The Philippine Journal of Orthopaedics

ORIGINAL ARTICLE

Outcomes of Patients with Tendinous Mallet Finger Injury Managed with DIPJ Extension Splinting vs Axial Pinning: A Descriptive Study

Roel Gabriel G. Rabino, MD and Raymar L. Sibonga, MD, FPOA

Department of Orthopaedics, De La Salle University Medical Center, Dasmariñas, Cavite, Philippines

ABSTRACT

Background. Mallet finger, a common finger injury, results from damage to the distal extensor tendon, causing a flexion deformity at the distal interphalangeal joint. While conservative treatment with splinting is often effective, surgical intervention using Kirschner wire fixation may be necessary for complex cases or non-compliant patients.

Objective. This study compared the outcomes of two treatments for tendinous mallet finger: splinting and pinning. Researchers analyzed patient demographics, distal interphalangeal joint range of motion, clinical outcomes, and complication rates between the two groups.

Methodology. We retrospectively reviewed patients diagnosed with tendinous mallet finger injury managed conservatively or surgically from 2018 to 2022 in a tertiary hospital.

Result. Both surgical and conservative treatments were effective, as shown by the excellent total active motion scores and satisfactory qDASH (Disabilities of the Arm, Shoulder, and Hand) outcomes in both groups. However, when comparing the Miller and Crawford criteria, the surgical group consistently showed slightly better functional outcomes.

Conclusion. Both treatments yielded similar results for range of motion, extension lag, and flexion loss, making them equally effective. However, axial pinning may result in better subjective improvement and satisfaction.

Keywords. tendinous mallet finger injury, axial pinning, mallet finger splinting

INTRODUCTION

Mallet finger injury is characterized by a discontinuity in the distal extensor tendon, causing delayed extension at the distal interphalangeal (DIP) joint with or without compensatory hyperextension at the proximal interphalangeal (PIP) joint. It is a common sports injury that happens when a straight digit tip is injured by an axial force, causing passive severe DIP hyperextension or hyperflexion.[1,2] The extensor tendon is damaged at the base of the distal phalanx, often involving a tendon rupture or bone avulsion.[3,4] This injury can result in a "drop finger" or "baseball finger" deformity.[5,6] The terminal extensor tendon may be torn due to crash injuries or lacerations in the dorsal area of the distal phalanx; most mallet injuries are closed.[7] This injury represents a substantial portion of tendinous injuries, with a global prevalence of 9.3% and comprising 5.6% of all hand and wrist tendinous injuries.[8]

Once diagnosed, restoring strong DIP joint extension is crucial to avoid a swan neck deformity. Most closed mallet finger injuries are treated conservatively with finger splints. Patients unable to tolerate splints have been advised to undergo surgical treatment using Kirschner wire fixation,[9] which some authors deem excessively invasive.

ISSN 0118-3362 (Print)
eISSN 2012-3264 (Online)
Printed in the Philippines.
Copyright© 2025 by Rabino and Sibonga.
Received: October 29, 2024.
Accepted: November 26, 2024.
Published Online: January 21, 2025.
https://doi.org/10.69472/poai.2025.03

Corresponding author: Roel Gabriel G. Rabino, MD
Resident, Department of Orthopaedics
De La Salle University Medical Center
Gov. D. Mangubat St., Dasmariñas,
Cavite, Philippines 4114
Tel. No. (046) 481 8000 loc. 1264
E-mail: rgrabinomd@gmail.com
ORCiD: https://orcid.org/0009-0007-1468-4326

This study compared outcomes of non-bony mallet finger injuries treated with either conservative splinting or surgical Kirschner wire fixation, including post-treatment range of motion in the DIP joint, Miller,[10] and Crawford[11] criteria outcomes, Filipino Quick Disabilities of the Arm, Shoulder, and Hand (qDASH)[12,13] questionnaire outcomes, and the incidence of complications.

