



# Proposal of a new sign: The isolated haematoma on the extensor pollicis longus compartment in non-displaced fractures of the distal radius.

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## ABSTRACT

Diagnosis of distal radius fractures may be difficult, especially in non-displaced fractures and particularly in cases with no clear traumatic history and no evident semiology. Advanced medical imaging studies — particularly computerized axial tomography —, could be useful together with clinical examination. The authors have observed that the presence of a specific haematoma in the third radial compartment of the extensor pollicis longus tendon indicates an underlying bone injury, generally affecting Lister's tubercle.

This brief paper presents the clinical-morphological characteristics of this described sign. The authors believe that the clinical observation of an haematoma in the sheath of the extensor pollicis longus tendon may be very relevant to confirm the presence of a slightly displaced or a non-displaced fracture of the distal radius.

## KEYWORDS

Extensor pollicis longus, non-displaced fractures, distal radius fracture, haematoma.

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## INTRODUCTION

Fractures of the distal radius are the most common at the emergency departments. The incidence of non-displaced fractures is lower than displaced fractures. A non-displaced fracture may be frequently overlooked due to the lack of evident classical signs or to an apparently normal radiological exploration [1-8]. Its diagnosis is important for an adequate treatment that will allow the prevention of possible secondary complications, including the secondary rupture of the extensor pollicis longus (EPL) tendon, and for avoiding possible related medical-legal implications [9-15].

Radiological findings may not exist or they may be so subtle that they could be overlooked. In these cases, physicians should have a high index of clinical suspicion, and perform complementary medical imaging studies — such as echography or computerized axial tomography (CAT) — to confirm or rule out the initial clinical suspicion [7,8,16-18].

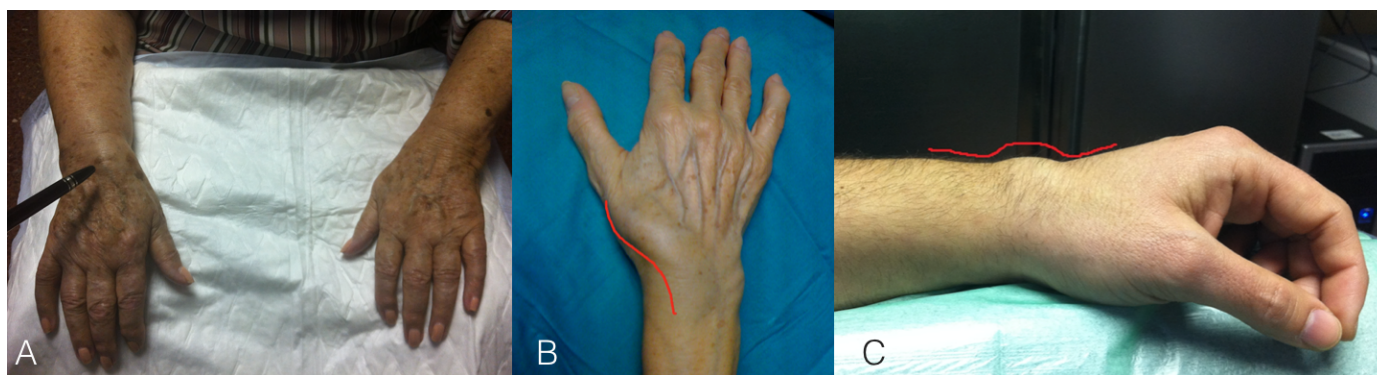


Fig. 1A. Observation and comparison of both extremities from a superior plane allows noticing the presence of a bulge that outlines the trajectory of the EPL tendon. Fig. 1B. In patients with scarce subcutaneous cellular tissue, haematomas or hematic tenosynovitis affecting the sheath of the EPL tendon may become a clear objective sign. It shows a sinuous aspect due to its coincidence with the tendon's trajectory. Fig. 1C. Lateral observation of the wrist allows the appreciation of a convex- or humpy-shaped deformity at the radial styloid level that changes the wrist's concave physiological profile.

That is the reason why the authors of this short paper propose that the existence of an haematoma in the sheath of the EPL tendon should be considered a highly suggestive sign of a distal radius fracture.

#### Clinical examination of signs of isolated haematomas in the sheath of EPL tendons

With relaxed patients seated with both superior extremities resting on a table physicians proceed to a comparative examination of both wrists and hands. This opportunity to compare the injured extremity with its contralateral will allow them to appreciate small morphological changes.

Examining both hands from dorsal, will allow to observe a cylindrically-shaped bulge that follows the trajectory of the EPL tendon, extending approximately from 2 cm proximal to the styloid process of the radius to the middle of the diaphysis of the first metacarpus (Figs. 1A and 1B).

A second examination from the radial side, will allow to observe a humpy-shaped deformity over the radial styloid that converts the wrist's concave physiological profile into a convex one (Fig. 1C).

