

The Dorsal Triangular Fibrocartilage of the Metacarpophalangeal Joint: A Cadaveric Study

David J. Hunter-Smith, MBBS, MPH,*†† Philip G. Slattery, MBBS,*†† Alexandra Rizzitelli, PhD,*
Sarah R. Hunter-Smith, MD,*†† Sian Fairbank, MBBS,*†† Warren Matthew Rozen, MD, PhD,*††
Michael W. Findlay, MBBS, PhD*††

Purpose To describe a fibrocartilaginous structure on the dorsal surface of the metacarpophalangeal (MCP) joint.

Methods A combination of anatomical dissection, histology, ultrasound, and magnetic resonance imaging was undertaken to explore the anatomical structure described, with clinical correlation undertaken by surgical exploration of MCP joints.

Results A dorsal structure of the MCP joint was identified as fibrocartilagenous in composition, triangular in shape, and—together with the volar plate and collateral and accessory collateral ligaments—forming a deepened dorsal fossa in which the metacarpal head invaginated. It was attached to the extensor tendon by loose connective tissue and formed part of the joint capsule.

Conclusions The dorsal fibrocartilage of the MCP joint is a constant anatomical structure that appears to complement the structural support for the metacarpal head and extensor tendon. Possible functions include stabilization of the extensor tendon, formation of a dorsal fossa, prevention of extensor tendon attrition, and synovial fluid production. Its structure and function may have implications in future development of joint replacement devices.

Clinical relevance This study adds to the collective knowledge about the precise anatomy of the MCP joint. Reconstructive surgery and, in particular, joint replacement surgery should consider the potential function and importance of this structure when designing interventions on the joint. (*J Hand Surg Am.* 2015;40(7):1410–1415. Copyright © 2015 by the American Society for Surgery of the Hand. All rights reserved.)

Key words Dorsal cartilage, metacarpophalangeal joint, volar plate, hand anatomy, extensor apparatus.

THE FIBROCARILAGINOUS STRUCTURE on the dorsal surface of the metacarpophalangeal (MCP) joint has received little attention. Milz et al in 1999 studied fibrocartilage within the MCP joint with

the aim of comparing the immunohistochemical ‘profile’ of the extensor tendons at the level of the MCP joint with the dorsal plate of the proximal interphalangeal (PIP) joint.¹ They noted that the extensor tendon did not replace the capsule of the MCP joint in the same way it did at the PIP joint, and thus the tendon had no direct contact with the synovial cavity and was separated from the joint cavity by peritendinous tissue that was part of the intertendinous fascia of Landsmeer. This is of particular interest because the extensor tendon has a greater moment arm over the MCP joint and thus subjected to greater compression and wrapping around the metacarpal head in flexion. We have observed clinically that there is an isolated anatomical structure that is identifiable within the joint proper, rather than within

From the *Department of Plastic and Reconstructive Surgery, Frankston Hospital, Frankston, Victoria, Australia; the †Department of Surgery, Monash University, Clayton, Victoria, Australia; and the ‡Monash University Plastic and Reconstructive Surgery Unit (Peninsula Clinical School), Frankston, Victoria, Australia.

Received for publication November 12, 2014; accepted in revised form March 12, 2015.

No benefits in any form have been received or will be received related directly or indirectly to the subject of this article.

Corresponding author: David J. Hunter-Smith, MBBS, MPH, Department of Plastic and Reconstructive Surgery, Frankston Hospital, Peninsula Health, 2 Hastings Road, Frankston, Victoria 3199, Australia; e-mail: david.hunter-smith@monash.edu.