METHODOLOGY

Study design

Retrospective Cohort Study

Study population

We conducted a four-year retrospective analysis of all patients diagnosed with tendinous acute mallet finger injuries. Protocol approval was obtained from the Technical Review Board and Independent Ethics Committee, De La Salle University Medical Center (DLSUMC). Data of patients treated from January 2018 to December 2022 were collected from the records of the DLSUMC operating room and clinics. Patients were diagnosed through clinical assessment and radiographic evaluation.

Inclusion criteria

Eligible patients included those with a flexible DIP joint, with or without subluxations, and without associated fractures, who were treated with either splinting or K-wire fixation. Patients should have also completed their management regimen, had the splint or K-wire removed at eight weeks, completed their one-year follow-up, and completed the Filipino qDASH questionnaire.

Exclusion criteria

Patients were excluded if they were non-compliant with treatment or follow-up (Figure 1).

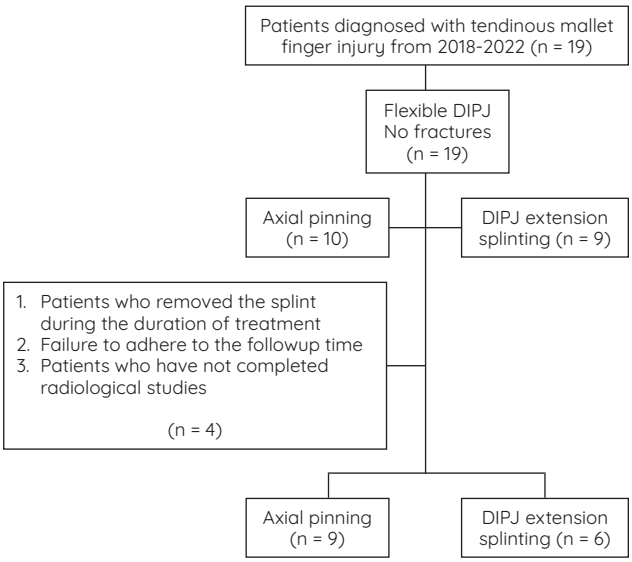

Figure 1. Flow diagram of study participants.

No randomization was done to assign patients to either group. Surgical treatment involved axial pinning with a Kirschner wire at the DLSUMC's operating room complex, verified by postoperative x-rays. Conservative treatment consisted of DIP joint extension splinting, with a repeat x-ray after one week to confirm that reduction was maintained. Both groups of patients followed up at the outpatient department or senior author's clinic. X-rays were repeated at eight weeks, 12 weeks and one year post-treatment. Outcomes were assessed by orthopedic surgery residents and the consultant. Clinical outcomes were assessed at the final examination at one year post-treatment. The final range of motion was measured using a digital goniometer. Clinical outcomes were measured using the Miller criteria (Table 1), the Crawford criteria (Table 2), and the Filipino qDASH. Any treatment complications such as skin maceration, ulcerations, pin loosening, pin tract infection, and nail deformity were recorded.

Surgical technique: axial pinning

All surgeries were done under digital block anesthesia. With the DIPJ extended, a 0.045 in K-wire was inserted centrally through the tip of the distal phalanx, advanced proximally to its base, penetrating the DIPJ, then advanced through the head of the middle phalanx up to its base without PIPJ penetration. Intraoperative fluoroscopy was used to confirm K-wire placement. The exposed end of the K-wire was trimmed and buried underneath the skin. Standard absorbent dressing was applied without suturing or splinting (Figure 2).

The pins were removed at the day surgery complex after eight weeks. Under digital block anesthesia, a small incision was made over the skin where the pin was palpable. The pin was gently rotated and pulled out, and sterile dressings were applied to the wound.

