

VOLAR DISLOCATION OF THE FIRST METACARPOPHALANGEAL JOINT A CASE REPORT AND REVIEW OF THE LITERATURE

by S. GARCIA MATA*, A. HIDALGO OVEJERO* and M. MARTINEZ GRANDE*

After suffering traumatic volar dislocation of the first metacarpophalangeal joint, a 27-year-old patient was treated using closed reduction of the thumb. The patient regained full function and stability of the joint after 5 months. A review of the literature indicates that open reduction is the most common treatment for volar dislocation, but our case report suggests that conservative treatment using closed reduction can be highly effective.

Keywords : volar dislocation ; conservative treatment ; thumb dislocation.

Mots-clés : luxation palmaire ; traitement orthopédique ; luxation du pouce.

RÉSUMÉ

S. GARCIA MATA, A. HIDALGO OVEJERO et M. MARTINEZ GRANDE. Luxation palmaire de la première articulation métacarpo-phalangienne. Présentation d'un cas et revue de la littérature.

Une luxation palmaire de la première articulation métacarpo-phalangienne du pouce chez un patient de 27 ans, fut réduite orthopédiquement. Le blessé récupéra une fonction complète et une bonne stabilité après 5 mois. D'une revue de la littérature, il ressort que la réduction sanglante est le traitement le plus courant des luxations palmaires mais notre cas suggère qu'un traitement conservateur peut également donner un excellent résultat.

SAMENVATTING

S. GARCIA MATA, A. HIDALGO OVEJERO en M. MARTINEZ GRANDE. Volaire luxatie van het eerste metacarpo-falangiale gewricht. Beschrijving van één geval en overzicht van de literatuur.

Eén volaire luxatie van het eerste metacarpo-falangiale gewricht bij een 27-jarige patiënt werd gereponeerd. Patiënt recupereerde na 5 maanden met een volledige funktie en stabiliteit. Uit een overzicht van de literatuur blijkt dat de bloedige repositie voor soortgelijke volaire luxaties de gebruikelijke behandeling is ; het beschreven geval toont aan dat een conservatieve therapie eveneens een uitstekend resultaat kan geven.

INTRODUCTION

The thumb stands apart functionally and anatomically from the other fingers. Functionally, it has the capability of performing as a pincer. Anatomically, it has distinct bones and sesamoids (11), and operates on different planes and axes of movement. Dorsal luxation of the metacarpophalangeal (MCP) joint (Farabeuf luxation) is an uncommon lesion (6, 9, 13, 14), but volar luxation is so rare, except in the case of rheumatoid arthritis (18), that authors like De Palma (4), Flynn (7), and Coyffman (3) *et al.* do not even mention it. Of the five cases found in the literature, two were associated with simultaneous interphalangeal luxation of the same digit. Of the other three (10, 13, 14), only one was treated in a conservative way (14). Sandzen (16) and Tubiana (17) included the radiographs of a patient with palmar dislocation of the MCP joint of the thumb

* Trauma and Orthopedic Services, Virgen Del Camino Hospital, Pamplona (Spain).

in their textbooks. In Tubiana's textbook Sedel (17) reports that this lesion is extremely rare, but is usually easy to treat. This study presents a new case report of volar luxation of the MCP joint of the thumb with successful recovery following conservative treatment. We also review the mechanisms of the pathological and anatomical production and treatment of volar luxation of the MNP joint of the thumb.

CASE REPORT

A 27-year-old medical doctor was hit on the back of the left thumb while playing goalkeeper at an indoor football match. He suffered severe pain and deformation of the thumb in flexion. X-rays were taken at the emergency room. They showed subluxation of the metacarpophalangeal joint with external rotation and volar displacement (figs. 1a and b). Clinical signs on admission were as follows : 1) swelling of the left thumb MCP joint,

2) a slightly flexed position, and 3) pain on pressure over the ulnar collateral joint aspect. The stability of the ulnar collateral was examined. It was found to be stable on flexion but questionably stable on extension.

