SCIENTIFIC ARTICLE

Revision Ligament Reconstruction Tendon Interposition for Trapeziometacarpal Arthritis: A Case-Control Investigation

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Purpose To test the null hypothesis that there is no difference in patient-reported and objective outcomes of revision ligament reconstruction and tendon interposition (LRTI) compared with primary LRTI.

Methods This case-control investigation enrolled 10 patients who had undergone revision LRTI at a tertiary care center. All patients had previously undergone primary trapeziectomy with LRTI. Patients with a minimum of 2 years' follow-up were eligible. All patients completed an in-office study evaluation. Controls (treated only with primary LRTI) were matched from our practice to reach a 1:2 case−control ratio. Outcome measures included Michigan Hand Questionnaire (primary outcome), *Quick*−Disability of the Arm, Hand, and Shoulder (*Quick*DASH) questionnaire, visual analog scale (VAS) for pain and improvement, and physical examination. Statistical analyses were conducted to compare patient groups.

Results Patients who underwent revision LRTI reported significantly worse outcomes on all measured standardized questionnaires compared with primary patients. The Michigan Hand Questionnaire indicated worse overall outcomes (54 vs 79) as well as worse pain, appearance, and ability to complete activities of daily living. Compared with those who did not undergo revision LRTI, patients who did also reported more impairment (*Quick*−Disability of the Arm, Hand, and Shoulder, 47 vs 23), greater pain (VAS pain, 6.3 vs 1), and less improvement after surgery (VAS improvement, 2.7 vs 7.9). There was also a significantly higher rate of patient-reported depression in the revision LRTI group (50% vs 10% of patients treated with primary LRTI). We did not find a significant difference in objective outcomes of pinch strength, grip strength, and thumb palmar abduction between the 2 groups.

Conclusion After revision LRTI, patient-reported outcomes indicate worse perceived function and greater pain than are expected are primary LRTI despite similar motion and strength. Revision surgery can be offered in the setting of persistent or recurrent symptoms, but patients should be counseled that improvement of symptoms is unpredictable. *(J Hand Surg Am. 2016;■(■):■−■. Copyright © 2016 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Therapeutic III.

Key words Basal joint, thumb arthritis, trapeziometacarpal, LRTI, revision.

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THE TRAPEZIOMETACARPAL (TMC) JOINT is the most common site of symptomatic osteoarthritis (OA) in the hand and wrist.[1] Among the multiple surgical treatment options for advanced TMC arthritis, trapeziectomy with ligament reconstruction and tendon interposition (LRTI) has traditionally been the most common procedure performed in the United States.[2] Since its description in 1983, LRTI has been advocated as a reliable treatment for thumb TMC OA, producing satisfactory reduction in pain and weakness.[3] Long-term studies report "81% to 95%" satisfactory pain relief.[2,4,5] Despite this, untreated scaphotrapezoid arthritis, thumb metacarpophalangeal joint hyperextension, first web space contracture, instability, pain, deformity, synovitis, or weakness[6] can necessitate revision surgery.

Revision surgery after failed TMC surgery is offered with a limited understanding of expected outcomes. Case series report rates of 53% to 76% relief of pain and improved work and recreational function after revision according to a grading scale developed by Conolly et al.[7–9] However, these patients underwent a variety of primary and revision procedures and no comparative cohorts were studied.

This study was designed to compare a validated patient-reported measure of hand function (Michigan Hand Questionnaire [MHQ], the primary outcome) and objective outcomes in patients after revision LRTI (rLRTI) with a matched cohort that had undergone only a primary LRTI. We tested the null hypothesis that patients who had undergone rLRTI after previous trapezial excision and primary LRTI would not differ in patient-reported or objective outcomes from the revision surgery from patients who did not go on to revision.

MATERIALS AND METHODS

After we obtained institutional review board approval, this case-control investigation enrolled patients treated for TMC arthritis at a single tertiary center. Eligible participants were identified by querying a departmental electronic billing database for Current Procedural Terminology codes 25447 and 26480 performed by any 1 of 5 fellowship-trained hand surgeons between April 1996 and January 2013. This Current Procedural Terminology code combination is used by all surgeons at our institution for both primary and rLRTI. Inclusion criteria included patients older than age 40 years who had undergone a primary LRTI with complete trapeziectomy or an rLRTI after a prior LRTI and trapeziectomy. Exclusion criteria included procedures

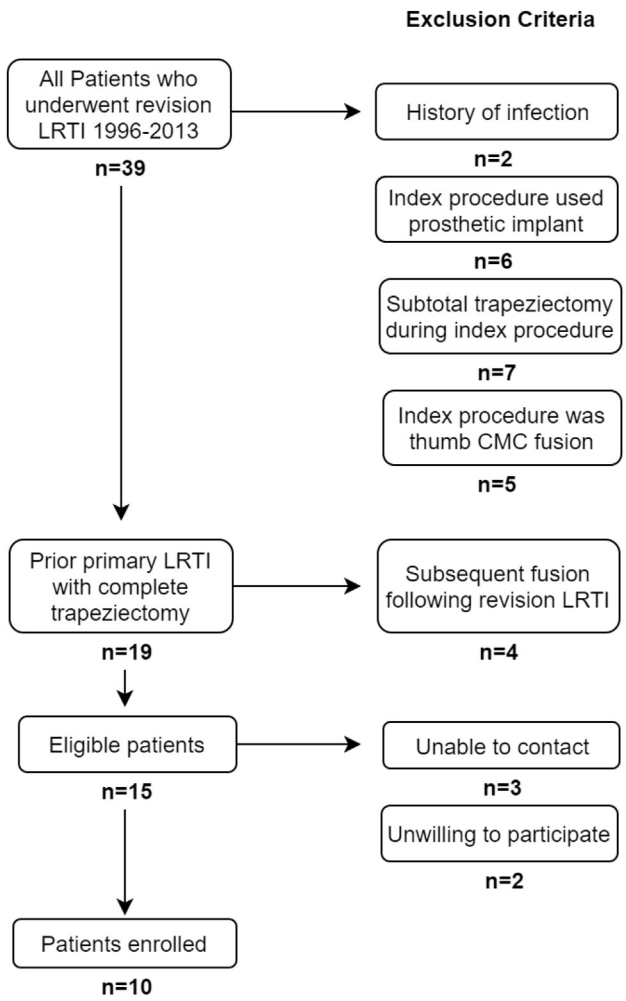

FIGURE 1: Inclusion and exclusion criteria for selection of revision ligament reconstruction and tendon interposition (LRTI) cohort.

other than LRTI (eg, Artelon spacer or arthrodesis) at the TMC joint, a history of infection in the affected hand, arthrodesis before or after rLRTI, and subtotal trapeziectomy during the index procedure (Fig. 1). Tables 1 and 2 present demographic data. If a patient underwent bilateral LRTI surgeries, only the first operative thumb was eligible to contribute data to this study, to avoid bias imparted by collecting non-independent data from bilateral thumbs of individual patients.

All control LRTI patients had undergone trapeziectomy followed by use of the complete flexor carpi radialis tendon for suspension and interposition. Nine of 10 rLRTI patients also underwent this surgery except for one patient, for whom allograft was used in the primary surgery.

The decision to proceed with revision surgery was a shared decision between the patient and the surgeon based on patient dissatisfaction with the symptoms