Table 1. Miller's Criteria for Assessing Extensor Tendon Function. Evaluates extensor tendon function based on active extension lag and flexion deficit at the DIP joint

Results	Total extension lag (degrees)	Total flexion loss (degrees)
Excellent	0	0
Good	≤10	≤20
Fair	11-45	21-45
Poor	≥45	≥45

Table 2. Crawford Criteria. Grades outcomes based on DIP joint flexion-extension loss and pain

Grade	Characteristics of distal interphalangeal joint
Excellent	Full extension Full flexion No pain
Good	Extension deficit 0-10 degrees Full flexion No pain
Fair	Extension deficit 10-25 degrees Any flexion loss No pain
Poor	Extension deficit >24 degrees Persistent pain

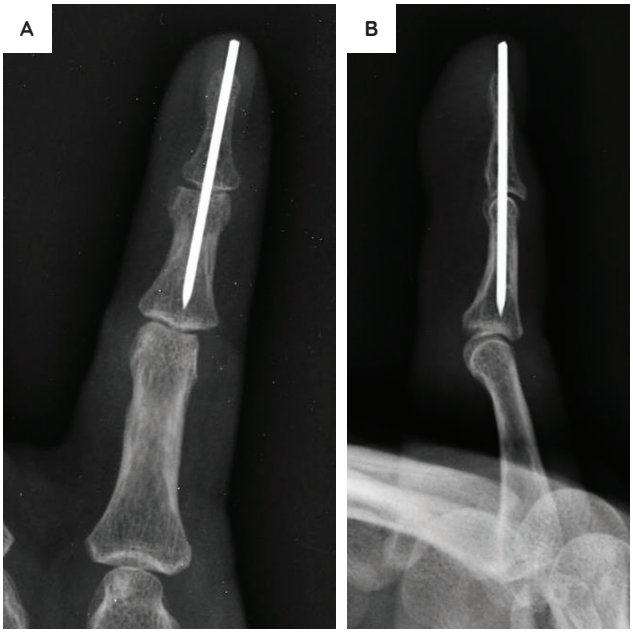

Figure 2. Kirschner wire fixation. **(A)** Anteroposterior radiograph. The K-wire was inserted axially in a retrograde fashion. Tricortical: pin penetrating the tip and base of distal phalanx and head of middle phalanx. **(B)** Lateral radiograph. The DIP joint was fixed in extension.

Figure 3. Conservative management. The padded tongue depressor was cut to length and applied distal to the proximal interphalangeal joint to keep the DIPJ extended. The splint was secured with sticking plaster.

Conservative management: volar/dorsal splint

A padded tongue depressor cut to the appropriate length was applied spanning the middle phalanx to the fingertip, immobilizing the distal interphalangeal joint (DIPJ) in extension. This was maintained with an adhesive plaster for eight weeks (Figure 3). If the DIP joint had been allowed to flex during that time, the patient was categorized as non-compliant.

Gentle range of motion exercises for the DIP joint were initiated after the removal of the splint or pin.

RESULTS

Nineteen patients were diagnosed with tendinous mallet finger injuries from January 2018 to December 2022. Ten underwent axial pinning, while nine underwent splinting. Four patients were non-compliant with treatment or postoperative x-rays or were lost to follow-up, leaving nine patients in the axial pinning group, and six in the splinting group (Figure 1). The mean age of the overall cohort was 35.8 ± 9.97 years. The surgical group had a higher proportion of males (66.67%) compared to the conservative group (50%). The right hand was more commonly affected, 77.78% in the surgical group and 66.67% in the conservative group. Injuries were relatively equally distributed between the small, ring, middle, and index fingers across both groups. In the surgical group, the small and ring fingers were most commonly affected (44.44% and 33.33%, respectively). In the conservative group, the ring and middle fingers were equally affected (33.33%), and the small finger was less frequently involved (16.67%) (Table 3).

At one year follow-up, these were the outcomes and complications noted (Tables 4 and 5).