The thumb was immobilized in a plaster cast similar to the type used for scaphoid fractures. The anterior subluxation and external rotation were corrected during the casting. Immobilization in the plaster cast was maintained for 4 weeks. After 5 months the patient was allowed active mobilization of the joint (figs. 2a and b). There is now normal function and movement of the joint, and the patient's work and sports activities are not limited.

DISCUSSION

Metacarpophalangeal dislocation of the thumb or fingers is rare. Dorsal dislocation occurs more frequently than volar (9, 13, 17), and patients

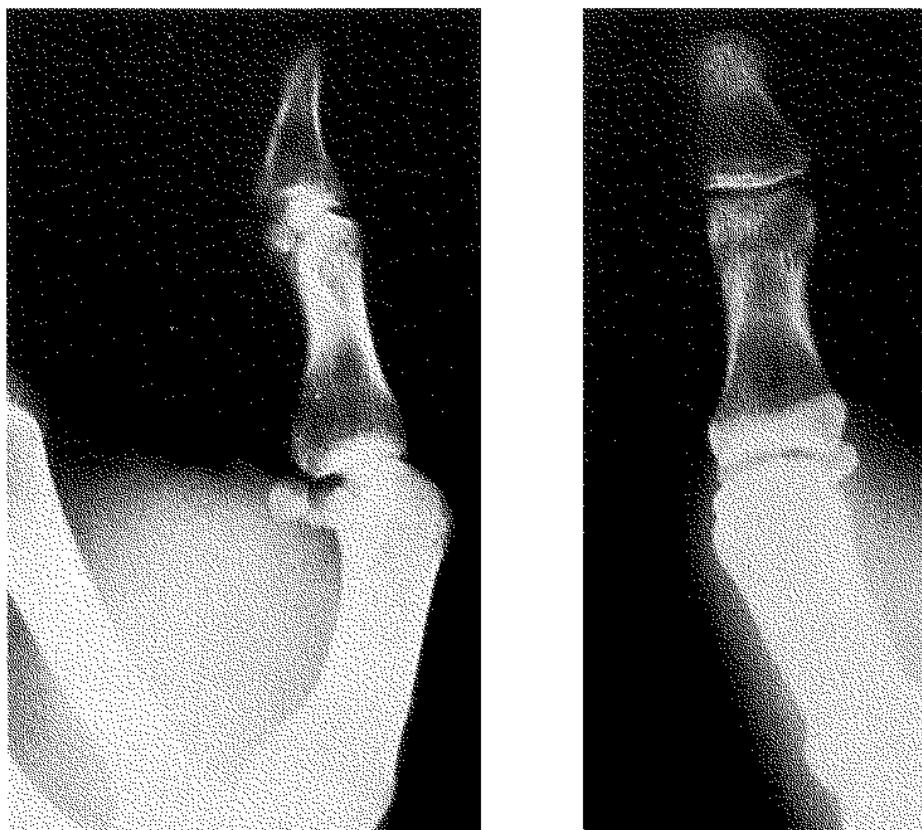


Fig. 1. — Xray of the patient at the emergency ward showing volar subluxation and external instability.

