SCIENTIFIC ARTICLE

Surgical and Nonsurgical Management of Mallet Finger: A Systematic Review

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Purpose The current literature describes multiple surgical and nonsurgical techniques for the management of mallet finger injuries, and there is no consensus on the indications for surgical treatment. The objective of this study was to determine, through a literature review, if any conclusions can be drawn concerning the indications for surgery in mallet finger injuries; the treatment outcomes of surgical versus nonsurgical management; the most effective methods of surgical and nonsurgical treatment; and the most common treatment complications of mallet finger injuries.

Methods A systematic review of multiple databases was performed. English language clinical studies evaluating therapeutic interventions for mallet fingers that reported objective, standardized outcome measures were included. Basic science studies, cadaveric studies, conference abstracts, level V evidence studies, studies lacking statistical data, and tendinous injuries other than mallet fingers were excluded. Salvage procedures and studies evaluating exclusively chronic lesions were also excluded.

Results Forty-four studies that reported clinical outcomes for the treatment of mallet finger injuries, 22 evaluating surgical treatments and 17 studies investigating nonsurgical treatments were included. The average distal interphalangeal joint extensor lag was 5.7° after surgical treatment and 7.6° after nonsurgical treatment. Complication rates of surgical and nonsurgical interventions were comparable (14.5% and 12.8%, respectively). Five studies directly compared the outcomes of surgical with nonsurgical management, with mixed results and recommendations.

Conclusions Both surgical and nonsurgical treatments of mallet finger injuries lead to excellent clinical outcomes. Insufficient evidence is available to determine when surgical intervention is indicated. Based on our literature review, it appears that these treatments are equivalent and should be individualized to the patient. *(J Hand Surg Am. 2017;■(■):1.e1-e20.*

Type of study/level of evidence Therapeutic IV.

Key words Mallet finger, outcomes, splinting, surgery.

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MALLET FINGER INJURIES ARE COMMON tendon injuries in the finger. The extensor tendon of the distal interphalangeal (DIP) joint may sustain damage of varying degrees, from partial tear to complete rupture, as characterized by Doyle's classification system[1] (Table 1, Fig. 1). The goal of management is to restore active DIP joint extension and prevent a swan neck deformity (DIP joint extensor lag and proximal interphalangeal joint hyperextension). Most mallet finger lesions can be

TABLE 1. Doyle Classification

Type	Characteristics
I	Closed injury ± avulsion fracture
II	Open injury (laceration at or around DIP joint)
III	Open injury + loss of skin and substance of the extensor tendon
IV	A: Growth plate fracture (pediatric) B: Fracture fragment involves 20% to 50% of articular surface (adult) C: Fracture fragment involves >50% of articular surface (adult)

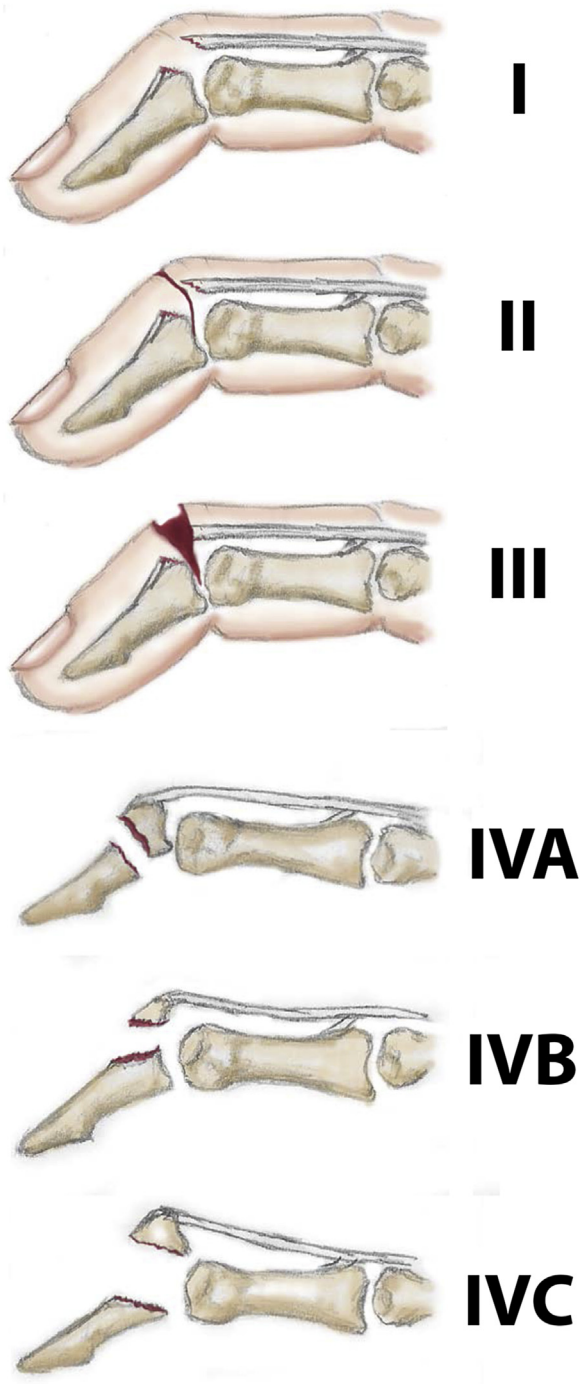

FIGURE 1: Doyle classification of mallet injuries.

treated nonsurgically by splinting, with the principal challenge being patient compliance.

There is no consensus regarding the indications for surgical intervention. Traditionally, surgeons recommended surgery for injuries involving more than one-third of the DIP joint articular surface[2,3] and those with subluxation or displacement.[4–6] Others have proposed nonsurgical management for almost all cases of mallet finger injuries, challenging the surgical indications.[7–10] To our knowledge, only 1 decision algorithm is described in the literature,[11] and it dictates the nonsurgical treatment of almost all mallet fingers, including injuries with fractures involving more than one-third of the articular surface with volar subluxation. Surgical treatment is advocated by these authors if the subluxation cannot be reduced by splinting.

The objective of this study was to determine through a literature review if any conclusions can be drawn concerning the indications for surgery in mallet finger injuries; the treatment outcomes of surgical versus nonsurgical management; the most effective methods of surgical and nonsurgical treatment; and the most common treatment complications of mallet finger injuries.

MATERIALS AND METHODS

We conducted a systematic review based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses[12] guidelines (Fig. 2). The search strategy was based on "mallet finger," and the authors independently confirmed the search on March 5, 2017. The following databases were used: PubMed, Scopus, CINAHL, The Cochrane Library, and clinicaltrials.gov. Results from web search engines and references of included articles were reviewed for potentially relevant studies missed by the initial search. All abstracts were manually screened, and the full text of all studies with potential for final inclusion was evaluated for eligibility by the first author.

Inclusion criteria required English language clinical studies evaluating any therapeutic intervention of mallet finger injury that reported an objective, standardized outcome measure with evidence level IV or higher. Basic science studies, cadaveric studies, conference abstracts, and studies not reporting