- **Total Extension Lag**: The conservative group demonstrated a mean of 8.08 (± 3.89) degrees of extension lag, while the surgical group demonstrated 6.67 (± 2.91) degrees.
- **Total Flexion Loss**: Similarly, the conservative group had a mean flexion loss of 4.25 (± 1.1) degrees, while the surgical group had a mean of 3.48 (± 1.0) degrees.
- **Total Active Motion (TAM)**: Both groups achieved excellent TAM scores, with 100% of patients in both groups reaching satisfactory total active motion.
- **Miller and Crawford Criteria**: All patients in the surgical group (100%) achieved a "good" outcome according to both criteria, whereas half (50%) of patients in the conservative group had a "fair" outcome.
- **qDASH Score**: Both groups had satisfactory functional outcomes, with the surgical group scoring a mean of 22.47 (± 2.40) while the conservative group scored a mean of 20.45 (± 3.22).
- **Radiographic Findings and Complications**: All patients in both groups had unremarkable radiographic findings, and no complications (skin-related complications, infection, arthritis) were reported in either group.

DISCUSSION

Mallet injuries, as defined by the Doyle classification, present in various forms: they can be closed injuries, either with or without an associated avulsion fracture, or open injuries, which may involve tendon or soft tissue damage, sometimes in conjunction with fractures.[14] Failure to restore DIP joint extension may lead to complications such as a swan neck deformity, a condition characterized by hyperextension of the PIP joint with concurrent DIP joint flexion.[15,16]

Conservative management, predominantly through six to eight weeks of DIPJ extension splinting, remains the standard for treating most closed mallet injuries. However, patient compliance is a common challenge with this approach. Wearing a splint continuously for the recommended duration can be uncomfortable. Skin-related complications, including necrosis, maceration, and ulceration, can arise due to the pressure and moisture buildup under the splint, especially when patients fail to maintain proper hygiene or allow the skin to air out regularly.[16-21]

Table 3. Demographic profile of the patients

	Total (n=15)	Surgical (n=9, 60%)	Conservative (n=6, 40%)
	Frequency (%); Mean ± SD		
Age, years	35.8 ± 9.97	34.44 ± 11.70	37.83 ± 7.17
Sex			
Male	9 (60)	6 (66.67)	3 (50)
Female	6 (40)	3 (33.33)	3 (50)
Affected hand			
Right	11 (73.33)	7 (77.78)	4 (66.67)
Left	4 (26.67)	2 (22.22)	2 (33.33)
Affected finger			
Small finger	5 (33.33)	4 (44.44)	1 (16.67)
Ring finger	5 (33.33)	3 (33.33)	2 (33.33)
Middle finger	4 (26.67)	2 (22.22)	2 (33.33)
Index finger	1 (6.67)	0	1 (16.67)

Table 4. One-year follow-up

	Total (n=15)	Surgical (n=9, 60%)	Conservative (n=6, 40%)
	Frequency (%); Mean ± SD		
Total extension lag	7.23 ± 3.28	6.67 ± 2.91	8.08 ± 3.89
Total flexion loss	3.79 ± 1.08	3.48 ± 1	4.25 ± 1.1
Total active motion (TAM)	164 ± 3.48	164.86 ± 3.26	162.67 ± 3.67
Excellent	15 (100)	9 (100)	6 (100)
Miller criteria			
Fair	3 (20)	0	3 (50)
Good	12 (80)	9 (100)	3 (50)
Crawford criteria			
Fair	3 (20)	0	3 (50)
Good	12 (80)	9 (100)	3 (50)
qDASH (Filipino)	21.66 ± 2.83	22.47 ± 2.40	20.45 ± 3.22
Satisfactory	15 (100)	9 (100)	6 (100)
Unremarkable Radiographic findings	15 (100)	9 (100)	6 (100)
Complication			
Absent	15 (100)	9 (100)	6 (100)
Present	0	0	0

Table 5. Demographics, clinical and radiological values of the study population **(A)** Surgical and **(B)** Conservative

