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VIEWPOINT

Anatomic Variations of the Median Nerve Identified during Endoscopic Carpal Tunnel Release with STRATOS

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There are many anatomic variations of the median nerve at the level of the carpal tunnel. During carpal tunnel release (CTR), attention to anatomical variants is crucial in preventing iatrogenic injury. Particular respect of the anomalous courses and takeoffs of the recurrent motor branch (RMB) and palmar cutaneous branch of the median nerve should be considered.[1] Lanz[2] first classified the course of the RMB in relation to the transverse carpal ligament (TCL) in 1977. Based on the origin and course of the RMB, anatomic variants are classified into 3 distinct groups: extraligamentous, subligamentous, and transligamentous. Despite more difficult visualization of these variants during endoscopic CTR and the incidence of such variants, few related complications have been reported.[1] Nonetheless, hand surgeons should be mindful of the anatomic variations and optimize their surgical approach.

Beyond cadaveric studies and operative validation of these variants, new technologies have helped clinicians and surgeons better visualize and characterize these anomalies with the use of high-resolution ultrasound, magnetic resonance imaging, and operative technologies.[3,4] An example of an operative technology improvement is the STRATOS endoscopic CTR system (STRATOS, A.M. Surgical, Smithtown, N.Y.). This system provides a clear cannula that aids with visualization of the entire carpal tunnel (**see figure, Supplemental Digital Content 1**, which displays the STRATOS ECTR system with clear cannula and independent blade, ***http://links.lww.com/PRSGO/A528***). Under direct 360 degrees of endoscopic visualization, one can differentiate the TCL fibers within the slot of the cannula, the median nerve protected radially and the flexor tendons protected ulnarly. The clear cannula provides the option of rotating the cannula slot onto the protected structures for further investigation and identification. This becomes highly important when an anatomic variation is present. In certain cases, these variants are clearly seen with the use of the STRATOS system. The provided figures are representative samples of obvious intervening structures in the cannula slot (Figs. 1, 2). These figures demonstrate examples of subligamentous and transligamentous RMB defined by Lanz[2], and one which is likely a branch of the palmer cutaneous nerve (**see figure, Supplemental Digital Content 2**, which displays the transligamentous RMB, ***http://links.lww.com/PRSGO/A529***; **see figure, Supplemental Digital Content 3**, which displays the Palmer Cutaneous Branch, ***http://links.lww.com/PRSGO/A530***).

If one is to see these intervening structures in the cannula slot, caution should occur before deployment of the blade.

Fig. 1. Transligamentous RMB.

Fig. 2. Subligamentous RMB.

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One should attempt to elevate the clear cannula tip to displace synovium and structures when positioning the cannula on the undersurface of the TCL. With no intervening structures in the cannula slot, deployment of the blade to divide the TCL can be performed safely. The STRATOS blade works independently of the cannula, as such, once the surgeon obtains a safe position, the surrounding anatomy remains protected through the procedure. If the surgeon identifies an anomalous RMB or palmer cutaneous branch, which cannot be displaced with the cannula tip, open surgical intervention should be considered.

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