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ORIGINAL ARTICLE

The Nirschl procedure versus arthroscopic extensor carpi radialis brevis debridement for lateral epicondylitis

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Background: The Nirschl technique and arthroscopic debridement are common surgical procedures for chronic lateral elbow tendinopathy. The purpose of this study was to compare outcomes following the use of these techniques to treat chronic lateral elbow tendinopathy.

Methods: We retrospectively reviewed 59 elbows of 55 patients who did not improve after conservative treatment. Twenty-nine elbows of 26 patients were treated with the Nirschl procedure (Nirschl group), and 30 elbows of 29 patients were treated with arthroscopic debridement (arthroscopy group). Outcomes were assessed subjectively with the quick Disabilities of the Arm, Shoulder and Hand questionnaire and the visual analog scale (VAS) for pain in 3 domains (overall pain, pain at rest, and pain during hard work) and objectively with pain-free grip strength.

Results: The Nirschl and arthroscopy groups showed significant improvements in subjective and objective outcomes at a mean of 28.5 months and 31 months, respectively ($P < .05$). No significant between-group differences were found in postoperative outcomes, including quick Disabilities of the Arm, Shoulder and Hand questionnaire scores; pain-free grip strength; and VAS scores for overall pain and pain at rest ($P > .05$). However, a small but significant difference was found in the postoperative VAS score for pain during hard work (1.6 ± 1.3 for Nirschl group vs 2.2 ± 2.0 for arthroscopy group, $P = .042$).

Conclusions: Both techniques are comparable and highly effective for treating chronic recalcitrant lateral elbow tendinopathy. Although the Nirschl technique provides slightly superior pain relief during hard work, the effect size is very small and the difference does not appear to be clinically important.

Level of evidence: Level III; Retrospective Cohort Design; Treatment Study

Keywords: Tennis elbow; Nirschl; open surgery; arthroscopy; comparative study; DASH

Lateral elbow tendinosis (LET) is a degenerative condition occurring at the bone-tendon interface of the extensor carpi radialis brevis (ECRB) origin at the lateral epicondyle.[4] Its natural course is considered self-limiting.[28] However, a substantial proportion of patients with this condition have pain and disability even after 1 year of various conservative treatments.[6,25] Patients with a symptom duration greater than 6 months or who receive local steroid injections have been found to have a poor potential for spontaneous recovery[5,6,25,28] and have a greater risk of undergoing surgical treatment.[25] Thus, surgery is considered in patients with a symptom duration greater than 6 months and with

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persistent severe pain despite conservative treatment for more than 3 months.

The Nirschl procedure is time-tested and one of the most widely used methods for surgical treatment of chronic recalcitrant LET.[16] The arthroscopic technique is another useful option that was developed more recently.[3] The advantages of the arthroscopic technique are that it is minimally invasive, is able to address concomitant intra-articular pathology, and provides early functional recovery and effective relief of pain.[26] However, clinical outcomes after Nirschl and arthroscopic tennis elbow debridement have not been directly compared with validated measures.

The purpose of this retrospective study was to compare outcomes after the Nirschl and arthroscopic techniques for the treatment of chronic LET using validated outcome assessment measures. The null hypothesis was that the Nirschl and arthroscopic techniques were equally effective.

Methods

This was a retrospective comparative study of the Nirschl procedure and arthroscopic debridement for the treatment of chronic LET. We searched our institutional database for patients who underwent surgical treatment for chronic LET by a single surgeon from January 2008 to June 2014. The indications for surgery for LET were failure of conservative therapy for more than 3 months, symptom duration longer than 6 months, and persistent severe pain (visual analog scale [VAS] pain score ≥5). We made the diagnosis of LET when tenderness to palpation at the ECRB origin of the lateral epicondyle and the Thomsen test were positive. We routinely examined patients with LET with palpation of the soft spot and the radiocapitellar joint line and with the lateral pivot-shift test to rule out lesions that mimic LET, such as radiohumeral plica syndrome or posterolateral rotatory instability. We used imaging studies, including radiography and ultrasonography, to rule out joint or bony lesions and to confirm degenerative changes at the ECRB origin. The exclusion criteria were the presence of concomitant elbow lesions likely to affect elbow function (fracture or ligament injuries at the ipsilateral elbow, moderate to severe osteoarthritis of the elbow joint with large osteophytes and/or joint space narrowing visible on plain radiography, and elbow joint stiffness) and a follow-up period shorter than 12 months after surgery.

