Mallet thumb: report of a case

BRJ Aerts1*, MP Somford2, A Beumer2

Abstract
Introduction
Mallet thumb is a rarely seen injury, with limited reports on whether conservative or surgical treatment should be applied. This report describes a case in which a patient with mallet thumb was treated conservatively and provides a short review of the literature.

Case report
A 48-year-old female presented herself at the Accident and Emergency Department of our hospital after a forced hyperflexion trauma of her left thumb. Clinical examination showed bruising, swelling and pain at the level of the distal phalanx of the left thumb, with a limited range of motion and pain. There was no ability to actively extend the interphalangeal joint. Radiographs did not reveal a fracture. Treatment was initiated with a forearm plaster cast that was replaced after a week for a mallet splint of the thumb for 6 more weeks. About 3.5 months after the injury, there was a complete recovery of active extension.

Conclusion
Closed mallet thumb is a rare injury that can preferably be treated conservatively with immobilisation of the interphalangeal joint for 6 to 8 weeks followed by a protective splint during the night for a further 2 to 4 weeks. According to the literature, we advise to treat acute closed mallet thumb conservatively.

Introduction
Unlike mallet finger, rupture or avulsion of the extensor tendon of the pollux (mallet thumb) is not frequently seen. This injury may result from an accident and can occur in the work environment or while performing sports. Both open and closed injuries are seen. The treatment of mallet thumb is discussed in the literature and includes conservative and surgical treatment1–7. This article describes a case of conservative treatment of mallet thumb and a review of the literature.

Case Report
A 48-year-old female presented herself at the Accident and Emergency Department of our hospital after a forced hyperflexion trauma of her left thumb. The trauma occurred during a struggle while trying to stop a nightclub bouncer from hitting her boyfriend. Her medical history revealed an ulnar collateral ligament rupture of the metacarpophalangeal (MCP) joint of the same thumb that was surgically repaired 2 years before presentation. This had healed uneventfully without any remaining complaints. Clinical

Figure 1: (a, b) Flexion deformity, 1 week after the injury. (c, d) Full active extension, 3.5 months after the injury.
examination showed bruising, swelling and pain at the level of the distal phalanx of the left thumb, with a limited range of motion and pain. There was no ability to actively extend the interphalangeal (IP) joint (Figure 1a, b). Radiographs did not reveal a fracture. Treatment was initiated with a forearm plaster cast that was replaced after a week for a mallet splint of the thumb for 6 more weeks. A splint for the night and during heavy physical activity was applied for the following 6 weeks. After 3.5 months, the active extension in the IP had completely recovered (Figure 1c, d). Flexion of the IP joint was 30°. The range of motion in the MCP joint had completely recovered and the IP and MCP joint were both stable.

**Discussion**

Mallet thumb is not as commonly seen as mallet finger; only a few case reports have been published.\(^1\)\(^-\)\(^7\) The injury may occur when the extended tip of the thumb hits an object with forced flexion of the distal IP joint or due to a hyperflexion or hyperextension injury, resulting in either a tear of the extensor tendon or an avulsion of the bony attachment of the tendon from its insertion point on the base of the distal phalanx. Diagnosis of this condition is a clinical one, but radiographs are mandatory because a fracture of the base of the phalanx may be present. Since mallet thumb is a rare injury, there is no consensus on whether conservative or surgical treatment should be applied (Table 1).

Open injuries are advised to be surgically repaired with K-wire fixation and tendon repair, followed by plaster immobilisation and removal of K-wires after approximately 6 weeks.\(^4\)\(^5\) Din and Meggitt\(^2\) advised in their report of four cases a surgical approach to mallet thumb injuries regardless of whether it was an open or closed injury. The arguments of these authors were that no successful conservative approaches were described at that time, the tendon in a mallet thumb holds sutures well and a large gap of the proximal end of the extensor pollicis longus tendon suggested that conservative treatment would not be sufficient.\(^2\) In mallet fingers, it is known that tendon lengthening of 1 mm results in approximately 25° of DIP joint extension lag.\(^8\)