0363-5023/15/4007-0019\$36.00/0
<http://dx.doi.org/10.1016/j.jhssa.2015.03.019>

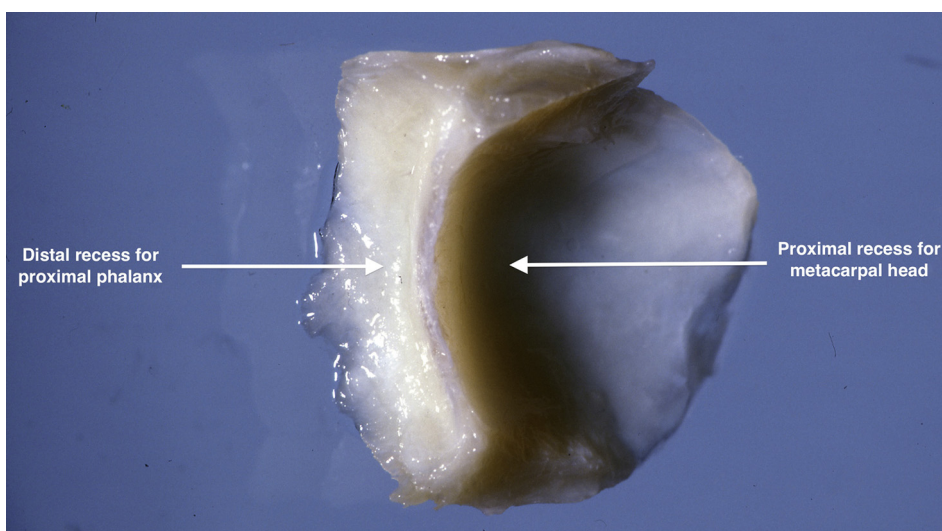


FIGURE 1: Cadaveric dissection, with view from within the MCP joint looking dorsally to show the 2 components/recesses formed by the anteroposterior prolongation of the dorsal fibrocartilage into the joint.

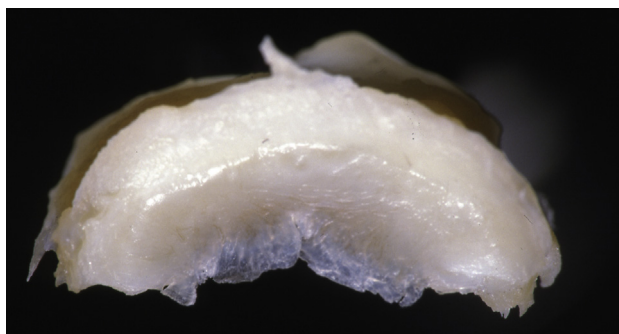


FIGURE 2: Cadaveric dissection, with axial view of the fibrocartilage showing an indent for the metacarpal head.

the tendon. This structure is attached to the joint capsule, and, in combination with the collateral ligaments, accessory collateral ligaments, and volar plate, appears to complement the stabilizing structures of the metacarpal head and extensor tendon.

Zancolli, Kaplan, Landsmeer, and Guyot closely analyzed the structure and function of the MCP joint.²⁻⁵ All illustrated the dorsal fibrocartilage of the MCP joint but failed to label or describe it. In 1906 Jacob and Testut⁶ mentioned a “fibro-cartilaginous glenoidien”, and in 1927 Auchincloss⁷ referred to a “dorsal glenoid ligament”, but neither paper described the structure in detail. In 1990, Slattery⁸ described the dorsal plate of the PIP joint, suggesting that the dorsal plate was analogous with the patella and had its origins within the extensor tendon. Slattery did not compare the PIP joint fibrocartilage with that of the MCP joint, however. More recent radiological studies exploring the MCP joint through magnetic resonance imaging (MRI) and ultrasound

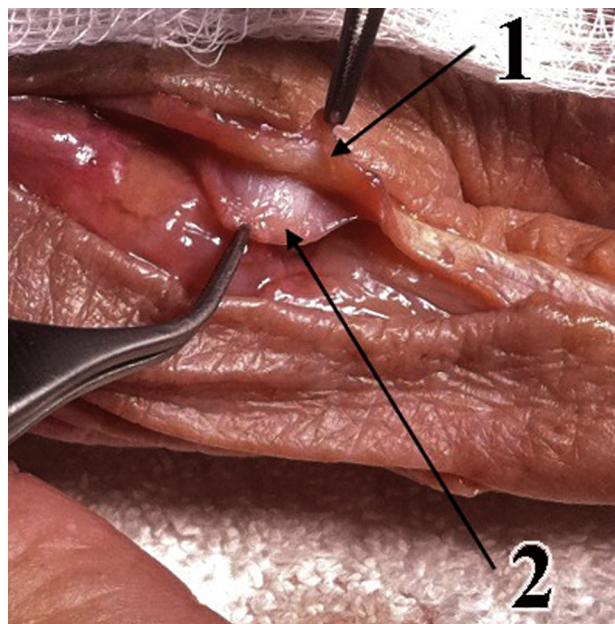


FIGURE 3: Fresh cadaveric specimen dissection, with exposure of the MCP joint showing (1) loose connective tissue connections between the dorsal fibrocartilage and the extensor tendon lie in this plane, between the volar surface of the extensor tendon and the dorsal fibrocartilage of the MCP joint; (2) the dorsal surface of the dorsal fibrocartilage making up part of the joint capsule.

imaging did demonstrate this dorsal fibrocartilage. In 2002, Theumann et al⁹ showed the dorsal fibrocartilage on MRI, although they did not acknowledge its presence. In 1993, ultrasound images by Grassi et al¹⁰ clearly showed the dorsal fibrocartilage, but they only mention an echoic structure that was interposed between the metacarpal head and the base of proximal phalanx without further detail. Boutry et al¹¹

Download English Version:

<https://daneshyari.com/en/article/4066634>

Download Persian Version:

<https://daneshyari.com/article/4066634>

[Daneshyari.com](https://daneshyari.com)