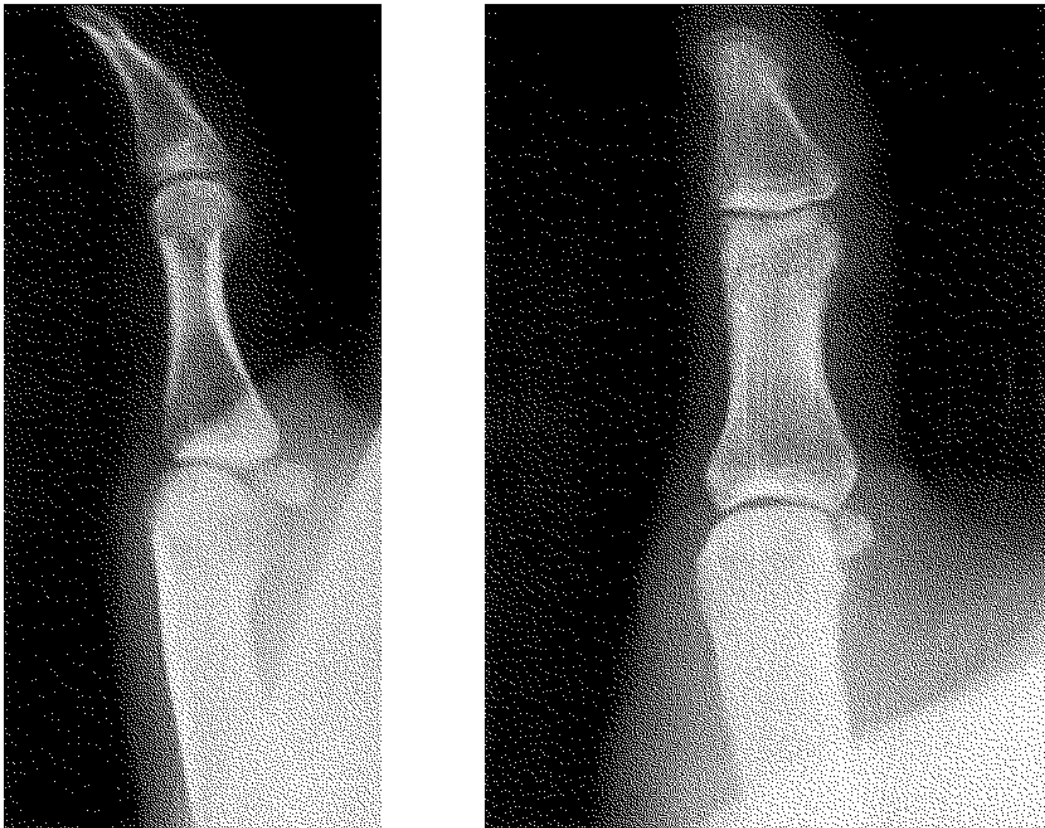


Fig. 2. — Xrays made after removal of the plaster cast.

experiencing dorsal dislocation tend to be older than those experiencing volar dislocation. Children and adolescents are more often affected by volar dislocation than adults (1, 8). Among the cases of metacarpophalangeal volar luxation found in the literature, the forefinger is the digit most frequently affected (5, 17), whereas the thumb is rarely affected. Moneim (13) discovered only one case, and we found only five cases (2, 10, 12, 13, 14). The case presented here involves metacarpophalangeal volar luxation of the thumb of an adult in which the clinical and radiological findings are similar to those in the case described by Moneim (13).

The MCP joint of the thumb maintains its stability using the ligaments, muscles and sesamoids (19). The lateral ligaments are double on each side, with the principal ligament inserted on the phalanx and the accessory ligament inserted on the ipsilateral sesamoid. The proximal and distal palmar liga-

ments join the metacarpal to the phalanx through each sesamoid and the palmar plate. When the joint is completely extended, hyperextension is blocked by tension in the palmar ligaments. If the joint is in flexion, the principal lateral ligament becomes tense. The flexor pollicis brevis muscle is inserted on the external sesamoid, and the adductor pollicis acts on the internal sesamoid, both actively opposing hyperextension. The accessory lateral ligament and palmar ligaments resist lateral movement during extension, in conjunction with their respective sesamoids. During complete extension lateral movement is prevented by the principal lateral ligament. Under normal circumstances the lateral ligament becomes tense with the thumb in hyperflexion, offering resistance to further flexion.

Volar luxation is described by Sedel (17) and Proubasta *et al.* (14) as resulting from dorsal impact against the MCP joint in flexion. This

description is based on finding cutaneous excoriations in the dorsum of the proximal phalanx. The patient in our case stated that he felt a blow on the dorsum of his thumb in flexion. We conclude that the causative mechanism is a blow on the dorsum of the proximal phalanx in flexion, or a hyperflexion injury.

