The Clinical Implications of the Oblique Retinacular Ligament

Joshua M. Adkinson, MD, Shepard P. Johnson, MBBS, Kevin C. Chung, MD, MS

The oblique retinacular ligament originates from the flexor tendon sheath, courses past the proximal interphalangeal joint, and merges with the lateral extensor tendon. There has been disagreement regarding the contribution of the oblique retinacular ligament to coordinated movements between the proximal and distal interphalangeal joints. Landsmeer postulated that it acts as a dynamic tenodesis that tightens with proximal interphalangeal joint extension, causing obligatory distal interphalangeal joint extension. However, studies have shown that the oblique retinacular ligament is variably present and often attenuated, which diminishes its presumed role in finger movement. Despite this, the concept of a checkrein linking interphalangeal joint motion heralded the development of effective and reproducible surgical interventions for swan-neck and mallet deformities. This article examines the controversy regarding the existence of the oblique retinacular ligament, its plausible functionality, and clinical implications in the practice of hand surgery. *(J Hand Surg Am. 2014;39(3):535–541.*

Key words Oblique retinacular ligament, swan-neck, mallet finger.

FINGER EXTENSION OCCURS THROUGH a complex balance of intrinsic and extrinsic muscles with support from retinacular structures.[1] A retinaculum is a fibrous band that acts to stabilize a tendon. Located in the finger, the oblique retinacular ligament (ORL) is believed to aid in stabilization of the proximal interphalangeal (PIP) joint. The ORL originates at the base of the proximal phalanx and courses obliquely past the PIP joint to terminate on the dorsum of the distal phalanx (Fig. 1). Exploring the precise anatomy and function of this structure has interested anatomists and hand surgeons for decades.

Discovery of the ORL is credited to Josias Weitbrecht, a preeminent 18th-century professor of anatomy, physiology, and medicine at the University of St. Petersburg in Russia.[2] He reported its presence in his 1742 textbook entitled *Syndesmologia Sive Historia Ligamentorum Corporis Humani Quam Secundum Observationes Anatomicas Concinnavit et Figuris Ad Objecta Recentia Adumbratis Illustravit*".[2–5] Weitbrecht labeled this structure "retinaculum tendini longi," owing to its tendinous, rather than ligamentous, role in hand function.[6] Landsmeer,[7] in 1949, independently described the ORL in detail. His publications laid the framework for controversy regarding the presence, anatomy, function, and clinical implications of this fibrous structure.

Historically, there has been disagreement regarding the contribution of the ORL to coordinated movements between the PIP and distal interphalangeal (DIP) joints. Landsmeer[8] believed that the ORL acts as a dynamic tenodesis extending the DIP joint as the PIP is extended and relaxing with PIP flexion to enable full DIP flexion. Conversely, Harris and Rutledge[3] felt that the ORL contributes only to lateral

From the Section of Plastic Surgery, Department of Surgery, University of Michigan Health System; the Department of Surgery, Saint Joseph Mercy Hospital; and Section of Plastic Surgery, University of Michigan Medical School, Ann Arbor, MI.

Received for publication October 3, 2013; accepted in revised form December 6, 2013.

Supported in part by the National Institute on Aging and National Institute of Arthritis and Musculoskeletal and Skin Diseases (grant R01 AR062066) and the National Institute of Arthritis and Musculoskeletal and Skin Diseases (grant 2R01 AR047328-06), and by a Midcareer Investigator Award in Patient-Oriented Research (grant K24 AR053120) (to K.C.C.).

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

Corresponding author: Kevin C. Chung, MD, MS, Section of Plastic Surgery, Department of Surgery, University of Michigan Health System, 2130 Taubman Center, SPC 5340, 1500 E. Medical Center Drive, Ann Arbor, MI 48109-5340; e-mail: kecchung@umich.edu.

