



Original article

Rotational stability test for the diagnosis of radial collateral ligament rupture in the fingers: Anatomical study

Test de stabilité rotatoire pour le diagnostic de rupture du ligament collatéral latéral des métacarpo-phalangiennes des doigts longs : étude anatomique

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Abstract

Diagnosing rupture of the radial collateral ligament (RCL) of the finger metacarpophalangeal (MCP) joints is difficult. The aim of this cadaver study was to validate a rotational test for the MCP after RCL transection. With the MCP and proximal interphalangeal joints in flexion, rotation along the axis of the proximal phalanx was applied through an extended distal interphalangeal joint to 36 cadaver fingers. Each finger's pulp described an arc of pronation and supination that was noted on the palm. The test was repeated three times: before transection, after transection of the proper collateral ligament (CL) and after transection of both the proper and accessory CLs. Rotational arcs were measured in pronation and supination. Mean length of the pronation arc after transection of the main RCL was 17.53 mm, while it was only 12.41 mm before transection for the supination arc. Mean length of the pronation arc after transection of both CLs was 22.83 mm compared to only 11.93 mm before transection. Our results show a significant difference in pronation stability of the MCP joint after transection of the RCL proper. We can conclude that this rotational stability test is a valid test for diagnosing RCL rupture in MCP joints.

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Keywords: Radial collateral ligament; Metacarpophalangeal joint; Sprain; Laxity; Stability

Résumé

Le diagnostic d'entorse grave du ligament collatéral radial (LCR) de la métacarpo-phalangienne (MCP) des doigts longs est difficile. L'objectif de ce travail anatomique était de valider un test clinique de stabilité rotatoire de la MCP après section du LCR. Les MCP et interphalangiennes proximales étant en flexion, les interphalangiennes distales en extension, une rotation était appliquée à 36 doigts de cadavres autour de l'axe de la phalange proximale. La pulpe décrivait un arc de pronation puis de supination repéré sur la paume. La manœuvre était répétée trois fois : avant section, après section du faisceau principal du LCR, après section de son faisceau accessoire. Les longueurs d'arc en pronation et en supination étaient mesurées. La longueur moyenne de l'arc de pronation après section du faisceau principal était de 17,53 mm et celle de l'arc de supination avant section du LCR de 12,41 mm. La longueur moyenne de l'arc de pronation après section des deux faisceaux était de 22,83 mm et celle de l'arc de pronation avant section du LCR était de 11,93 mm. Nos résultats montrent une différence significative de stabilité en pronation de la MCP avec

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section isolée du faisceau principal du LCR. Le test clinique de stabilité rotatoire de la MCP est utile pour le diagnostic clinique de rupture du LCR des MCP des doigts longs.

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Mots clés : Ligament collatéral radial ; Articulation métacarpo-phalangienne ; Entorse ; Laxité ; Test ; Stabilité

1. Introduction

The RCL of the finger MCP joint is taut in flexion and stabilizes the joint by opposing radial lateral forces [1–3]. The diagnosis of severe MCP RCL sprain with complete rupture is difficult to make both clinically and by imaging [4–6]. Without appropriate treatment, these sprains can lead to complications, such as chronic pain, stiffness, instability [4,7–9].

Bellemère previously described a specific clinical test for early diagnosis of RCL rupture [10]. We performed a cadaver study to validate this rotational test.

2. Material and methods

All four long fingers of nine fresh cadaver hands (36 fingers) were prepared to perform the MCP rotational stability test.

During the test, all hands were positioned with their dorsum on a hard surface [10]. All MCP and PIP joints were flexed 90° so that the pulps were in contact with the palm when the DIP was extended. The neutral position was noted for each finger using a line drawn down the middle of each nail (Fig. 1A).

On either side of this neutral point, rotation was passively applied along the longitudinal axis of the proximal phalanx while maintaining the pulp in contact with the palm. Each pulp thus went through a pronation arch on the ulnar side and a supination arc on the radial side. The extreme of each position was reached when the examiner felt a hard end stop. A mark was drawn on the palm for each end position (Fig. 1B and C).

Recordings were repeated three times for each finger: before transection, after mid-substance transection of the RCL proper through a short dorsoradial incision, and after transection of the

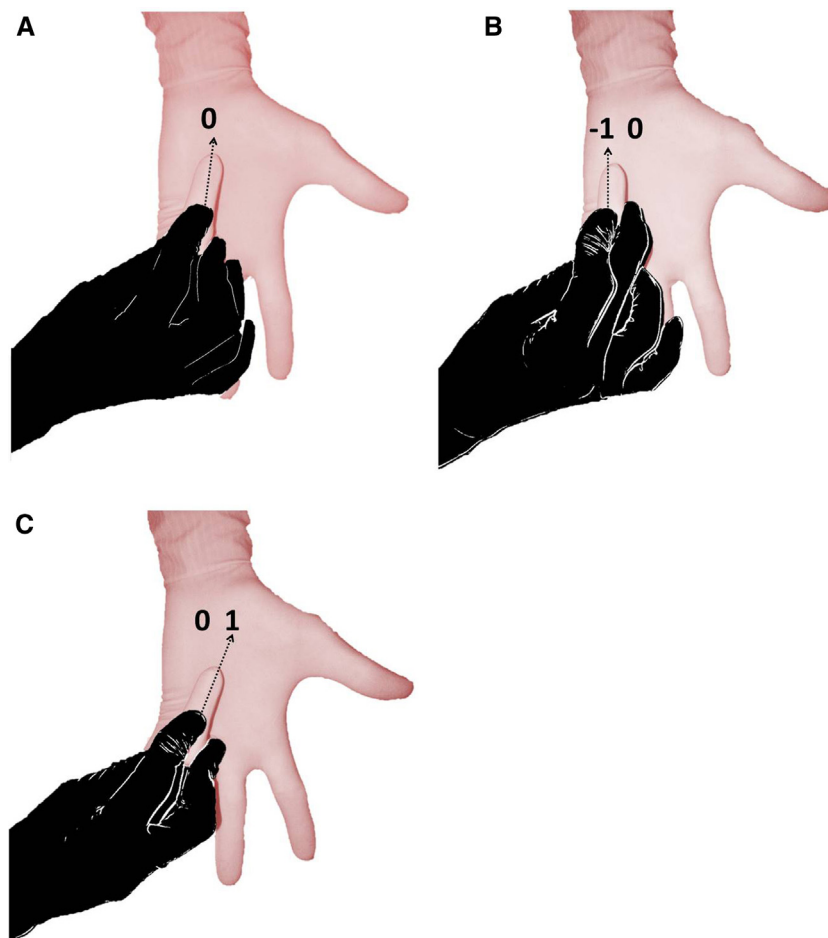


Fig. 1. Evaluation of the rotational stability of the left ring finger MCP. The examiner must hold both proximal and distal phalanges to neutralize PIP laxity. Neutral point of the ring finger marked on the palm opposite the (0) (A). B. Maximal pronation arc (0 to -1). C. Maximal supination arc (0 to 1).

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