Br*

1983;65:606-7.

11. Arvanitakis M, Calcagni M, Giesen T. Closed mallet thumb injury treated surgically: A case report. *Case Reports Plast Surg Hand Surg* 2017;4:27-9.
12. Abe Y, Rokkaku T, Tokunaga S, Yamada T, Okamoto S. Closed mallet thumb injury: Our experience of 10 patients treated with surgery and a systematic review. *J Plast Reconstr Aesthet Surg* 2016;69:835-42.
13. Chen X, Jones IA, Park C, Vangsness CT Jr. The efficacy of platelet-rich plasma on tendon and ligament healing: A systematic review and meta-analysis with bias assessment. *Am J Sports Med* 2018;46:2020-32.
14. Doyle JR. Extensor tendons: Acute injuries. In: Green DP, Pederson CW, Hotchkiss RN, editors. *Green's Operative Hand Surgery*. 4th ed. New York: Churchill Livingstone; 1999. p. 195-8.

Conflict of Interest: Nil

Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this case report

How to Cite this Article

Sumeeth P, Reddy HS, Alva A. Closed Mallet Thumb Injury-A Rare Case Report. *Journal of Orthopaedic Case Reports* 2023 November;13(11): 80-83.