0363-5023/14/3903-0021$36.00/0
http://dx.doi.org/10.1016/j.jhsa.2013.12.011

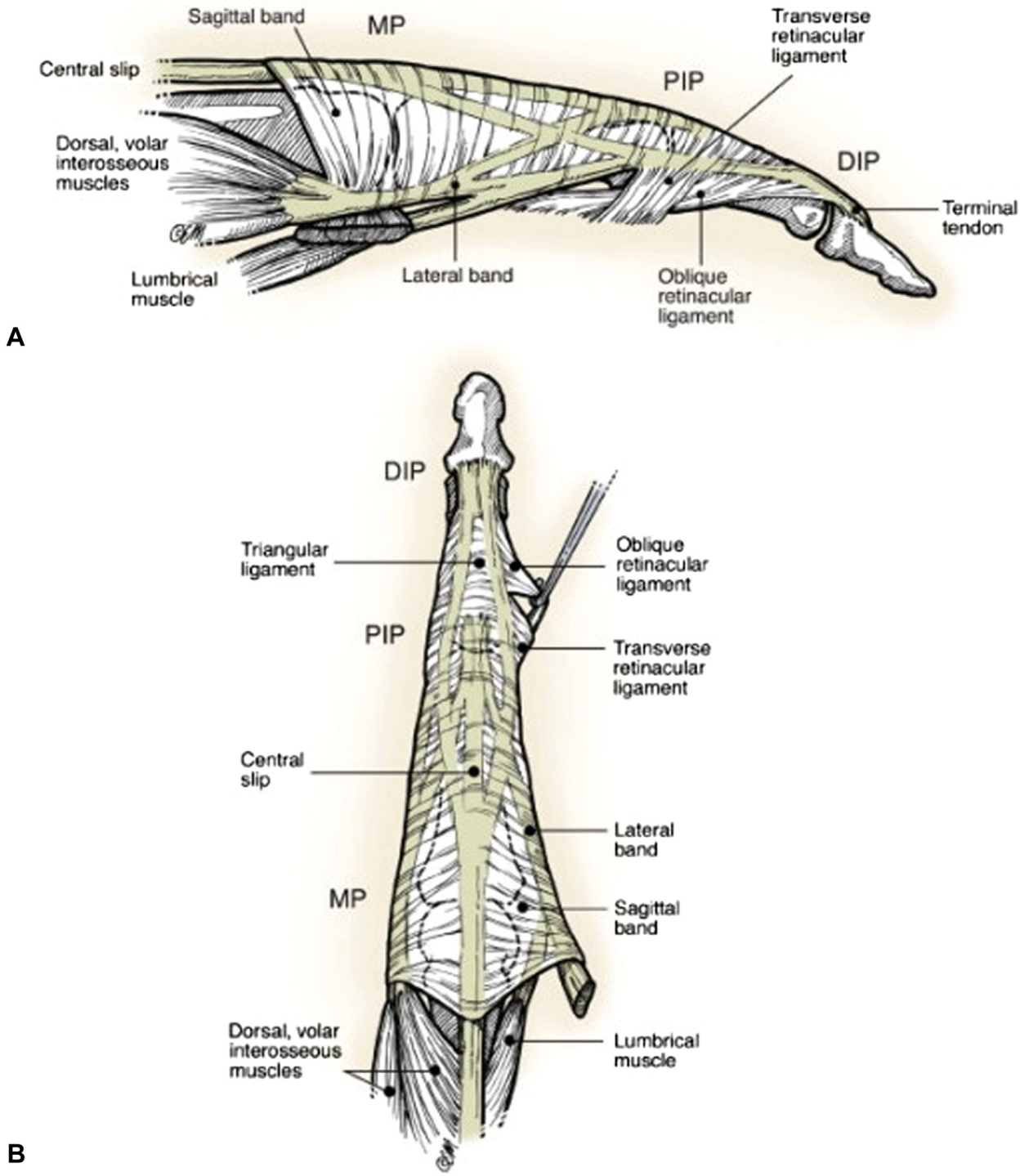

FIGURE 1: The digital extensor mechanism: **A** lateral view, **B** dorsal view with traction on the ORL. (Reprinted with permission from Strauch RJ. Extensor tendon injury. In: Wolfe SW, Hotchkiss RN, Pederson WC, Kozin SH, eds. *Green's Operative Hand Surgery.* 5th ed. New York, NY: Churchill Livingstone; 2005:163. Copyright © Elsevier.)

stability of the PIP joint. Regardless of the true functionality of the ORL, an important byproduct has emerged from this debate. Using Landsmeer's dynamic interphalangeal tenodesis theory, surgical procedures have been developed to address hand maladies such as swan-neck and mallet deformities. This article examines the controversy surrounding the existence, anatomy, plausible functionality, and clinical implications of the ORL in the practice of hand surgery.