### Table 1 Overview of the literature in treatment of mallet thumb

<table>
<thead>
<tr>
<th>Authors</th>
<th>Cases</th>
<th>Bony/non-bony</th>
<th>Open/closed</th>
<th>Treatment</th>
<th>Motion IP joint flexion/extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>De Smet 2003</td>
<td>1</td>
<td>Non-bony</td>
<td>Closed</td>
<td>8 weeks splint</td>
<td>75°/0°</td>
</tr>
<tr>
<td>Din 1983</td>
<td>4</td>
<td>Non-bony</td>
<td>Closed</td>
<td>Reattachment with sutures</td>
<td>45°/0°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bony (fracture proximal phalanx)</td>
<td>Closed</td>
<td>Reattachment with sutures + 2 K-wires Forearm cast (K-wires removed after 4 weeks)</td>
<td>25°/0°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-bony</td>
<td>Closed</td>
<td>Reattachment with sutures + 2 K-wires Forearm cast (K-wires removed after 4 weeks)</td>
<td>45°/0°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-bony</td>
<td>Closed</td>
<td>Reattachment with sutures + K-wire (K-wire removed after 6 weeks)</td>
<td>45°/0°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-bony</td>
<td>Closed</td>
<td>Full extension IP-joint</td>
<td></td>
</tr>
<tr>
<td>Norrie 2013</td>
<td>1</td>
<td>Non-bony</td>
<td>Closed</td>
<td>8 weeks mallet splint + 4 weeks night time</td>
<td>Full range of motion IP-joint</td>
</tr>
<tr>
<td>Tabbal 2009</td>
<td>1</td>
<td>Non-bony</td>
<td>Closed</td>
<td>Reattachment with sutures + K-wire (K-wire removed after 6 weeks)</td>
<td>Excellent function</td>
</tr>
<tr>
<td>Patel 1986</td>
<td>4</td>
<td>Non-bony</td>
<td>2 sharply cut 2 closed</td>
<td>8 weeks splint + 2 weeks night time</td>
<td>75°/–15° 75°/+15° 85°/+5° 60°/+15°</td>
</tr>
<tr>
<td>Primiano 1986</td>
<td>2</td>
<td>Non-bony</td>
<td>Closed</td>
<td>6 weeks splint</td>
<td>75°/–25° 45°/0°</td>
</tr>
</tbody>
</table>

IP joint = interphalangeal joint.
In contrast to the report of Din and Meggitt, conservative treatment was described by other authors in more recent publications and in general consisted of (cast) immobilisation of the IP joint in hyperextension for 6–8 weeks followed by rehabilitation therapy and a protective splint during the night for a further 2–4 weeks.\(^1,3,5,7\) This treatment provided excellent results with full recovery of function.

Patel et al.\(^6\) treated four patients conservatively, two of them had sharply cut the extensor tendons and recovered with satisfactory results. McCarten et al.\(^3\) presented two cases of mallet thumb. The first patient was treated surgically because of a patient delay of 3 weeks. The second patient presented 3 days after the trauma, and conservative management was applied. Both patients had a full range of motion after 6 weeks of follow-up. The authors discussed that delayed presentation might be an indication for surgery.

In our case, conservative treatment was applied according to the sparse literature available and resulted in a range of motion with complete recovery of extension and a flexion restricted to 30° after 3.5 months follow-up.

**Conclusion**

Closed mallet thumb is a rare injury that can preferably be treated conservatively with immobilisation of the IP joint for 6–8 weeks followed by a protective splint during the night for a further 2–4 weeks. According to the literature, we advise to treat acute closed mallet thumb conservatively. Delayed presentation (>3 weeks) might be an indication for surgical treatment. Open injuries are advised to treat surgically, followed by immobilisation in a splint or K-wire fixation for 6 weeks.

**Consent**

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editor-in-chief of this journal.

**Abbreviations list**

IP, interphalangeal; MCP, metacarpophalangeal.

**References**