

Challenging the Paradigm of Index PIP Joint Reconstruction: The Evolving Role of Vascularized Toe Joint Transfer

Abstract

Reconstruction of the proximal interphalangeal (PIP) joint remains challenging, particularly in the index finger, where joint stability is essential for effective key pinch. Due to concerns regarding instability and mechanical failure following implant arthroplasty, arthrodesis has traditionally been favored as a reliable treatment, although at the expense of joint motion. Vascularized toe joint transfer (VJT) offers a biological, motion-preserving alternative; however, its wider acceptance has been limited by historically modest functional outcomes, particularly an extension lag of approximately 30°.

Recognizing the importance of the extensor mechanism in determining postoperative function, we have refined our surgical strategy by systematically evaluating the recipient extensor apparatus and incorporating tailored reconstruction, including central slip reconstruction and lateral band centralization, at the time of joint transfer. These modifications aim to address the longstanding problem of extension deficiency and improve functional joint motion.

To reassess the role of VJT in index finger reconstruction, we reviewed 30 patients who underwent vascularized toe PIP joint transfer for post-traumatic osteoarthritis between 2009 and 2025. At a mean follow-up of 44 months, the average active range of motion reached 61°, with an extension lag of 16°. Grip and key pinch strengths recovered to 72% and 74% of the contralateral hand, respectively. Although 73% of patients required secondary procedures, predominantly tenolysis, no transferred joints ultimately failed or required conversion to arthrodesis. These findings suggest that VJT can provide sustained joint mobility and functional stability in appropriately selected patients.

With advances in extensor reconstruction and improved functional outcomes, the role of VJT in index finger reconstruction deserves renewed consideration. While the technical complexity and frequent need for secondary procedures remain important limitations, VJT may offer a valuable motion-preserving alternative for young and active patients with post-traumatic PIP joint destruction. Rather than accepting arthrodesis as the inevitable solution, modern vascularized toe joint transfer may expand the reconstructive options for this particularly demanding joint.