A. Surgical (k-wire)														
Patient	Age	Gender	Affected hand	Affected finger	Final (1 year post-treatment)									
					Total extension lag	Total flexion loss	Total active motion (TAM)		Millers criteria	Crawford criteria	qDASH (Filipino)		Radiographic findings	Complications
1	52	female	right	small finger	8.9	2.6	163.5	excellent	good	good	22.72	satisfactory	unremarkable	none
2	24	male	left	small finger	0.4	2.1	172.5	excellent	good	good	20.45	satisfactory	unremarkable	none
3	16	female	right	middle finger	7.0	4.9	163.1	excellent	good	good	18.18	satisfactory	unremarkable	none
4	24	male	left	small finger	9.0	2.1	163.9	excellent	good	good	22.72	satisfactory	unremarkable	none
5	29	male	right	ring finger	8.2	3.7	163.1	excellent	good	good	25.00	satisfactory	unremarkable	none
6	44	female	right	ring finger	4.0	4.0	167.0	excellent	good	good	20.45	satisfactory	unremarkable	none
7	41	male	right	middle finger	9.0	4.4	161.6	excellent	good	good	25.00	satisfactory	unremarkable	none
8	41	male	right	ring finger	5.5	4.0	165.5	excellent	good	good	25.00	satisfactory	unremarkable	none
9	39	male	right	small finger	8.0	3.5	163.5	excellent	good	good	22.72	satisfactory	unremarkable	none

B. Conservative (splinting)														
Patient	Age	Gender	Affected hand	Affected finger	Final (1 year post-treatment)									
					Total extension lag	Total flexion loss	Total active motion (TAM)		Millers criteria	Crawford criteria	qDASH (Filipino)		Radiographic findings	Complications
1	36	female	right	middle finger	5.3	4.6	165.1	excellent	good	good	20.45	satisfactory	unremarkable	none
2	25	female	right	index finger	5.2	5.8	164.0	excellent	good	good	15.90	satisfactory	unremarkable	none
3	40	female	left	middle finger	11.7	3.7	159.6	excellent	fair	fair	22.72	satisfactory	unremarkable	none
4	46	male	left	ring finger	12.4	2.9	159.7	excellent	fair	fair	18.18	satisfactory	unremarkable	none
5	42	male	right	ring finger	3.4	3.4	168.2	excellent	good	good	20.45	satisfactory	unremarkable	none
6	38	male	right	small finger	10.5	5.1	159.4	excellent	fair	fair	25.00	satisfactory	unremarkable	none

For patients unable to adhere to the demands of splinting due to occupational demands, K-wire fixation is often recommended. After the six to eight-week immobilization period, part-time splinting for an additional 2 to 4 weeks may follow, allowing for a more gradual transition to full mobility. K-wire fixation stabilizes the joint without violating the tendon, thereby maintaining the structural integrity of the extensor mechanism while promoting proper joint alignment during the healing process.[16-21]

Despite its advantages, K-wire fixation has complications. Issues range from short-term joint stiffness and septic arthritis to long-term osteoarthritis.[22] Osteoarthritis can develop from the disruption of the articular surface during pin insertion, altering joint mechanics and causing articular degeneration. Surgery carries inherent risks of infection, K-wire loosening, and pain at the insertion site. If infection extends to the bone, the resulting osteomyelitis requires extensive treatment, including prolonged antibiotic therapy or additional surgeries.[23-30]

Casscells and Strange in 1957 first introduced transarticular fixation of the DIP joint using K-wires.[31] This method was paired with immobilization of the proximal interphalangeal (PIP) joint using a plaster cast to maintain joint stability for four weeks. Studies comparing surgical and non-surgical treatment for mallet fingers have varying results. While Auchincloss[23] and Renfree[24] found that surgery improved DIP joint extension, both concluded that clinical outcomes were similar to conservative treatment. Auchincloss suggested surgery might be better for delayed presentations, while Groebli[32] recommended splinting in such cases, reserving surgery for open injuries or persistent joint incongruity. Lubahn[33] favored surgery for subluxation or large fractures, citing improved extension and cosmesis, whereas Wehbe and Schneider[34] generally recommended non-surgical treatment regardless of subluxation or fracture size.

In our study, K-wire fixation was applied longitudinally through the DIP joint and buried beneath the skin without external splinting, streamlining recovery. One year postoperatively, the absence of rotational deformities demonstrated the technique's efficacy, especially for patients needing unrestricted hand use in their occupations.