There is controversy regarding the pathological anatomy of the lesion. Renshaw and Louis (15) found the problem to be at the distal insertion of the volar plate with interposition and intact collateral ligaments. Moneim (13) found rupture of the capsule and the radial collateral ligament of the thumb. Besides rupture of the dorsal capsule, Gunther and Zielinski (10) and Proubasta *et al.* (14) found rupture of the cubital collateral ligament, although the latter were unable to verify the lesions visually, owing to the conservative treatment. Sedel (17) attributes the causal mechanism to dorsal structures. He suggests that capsule and extensor apparatus rupture causes a pseudo-

boutonnière with subluxation of the extensor pollicis longus and the extensor pollicis brevis. Each of these muscles moves to one side, causing hyperextension of the distal phalanx. Similar lesions were found by Gunther and Zielinski (10). In our case treatment was closed, so we cannot verify the exact pathological anatomy. However, because the pain remained at a constant level for five months, we think that there was dorsal capsule rupture, radial collateral ligament rupture and probably a volar plate insertion abnormality. The only case that is clinically and radiologically similar to ours is Moneim's (13), which confirms our findings. We would like to stress the fact that radiography, done 18 months after the lesion occurred, revealed new bone formation at the insertion level of both collateral ligaments. This supports the theory of a lesion at their insertion (figs. 3a and b). In fig. 4a and b we can appreciate the complete mobility of the left thumb.

Of the five cases surveyed, all but two (14, 17)

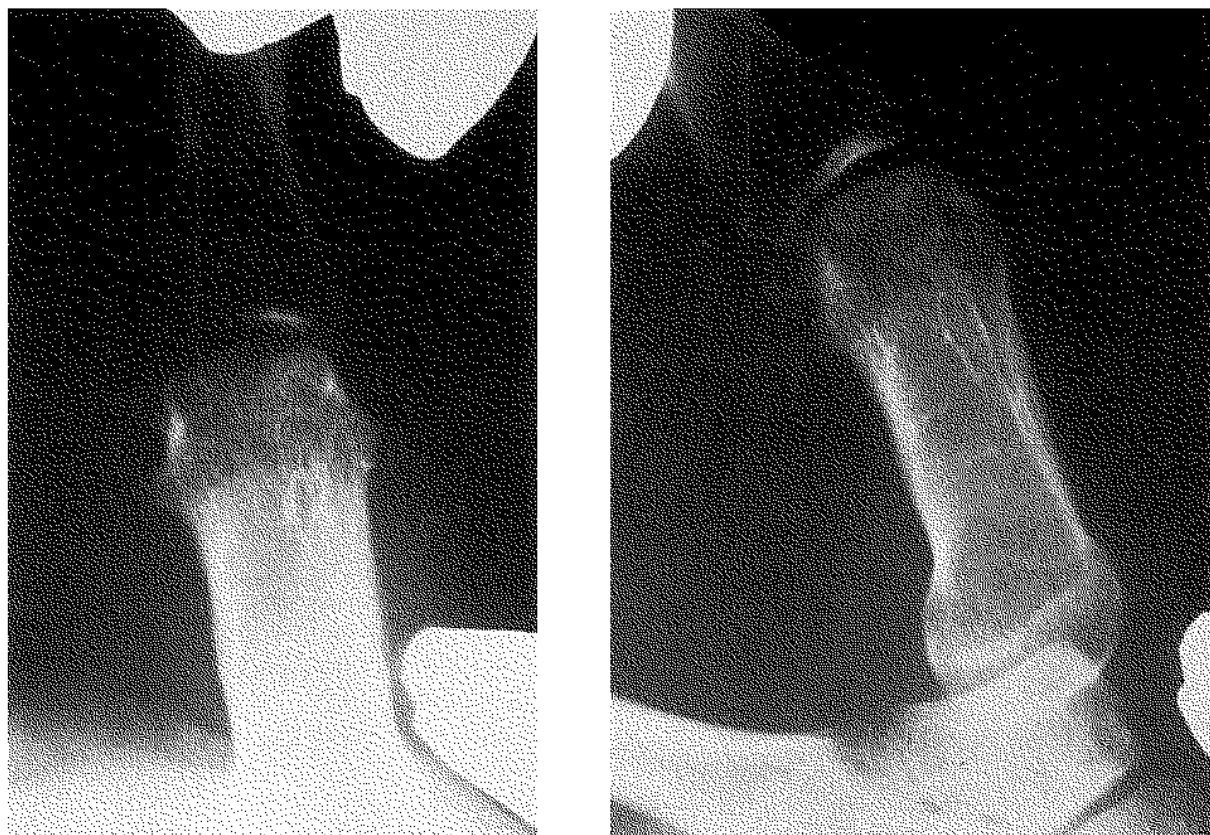


Fig. 3. --- Forced Xray showing ulnar and radial stability, respectively, 18 months after the injury.

