

Suspensionplasty With the Abductor Pollicis Longus Tendon for Osteoarthritis in the Carpometacarpal Joint of the Thumb

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Purpose: Many surgical procedures have been described for treating painful osteoarthritis at the carpometacarpal joint of the thumb. This article reports our clinical and radiographic results in performing suspensionplasty using the abductor pollicis longus (APL) tendon without tendon interposition after a complete trapeziectomy for patients with painful osteoarthritis in the carpometacarpal joint of the thumb.

Methods: Eighteen patients (2 men, 16 women), including 21 thumbs with advanced arthritis of the first carpometacarpal joint, who were treated by suspensionplasty using the APL tendon after a complete trapeziectomy were evaluated both clinically and radiographically. Ten thumbs were classified as stage III and 11 were classified as stage IV (Eaton's classification). The average follow-up period was 33.3 months.

Results: All patients (18 patients, 21 thumbs) reported pain with daily use before surgery; after surgery 13 of the 21 thumbs had no pain, 5 thumbs had mild pain with strenuous activity, and the remaining 3 thumbs had mild pain with light work. At the final follow-up evaluation the radial and palmar abductions each were $56^{\circ} \pm 9^{\circ}$ and $56^{\circ} \pm 6^{\circ}$. The grip and key-pinch strengths were 16 ± 6 kg and 4 ± 1 kg, respectively. The first metacarpal subsidence at rest was 15% and the additional subsidence when performing a 2-kg key pinch was 6% in the final follow-up radiographic findings.

Conclusions: This study showed that the APL suspensionplasty has a favorable outcome for painful osteoarthritis in the carpometacarpal joint of the thumb and that the APL tendon can be removed as a deforming force without any abduction weakness. (*J Hand Surg* 2006;31A:425–428. Copyright © 2006 by the American Society for Surgery of the Hand.)

Type of study/level of evidence: Therapeutic, Level IV.

Key words: Osteoarthritis, trapeziometacarpal joint, suspensionplasty, abductor pollicis longus tendon, trapeziectomy.

The goals of surgical treatment for painful osteoarthritis at the carpometacarpal joint of the thumb are the relief of pain and the restoration of stability and strength. Many surgical procedures have been described for treating these disabling conditions. Although ligament reconstruction and tendon interposition (LRTI) arthroplasty using the flexor carpi radialis tendon¹ have been used widely, some reports have pointed out the occurrence of postoperative first metacarpal subsidence.^{2,3} Furthermore recent studies also have suggested that the addition of

tendon interposition did not affect the outcome after ligament reconstruction.^{4,5} Thompson⁶ first described the suspensionplasty procedure using the abductor pollicis longus (APL) tendon without tendon interposition after a complete trapeziectomy for cases of painful scaphometacarpal impingement after a trapeziectomy either without intercarpal ligament reconstruction or with the removal of silicone trapezium replacements. Diao⁷ also reported the biomechanical advantages of this procedure based on a cadaveric biomechanical analysis using a sonic digitizer tracking system. Belcher and Nicholl⁸ reported the surgical outcomes of a different technique using

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the APL tendon as a sling. This article reports our clinical and radiographic results in performing suspensionplasty using the APL tendon in patients with painful osteoarthritis in the carpometacarpal joint of the thumb.

Patients and Methods

Eighteen patients (2 men, 16 women) (21 thumbs) with a 1-year minimum follow-up period were included in this study. The average age at surgery was 63 years (range, 52–77 y). According to Eaton's classification⁹ 10 thumbs were classified as stage III and the other 11 were classified as stage IV. The pain, range of motion, and grip and key-pinch strengths were assessed before and after surgery. For the radiographic evaluations standard posteroanterior and oblique radiographs with the hand at rest were taken for all patients before surgery and at each follow-up visit. At the final follow-up examination standard oblique radiographs were taken of the site of the arthroplasty with the hand at rest and using a 2-kg key pinch. As an index of first metacarpal subsidence the ratio of the height of the trapezial resection space divided by the length of the first metacarpal was applied on the postoperative radiographs at rest and while performing a 2-kg key pinch (Fig. 1).³ The average follow-up period was 33 months (range, 12–71 mo). The range of motion and grip and key-pinch strengths were expressed as the mean \pm SD. All data were subjected to statistical analysis using



Figure 1. As an index of first metacarpal subsidence the ratio of the height of the trapezial resection space (B) divided by the length of the first metacarpal (A) was applied on postoperative radiographs both at rest and when using a 2-kg key pinch. Reprinted with permission from Soejima.¹²

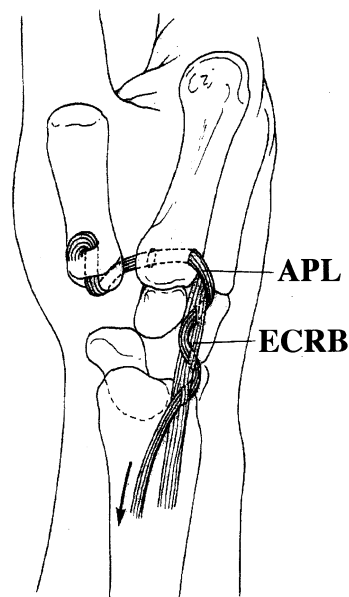


Figure 2. Suspensionplasty. After performing the trapeziectomy the APL tendon is passed through the thumb and the index metacarpal tunnels and then is sutured to the extensor carpi radialis brevis (ECRB) tendon using an interweave-type juncture. Reprinted with permission.¹²

the paired *t* test. A *p* value of less than .05 was considered significant.

Surgical Technique

According to the original procedure described by Thompson⁶ the thumb is exposed using a Wagner incision with meticulous attention to the sensory branch of the radial nerve. After the complete removal of the trapezium in a piecemeal fashion the entire width of the APL tendon is divided at its musculotendinous junction and then is flipped out to the first metacarpal insertion site. The first bone tunnel is made approximately 1 cm distal from the articular surface to the center of the first metacarpal base articular surface with a 3.2-mm-diameter cannulated drill. The second bone tunnel is made from the radiopalmar portion of the second metacarpal base (trapezial facet) to the ulnodorsal surface in the same manner. Subsequently the APL tendon is passed through the thumb and the index metacarpal tunnels (Fig. 2). The thumb metacarpal was positioned at the level of the index carpometacarpal joint when tensioning the APL tendon through the bone tunnels. Finally the free end of the APL tendon was sutured under manual tension to the extensor carpi radialis brevis tendon using an interweave-type juncture. Neither tendon interposition nor a temporary transfixing pin was applied in our series. A short-arm thumb spica splint was applied for 2 weeks and then range-of-motion and grip-strengthening exercises were initiated.

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