A similar study by Nagura et al.[35] explored the use of a single K-wire inserted obliquely through the DIP joint. While the oblique approach may offer advantages, such as engaging more cortical bone to reduce the likelihood of wire loosening and easier extraction in the event of wire breakage, insertion is more difficult and is more likely to injure adjacent soft tissues. Axial K-wire placement technique remains a preferred option due to its simplicity and direct stabilization of the joint. In this study, pain and scarring at the wire insertion site were minimal, attributed to careful surgical technique and proper wound care.

Our surgical technique was intended to reduce common complications including infection, irritation, pain, and the risk of osteoarthritis from articular disruption. By centrally placing a single axial K-wire, the technique minimizes joint damage and mechanical irritation. This approach also reduces the need for multiple pins, which can exacerbate the risk of infection and other complications. By providing a stable fixation, this technique optimizes the healing process, offering a favorable balance between joint stabilization and functional recovery.

While both treatments are viable, surgical intervention for finger injuries resulted in slightly better subjective outcomes. All patients in the surgical group achieved a "good" outcome based on both the Miller and Crawford criteria in contrast to only half of the patients treated conservatively. The absence of complications in either group demonstrated the safety of both approaches.

CONCLUSION

Both surgical and conservative treatments resulted in similar ranges of motion, and incidences of extension lag and flexion loss, suggesting that they were equally effective. However, axial pinning may result in greater overall improvement and satisfaction based on subjective measures. Treatment must be individualized based on clinical presentation and patient preferences, as both approaches have their merits depending on the desired outcomes.

Limitations

The study was limited only to a single institution. The number of participants was limited by the total number of patients treated by the senior investigators during this period. Patients were not randomized to treatment groups. We also noted more dropouts from the conservative group. While the results may provide valuable insights into patient outcomes, they must be interpreted cautiously and might not be generalizable to other populations or practice settings.

Recommendations and future research directions

Future research should involve multiple centers to increase the sample size and enhance the generalizability of the findings. A larger, more diverse patient population would provide greater statistical power and allow for subgroup analysis (e.g., by age, fracture type, or activity level). Moreover, while the current study assessed outcomes at one year, longer follow-up is crucial to evaluate the long-term efficacy and potential complications of both surgical and conservative treatments. This would help determine if the observed benefits of surgical treatment, particularly in terms of patient satisfaction, are sustained.

STATEMENT OF AUTHORSHIP

All authors certified fulfillment of ICMJE authorship criteria.

AUTHORS DISCLOSURE

The authors declared no conflict of interest.

FUNDING SOURCE

None.