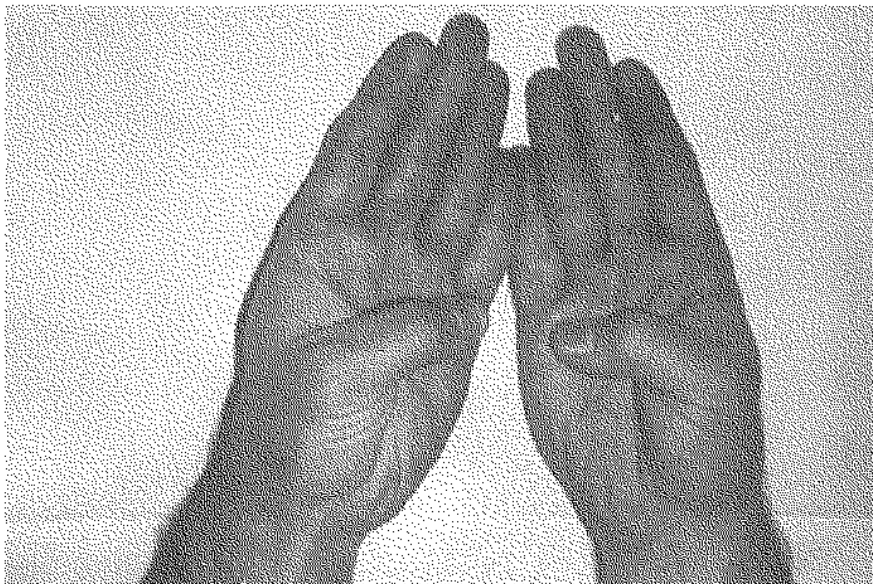
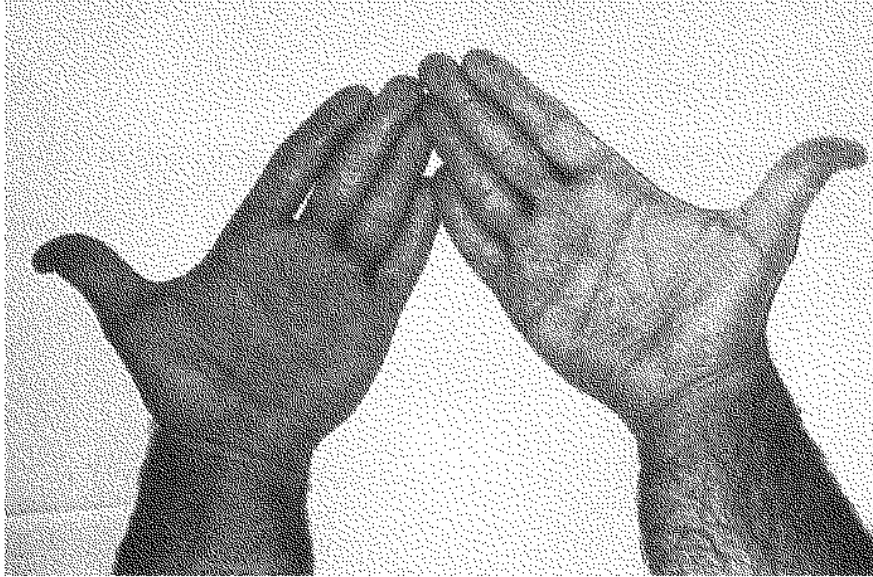


Fig. 4. — Left hand of the patient showing complete mobility of the thumb compared with the normal right hand 5 months after the injury.

were volar dislocation treated with open reduction and fixation (10, 13). The reason given (13) was that closed reduction runs a high risk of failure, due to the interposition of the capsule. Of the other two cases, Sedel (17) does not recommend open treatment, and Proubasta *et al.* (14) were the only ones to actually perform closed treatment. In our case, closed treatment was effective. We suggest that such conservative treatment was the appropriate course. Only if closed treatment fails to reduce the deformation would we advise open reduction and fixation with Kirschner wires.