Patients could also be asked to place both extremities in a neutral pronosupination, one in front of the other, to proceed with the comparative examination from a superior plane (Fig. 2).

When the patient is requested to place the thumb in maximum abduction and extension, the protrusion of the tendon is emphasized distal to the retinaculum, and also the haematoma that profiles the tendon's trajectory and the third extensor compartment becomes even more outlined, and shortened (Figs. 3A and 3B).

Palpation of the bulge reveals a soft consistency that allows both its anterograde or posterograde migration along

the anatomical trajectory of the EPL. However, it is not possible to evacuate the contents of the tumour, which recovers its original shape as soon as digital pressure stops (Figs. 4A and 4B).

Palpation of the bulge reveals a soft consistency that allows both its anterograde or posterograde migration along the anatomical trajectory of the EPL. However, it is not possible to evacuate the contents of the tumour, which recovers its original shape as soon as digital pressure stops (Figs. 4A and 4B).



Fig. 2. If patients are asked to place both wrists in neutral pronosupination, the dorsal profile of both of them can be compared showing the loss of the normal concavity due to the presence of a convexity or hump (in the right wrist) when compared with the normal or physiological concavity (in the left wrist).

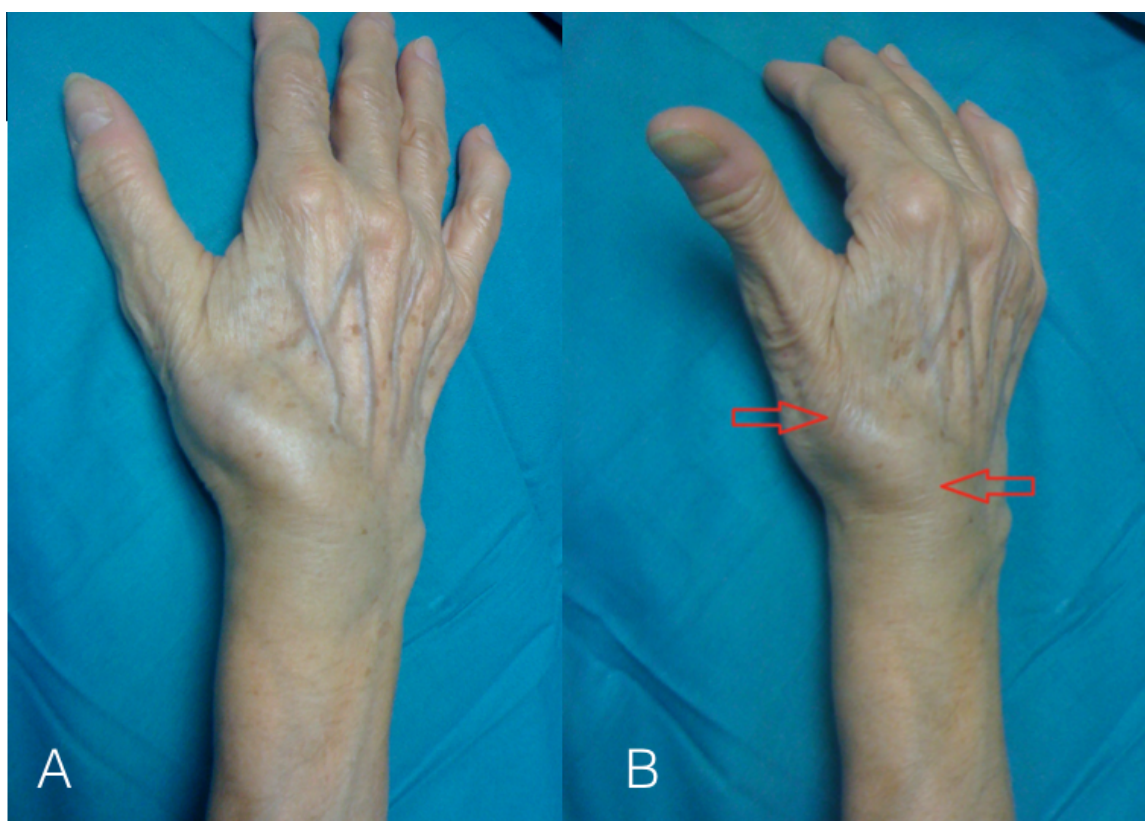


Fig. 3A. In a resting position, a cylindrical-shaped tumour may be seen outlining the sinuous trajectory of the EPL tendon and extending from approximately 2 proximal cm from the apophysis of the styloid process of the radius to the middle of the diaphysis of the first metacarpus. Fig. 3B. If patients are asked to place the thumb in maximum extension and abduction, the protrusion of the tendon in the distal area of the retinaculum can be observed, and also the haematoma, that reveals the tendon's trajectory, becomes even more evident, while the third extensor compartment suffers the apparent shortening of its largest length.