REFERENCES

1. Salazar Botero S, Hidalgo Diaz JJ, Benaïda A, Collon S, Facca S, Liverneaux PA. Review of acute traumatic closed mallet fin ger injuries in adults. Arch Plast Surg. 2016;43(2):134–44. PMID: 27019806 PMCID: PMC4807168 DOI: 10.5999/aps.2016.43.2.134
2. Eddy M. Hands, fingers, thumbs: assessment and management of common hand injuries in general practice. Aust Fam Physician. 2012;41(4):202–9. PMID: 22472680
3. Ramponi DR, Hellier SD. Mallet Finger. Adv Emerg Nurs J. 2019;41(3):198–203. PMID: 31356243 DOI: 10.1097/TME.0000000000000251
4. Stack HG. Mallet finger. Hand. 1969;1(1):83–9. DOI: 10.1016/0072-968X(69)90069-2
5. Alla SR, Deal ND, Dempsey IJ. Current concepts: mallet finger. Hand (N Y). 2014;9(2):138–44. PMID: 24839413 PMCID: PMC4022957 DOI: 10.1007/s11552-014-9609-y
6. Handoll HH, Vaghela MV. Interventions for treating mallet finger injuries. Cochrane Database Syst Rev. 2004;(3):CD004574. PMID: 15266538. DOI: 10.1002/14651858.CD004574.pub2
7. Cheung JP, Fung B, Ip WY. Review on mallet finger treatment. Hand Surg. 2012;17(3):439–47. PMID: 23061962 DOI: 10.1142/S0218810412300033
8. Hamas RS, Horrell ED, Pierret GP. Treatment of mallet finger due to intra-articular fracture of the distal phalanx. J Hand Surg Am. 1978;3(4):361–3. PMID: 681720 DOI: 10.1016/s0363-5023(78)80038-0
9. Wolfe SW, Hotchkiss RN, Pederson WC, Kozin SH, Cohen MS, ed. Specific tendon injuries. In: Green's operative hand surgery. 7th ed. Philadelphia: Elsevier Churchill Livingstone; 2017.
10. Miller H. Repair of severed tendons in the hand and wrist. Surg Gynecol Obstet. 1942;74:693–8.
11. Crawford GP. The molded polythene splint for mallet finger deformities. J Hand Surg Am. 1984;9(2):231–7. PMID: 6715831 DOI: 10.1016/s0363-5023(84)80148-3
12. Hudak PL, Amadio PC, Bombardier C. Development of an upper extremity outcome measure: the DASH (disabilities of the arm, shoulder, and hand) [corrected] The Upper Extremity Collaborative Group (UECGAm J Ind Med. 1996;29(6):602–8. PMID: 8773720 DOI: 10.1002/(SICI)1097-0274(199606)29:6<602::AID-AJIM4>3.0.CO;2-L
13. Estrella EP, Orillaza NS, Castillo-Carandang NT, Cordero CP, Juban NR. The validity, reliability and internal consistency of the cross-cultural adaptation of the FIL-DASH (Filipino version of the Disability of the Arm, Shoulder, and Hand) questionnaire in patients with traumatic brachial plexus injuries. J Hand Surg Asian Pac Vol. 2019;24(4):456–61. PMID: 31690189 DOI: 10.1142/S2424835519500590
14. Hanz KR, Saint-Cyr M, Semmler MJ, Rohrich RJ. Extensor tendon injuries: acute management and secondary reconstruction. Plast Reconstr Surg. 2008;121(4):109e-20e. PMID: 18317093 DOI: 10.1097/01.prs.0000299469.16296.cb
15. Batibay SG, Akgül T, Bayram S, Ayik ö, Durmaz H. Conservative management equally effective to new suture anchor technique for acute mallet finger deformity: a prospective randomized clinical trial. J Hand Ther. 2018;31(4):429–36. PMID: 28966061 DOI: 10.1016/j.jht.2017.07.006
16. Smit JM, Beets MR, Zeebregts CJ, Rood A, Welters CFM. Treatment options for mallet finger: a review. Plast Reconstr Surg. 2010;126(5):1624–9. PMID: 21042117 DOI: 10.1097/PRS.0b013e3181ef8ec8
17. Toker S, Türkmen F, Pekince O, Korucu İ, Karalezli N. Extension block pinning versus hook plate fixation for treatment of mallet fractures. J Hand Surg Am. 2015;40(8):1591–6. PMID: 26070233 DOI: 10.1016/j.jhsa.2015.04.027
18. Renfree KJ. Acute, closed tendinous mallet injuries. J Hand Surg Am. 2014;39(12):2502–5. PMID: 25443171 DOI: 10.1016/j.jhsa.2014.08.045
19. Altan E, Alp NB, Baser R, Yalçin L. Soft-tissue mallet injuries: a comparison of early and delayed treatment. J Hand Surg Am. 2014;39(10):1982–5. PMID: 25194772 DOI: 10.1016/j.jhsa.2014.06.140