CONCLUSIONS

Volar dislocation of the first MCP joint is a very rare lesion. Although open reduction and fixation is the most frequent treatment used, conservative treatment is also effective and simpler.

REFERENCES

- BORDE J., LEFORT J. *Traumatismes du poignet et de la main chez l'enfant*. In : Ed. Tubiana R., *Traité de Chirurgie de la main*, vol. II. Masson, Paris, 1984, 722-739.
- CLEAK D. K. Simultaneous dislocations of the interphalangeal and metacarpophalangeal joints in a thumb. *Hand*, 1981, 13, 167-168.
- COYFFMAN F. *Tratado de cirugía plástica, estética y reparadora*. Salvat, 1986, 27, pp. 1179.
- DE PALMA A. F. *The management of fractures and dislocations*. Vol. II, W. B. Saunders, Philadelphia and London, 1959, 540-543.
- EATON R. G. *Lésions récentes et anciennes des ligaments des doigts*. In : Ed. Tubiana R., *Traité de Chirurgie de la main*. Vol. II, Masson, Paris, 1984, 751-770.
- FARABEUF L. H. De la luxation du pouce en arrière. *Bull. Soc. Chir.*, 1876, 11, 21. (From : Sedel L. (17)).
- FLYNN J. E. *Cirugía de la mano*. Toray S.A., Barcelona, 1984, 346-347.
- GILBERT A. *Luxation métacarpophalangienne chez l'enfant*. In : Ed. Tubiana R., *Traité de Chirurgie de la Main*, Vol. II, Paris, Masson, 1984, 796-800.
- GREEN D. P., TERRY G. C. Complex dislocation of the metacarpophalangeal joint. Correlative pathological anatomy. *J. Bone Joint Surg.*, 1973, 55-A, 1480-1486.
- GUNTHER S. F., ZIELINSKI C. J. Irreducible palmar dislocation of the proximal phalanx of the thumb. Case report. *J. Hand Surg.*, 1982, 7-A, 515-517.
- KAPANDJI I. A. *Cuadernos de fisiología articular*. Vol. I. Toray-Masson, Barcelona, 1982, 216-262.
- MERIAUX J. L., LEVIET D., DJERMAG Y., VILAIN R. Un cas de luxation simultanée des articulations métacarpophalangienne et interphalangienne du pouce. *Rev. Chir. Orthop.*, 1983, 69, 481-482.
- MONEIM M. S. Volar dislocations of the metacarpophalangeal joint. Pathologic anatomy and report of two cases. *Clin. Orthop.*, 1983, 176, 186-189.
- PROUBASTA I., CASAJUS I., JORBA E., PALACIO A. Luxación palmar de la articulación metacarpofalángica del pulgar. A propósito de un caso. *Avances Traum.*, 1986, 16-2, 87-89.
- RENSHAW R. S., LOUIS D. S. Complex volar dislocation of the metacarpophalangeal joint. A case report. *J. Trauma*, 1973, 13, 1086-1089.
- SANDZEN S. C. *Atlas of wrist and hand fractures*. Littleton Man., PSG Pub. Co., 1979, 191-192.
- SEDEL L. *Luxations de l'articulation métacarpophalangienne du pouce et des doigts*. In : Ed. Tubiana R., *Traité de Chirurgie de la main*, vol. II. Masson, Paris, 1984, 790-796.
- SMITH R. J., KAPLAN E. B. Rheumatoid deformities at the metacarpophalangeal joints of the fingers. A correlative study of anatomy and pathology. *J. Bone Joint Surg.*, 1967, 49-A, 31-47.
- STENER B. *Entorces récentes de l'articulation métacarpophalangienne du pouce*. In : Ed. Tubiana R., *Traité de Chirurgie de la main*, Vol. II. Masson, Paris, 1984, 770-778.

S. GARCIA MATA
c/Sandoval no 3
Escalera B, 5º izquierda
31002 Pamplona (Spain)