

Vertical Locking of the Metacarpophalangeal Joint in Young Adults

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Locking of the metacarpophalangeal joints has been occasionally reported in older adults, but reports of this problem are rare in younger individuals. We report 8 young adult patients with a metacarpophalangeal joint locked in 90° flexion after minor trauma. The cases included 6 little fingers and 2 thumbs in 1 male and 7 female patients aged 16 to 39 years. All were easily reduced closed. We postulate the mechanism of injury. (*J Hand Surg* 2011;36A:1482–1485. Copyright © 2011 by the American Society for Surgery of the Hand. All rights reserved.)

Type of study/level of evidence Therapeutic IV.

Key words Vertical locking, locking, metacarpophalangeal joint, locking finger, locked finger.

LOCKING OF THE metacarpophalangeal (MCP) joints, excluding trigger fingers, has been occasionally reported in older adults,¹ but reports are rare in younger individuals. Reports of the MCP joint locked in 90° of flexion, sometimes called vertical locking, are also rare,^{2,3} especially in young patients. We present 8 young adults who had vertical locking of the MCP joint: 2 instances in the thumb (previously reported³) and 6 in the little finger.

CASE REPORTS

Patient data

This series consisted of 1 male and 7 female patients, ranging in age from 16 to 39 years. A total of 6 little fingers and 2 thumbs were injured. All patients reported a slight injury. The locked joints were easily reduced.

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Local anesthesia was used in 1 case. No fracture or joint instability was seen after reduction in patients (Table 1).

Case 4

A 16-year-old girl fell off her bed, striking her right little finger, which was forced into flexion. On examination, that MCP joint was locked in 90° flexion (Fig. 1). Full active motion was present at the interphalangeal joints. X-rays showed palmar subluxation of the proximal phalanx without other abnormal findings.

The patient was able to actively extend the joint almost fully as soon as the locking was released by longitudinal traction and manipulation without anesthesia. The joint was immobilized in slight flexion with a volar splint for 2 weeks. The pain disappeared, and 3 months after reduction, MCP joint motion measured 0/50 (extension/flexion degrees, respectively; the same shall apply hereinafter) in the affected digit and 0/90 in the unaffected fingers. The patient stated that she could not fully flex the MCP joint in the injured little finger compared with the unaffected finger before this injury.

Case 8

A 21-year-old man had the thumb proximal phalanx forced volarly in a fight. The right thumb MCP joint was locked in 90° of flexion (Fig. 2). X-rays showed subluxation of the proximal phalanx palmar to the metacarpal head, seemingly caught on its volar prominence (Fig. 3).

The locking was easily corrected without anesthesia

TABLE 1. Eight Cases of Vertical Locking of the MCP Joint

Case	Age	Gender	Side	Affected Finger	Situation of Injury	Anesthesia	MCP Joint Motion After Reduction	
							Affected	Unaffected
1	39	F	R	Little	Struck child's abdomen	Local	0/85	0/85
2	32	F	R	Little	Volleyball	None	0/80	0/90
3	26	F	L	Little	Struck adult's abdomen	None	0/80	0/95
4	16	F	R	Little	Fall from bed	None	0/50	0/90
5	16	F	L	Little	Basketball	None	0/80	0/90
6	17	F	R	Little	Volleyball	None	0/85	0/95
7	32	F	R	Thumb	Caught in key holder	None	10/50	0/50
8	21	M	R	Thumb	Punched	None	30/65	20/65

F, female; M, male; R, right; L, left.



FIGURE 1: Case 4. A 16-year-old girl with the little finger locked in flexion at 90°.



FIGURE 2: Case 8. A 21-year-old man's right thumb MCP joint is locked in 90° of flexion.

using manual traction and pushing the proximal phalanx dorsally. After reduction, active flexion and extension of the MCP joint were possible without radioulnar instability. The joint was immobilized in full extension for 2 weeks. Two months later, active MCP joint motion was 30/65 in the affected thumb and 20/65 in the unaffected thumb.

DISCUSSION

Since Langenskiold⁴ reported 2 cases of locking of the MCP joint of the index finger in 1949, locking finger has been reported occasionally. The locked MCP joints usually have loss of approximately 30° to 40° of extension with full flexion. Various mechanisms of locking have been reported, including volar plate tear,⁵ impingement of an enlarged sesamoid,⁶ collateral ligament catching on a metacarpal head prominence,⁷⁻¹⁰

accessory collateral ligament tear,¹¹ abnormal shape of the metacarpal head,^{4,12} a metacarpal head osteophyte catching on the volar ligament,^{1,2} and intra-articular derangement.¹³

Although many cases of locking fingers have been reported, to our knowledge, the one reported by Flatt² in 1961 is the only case of so-called vertical locking. Flatt noted that an abnormal volar projection on the metacarpal head accounted for the way in which the proximal phalanx palmar to it locked (Fig. 4).

Harvey⁹ suggested a simple classification of MCP joint locking based on a literature review. In the degenerative group of mainly elderly patients, the middle finger was by far most likely to be affected. The mechanism of locking was due to osteophytes around the palmar edge of the metacarpal head trapping the collateral ligament or volar plate. The spontaneous group of patients was seen at a much younger age, generally less

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