20. Salazar Botero S, Hidalgo Diaz JJ, Benaïda A, Collon S, Facca S, Liverneaux PA. Review of acute traumatic closed mallet finger injuries in adults. Arch Plast Surg. 2016;43(2):134–44. PMID: 27019806 PMCID: PMC4807168 DOI: 10.5999/aps.2016.43.2.134
21. Pike J, Mulpuri K, Metzger M, Ng G, Wells N, Goetz T. Blinded, prospective, randomized clinical trial comparing volar, dorsal, and custom thermoplastic splinting in treatment of acute mallet finger. J Hand Surg Am. 2010;35(4):580–8. PMID: 20353859 DOI: 10.1016/j.jhsa.2010.01.005
22. Rockwell WB, Butler PN, Byrne BA. Extensor tendon: anatomy, injury, and reconstruction. Plast Reconstr Surg. 2000;106(7):1592–603. PMID: 11129192 DOI: 10.1097/00006534-200012000-00024
23. Auchincloss JM. Mallet-finger injuries: a prospective, controlled trial of internal and external splintage. Hand. 1982;14(2):168–73. PMID: 6749606 DOI: 10.1016/s0072-968x(82)80011-9
24. Renfree KJ, Odgers RA, Ivy CC. Comparison of extension orthosis versus percutaneous pinning of the distal interphalangeal joint for closed mallet injuries. Ann Plast Surg. 2016;76(5):499–503. PMID: 25144418 DOI: 10.1097/SAP.0000000000000315
25. Strauch RJ. Extensor tendon injury. In: Wolfe SW, Hotchkiss RN, Pederson WC, Kozin SH, Cohen MS, editors. Green's operative hand surgery, vol. 1, 7th ed. Philadelphia: Churchill Livingstone; 2017.
26. Lin JS, Samora JB. Surgical and nonsurgical management of mallet finger: a systematic review. J Hand Surg Am. 2018;43(2):146–63. PMID: 29174096 DOI: 10.1016/j.jhsa.2017.10.004
27. Brzezienski MA, Schneider LH. Extensor tendon injuries at the distal interphalangeal joint. Hand Clin. 1995;11(3):373–86. PMID: 7559816
28. Thillemann JK, Thillemann TM, Kristensen PK, Foldager-Jensen AD, Munk B. Splinting versus extension-block pinning of bony mallet finger: a randomized clinical trial. J Hand Surg Eur Vol. 2020;45(6):574–581. PMID: 32338190 DOI: 10.1177/1753193420917567
29. Chung DW, Lee JH. Anatomic reduction of mallet fractures using extension block and additional intrafocal pinning techniques. Clin Orthop Surg. 2012;4(1):72–6. PMID: 22379558 PMCID: PMC3288497 DOI: 10.4055/cios.2012.4.1.72
30. Lee YH, Kim JY, Chung MS, Baek GH, Gong HS, Lee SK. Two extension block Kirschner wire technique for mallet finger fractures. J Bone Joint Surg Br. 2009;91:1478–81. PMID: 19880893 DOI: 10.1302/0301-620X.91B11.22478
31. Casscells SW, Strange TB. Intramedullary wire fixation of mallet finger. J Bone Joint Surg Am. 1957;39-A(3):521–6. PMID: 13428796
32. Groebli Y, Riedo L, Della Santa D, Marti MC. Mallet fractures. Ann Chir Main. 1987;6(2):98e108. PMID: 3426323 DOI: 10.1016/s0753-9053(87)80021-2
33. Lubahn JD. Mallet finger fractures: a comparison of open and closed technique. J Hand Surg Am. 1989;14(2 Pt 2):394-6. PMID: 2732433 DOI: 10.1016/0363-5023(89)90121-4
34. Wehbé MA, Schneider LH. Mallet fractures. J Bone Joint Surg Am. 1984;66(5):658–69. PMID: 6725314
35. Nagura S, Suzuki T, Iwamoto T, et al. A comparison of splint versus pinning the distal interphalangeal joint for acute closed tendinous mallet injuries. J Hand Surg Asian Pac. 2020;25(2):172–6. PMID: 32312200 DOI: 10.1142/S2424835520500198
36. Clayton RA, Court-Brown CM. The epidemiology of musculoskeletal tendinous and ligamentous injuries. Injury. 2008;39(12):1338–44. PMID: 19036362 DOI: 10.1016/j.injury.2008.06.021

Disclaimer. All articles and materials published in PJO are solely those of the authors. Statements and opinions expressed by authors do not represent those of the editor/s of the Philippine Journal of Orthopaedics or of its publisher, the Philippine Orthopaedic Association.