Operative procedures

The choice of the surgical technique was made according to the surgeon's discretion. The arthroscopic procedure was performed in a modified fashion from the description of Baker et al.[3] After receiving general or regional anesthesia, the patient was placed in the lateral decubitus position, with the arm supported by a side bar and the elbow at 90° of flexion. The elbow was prepared and draped, and the tourniquet was inflated. After marking of landmarks and joint distention with a 20- to 25-mL saline solution injection, the proximal anteromedial portal was established as a viewing portal at approximately 2 cm proximal to the medial epicondyle and 1 cm anterior to the medial intermuscular septum. A 2.9-mm, 30° arthroscope (Linvatec, Largo, FL, USA) was introduced through the viewing portal, and the proximal anterolateral portal was established as a working portal under arthroscopic visualization using the outside-in technique at the level of the proximal margin of the capitellum. Joint distension was achieved with gravity inflow. We inspected the elbow joint for capsule changes, cartilage degeneration, and other pathologic lesions, such as radiohumeral plica or posterolateral rotatory instability. The lateral joint capsule was released from the proximal and lateral margins of the capitellum using a 3.5-mm shaver (Linvatec) until the undersurface of the ECRB tendon was visualized (Fig. 1, *A* and *B*). Then, we advanced the arthroscope laterally and proximally and followed the ECRB tendon to its attachment site to the lateral epicondyle (Fig. 1, *C*). Tendinosis is typically located at the ECRB insertion site to the lateral epicondyle and looks like lint, with the loss of a shiny surface and parallel bundles of fibers. The ECRB tendon origin was then removed using a 2.4-mm, 30° radiofrequency ablation device (ArthroCare, Sunnyvale, CA, USA). Removal was begun from the proximal and anterior edge of the ECRB footprint on the lateral epicondyle and progressed in the posterior and distal directions, while being limited anterior to the midline of the radial head to avoid injuries to the lateral collateral ligament.[8] The ECRB tendon was distally retracted after ablation (Fig. 1, *D* and *E*). We then used a 3.5-mm shaver to remove remnant tendinosis and calcified tissue from the retracted ECRB tendon and the lateral epicondyle. Decortication of the lateral epicondyle was not performed. We removed the radiohumeral plica if it was symptomatic. The skin was repaired, and a bulky compressive dressing was applied.

Open surgery was conducted following the description of Nirschl and Pettrone.[19] Under general or regional anesthesia and with tourniquet control, the patient was placed in the supine position. An approximately 4- to 5-cm-long oblique incision was made just anterior to the lateral epicondyle. At the deep fascial layer, an interval between the extensor carpi radialis longus (ECRL) and extensor digitorum communis (EDC) tendons was visually identified, incised, and spread. The ECRB tendon was identified under the EDC tendon and was inspected for typical degenerative changes. We were able to identify tendon degeneration visually in all open surgery cases, and we sharply excised the tendon about 1 cm in length, including the degenerated part, from its insertion to the lateral epicondyle. A scratch maneuver with a No. 15 scalpel blade was used to remove remnant degenerated tendon at the anterior EDC.[7] The ECRL fascia was then repaired to the EDC fascia with No. 3-0 absorbable sutures to cover the defect created after the excision of the ECRB origin. After insertion of a Silastic drain (Sewoon medical, Seoul, Korea), the wound was repaired layer by layer, and a bulky compressive dressing was applied.

Postoperative rehabilitation

The same rehabilitation protocol was applied to both the open surgery (Nirschl) group and the arthroscopic surgery group. Active-assisted range-of-motion exercises for the elbow started 1 day after surgery. The bulky compressive dressing was changed to a light dressing 2 days after the operation, and the sutures were removed 2 weeks after surgery. We encouraged patients to use their arms in daily activities and slowly progress to more difficult tasks as long as the pain was tolerable.

Outcome assessments

An independent examiner conducted all preoperative and postoperative assessments. Subjective assessments included the pain VAS