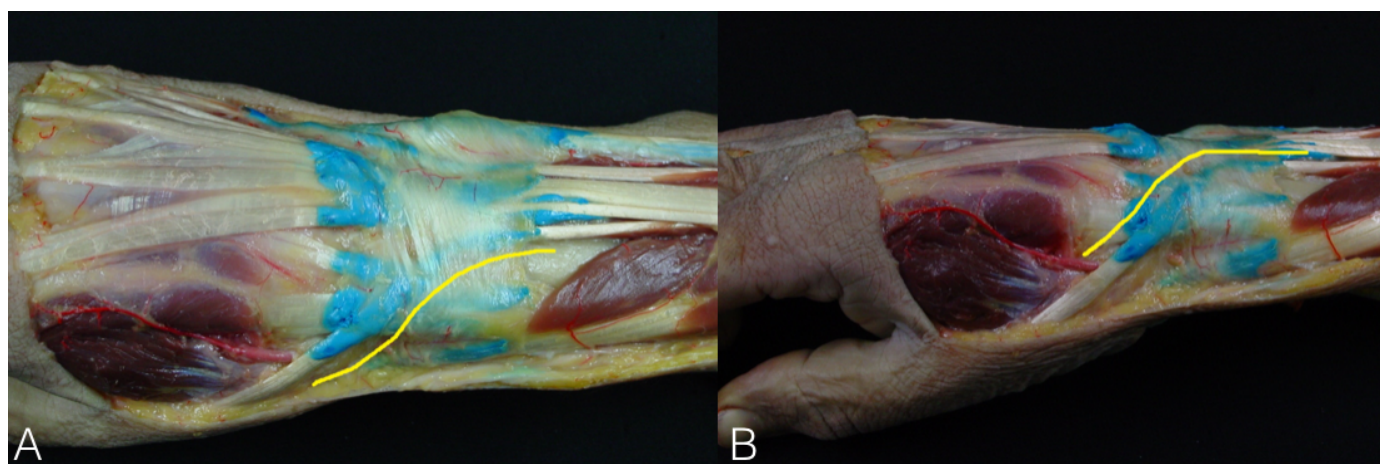


Fig. 4A. Anatomical dissection after an infiltration with blue latex at the level of the extensors located at the level of the extensor's retinaculum. The sinuous and oblique medial to lateral trajectory of the EPL's tendon and sheath may be seen. Fig. 4B. In this lateral view of the wrist, the direction of the EPL tendon, and how it is located above the sheaths and tendons of the extensor carpi radialis longus (ECRL) muscle and the extensor carpi radialis brevis (ECRB) muscle, may be seen.

## DISCUSSION

This brief report describes a clinical sign: an isolated haematoma on the EPL that will make physicians to suspect a fracture of the distal radius during the initial evaluation of a traumatism on superior extremities [1-6].

A routine X-ray study cannot always detect a scarcely displaced distal radius fracture and, some times, if there is not a high clinical suspicion of an underlying injury, physicians may erroneously put an end to their study and fail to diagnose it correctly, with all the complications for both their patients and for them, which might result in a possible medical-legal implication [1,7,10,12-14,19].

The sole fact of having high indexes of clinical suspicion can lead to seek additional imaging studies. Resources such as echography or CAT may provide additional conclusive information. The costs associated with the procedure they imply and delays until diagnosis is made should not be overlooked [7,8,16-18].

In spite that haematomas may not be very evident in all cases of non-displaced distal radius fractures, they have to be taken as a highly suggestive sign of an underlying injury, as it is the case of non-displaced radial head fractures with radiological observation of the fat pad sign, and of haematomas in the lateral side of the thorax, which have been described in humerus proximal fractures [20].

Depending on the energy associated with the traumatism that caused the fracture, the displacement of bone fragments may be minimal [7,8]. However, even in these cases, bleeding will occur and it will directly drain into the third extensor compartment of the wrist and will affect the EPL tendon. Haematomas may become an objective sign in different planes of the extremities, presenting a characteristic morphology that depends on the observation plane, as it has been described above. Contents of haematomas are not evacuated out of their original location with anterograde or posterograde digital pressure. This phenomenon has been attributed by the authors to the haematomas' sole infiltration into the tendon's sheath, outlining its anatomical distribution, while not draining freely along the whole compartment.

This clinical sign may be useful when combined with a thorough history and physical examination of patients with a clinical suspicion of a non-displaced distal radius fracture.

## CONCLUSIONS

Unlike those high-energy fractures or those low-energy fractures which cause symptoms or signs such as deformities, injuries, bruising, or loss of function, there is a group where the impact is low and insufficient to cause deformity. Such cases are those which are at risk of a fracture to be misdiagnosed, causing an unpleasant situation for both patient and physician.

The authors believe that the sign of an isolated haematoma in the third compartment should lead to suspect a non-displaced fracture of the distal radius. However, this observation needs to be confirmed by further studies.

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