

Atraumatic Spontaneous Achilles Tendon Rupture in Patients Receiving Oral Corticosteroids Treated With the Modified Side-Locking Loop Suture Technique

Kiminori Ushio, MD¹, Shinji Imade, MD, PhD², Hiroshi Takuwa, MD¹, Masaru Kadowaki, MD², Yuji Uchio, MD, PhD³

¹Orthopedist, Department of Orthopaedic Surgery, Shimane University Faculty of Medicine, Shimane, Japan

²Assistant Professor, Department of Orthopaedic Surgery, Shimane University Faculty of Medicine, Shimane, Japan

³Professor, Department of Orthopaedic Surgery, Shimane University Faculty of Medicine, Shimane, Japan

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ABSTRACT

Atraumatic spontaneous Achilles tendon ruptures sometimes occur in patients receiving oral corticosteroids. In general, these cases are treated surgically; however, delayed postoperative management can lead to impaired activities of daily living. The modified side-locking loop suture (SLLS) technique is a useful suture method for safe and early active mobilization. Three cases of spontaneous Achilles tendon ruptures were treated with the modified SLLS technique with good clinical results. The modified SLLS technique is a useful method with a short rehabilitation period for treating atraumatic spontaneous Achilles tendon rupture in patients undergoing corticosteroid therapy.

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Achilles tendon ruptures are one of the most common sports-related injuries, occurring most often from running, sprinting, jumping, or agility activities involving explosive plyometric contractions (1). Atraumatic spontaneous Achilles tendon ruptures occur occasionally, and the use of corticosteroids has been reported to be one of the risk factors (2–5). The reported incidence of Achilles tendon ruptures is 0.02% (6). Operative treatment is generally used in these cases. Nevertheless, patients have generally been instructed to avoid weightbearing activities for 6 to 8 weeks postoperatively because the tensile strength immediately after surgery is unknown. However, these patients tend to already have some difficulty in performing their activities of daily living (ADLs) because almost all of them have some sort of underlying disease. The addition of a long-term non-weightbearing regimen would further impair their performance of ADLs.

The modified side-locking loop suture (SLLS) technique is easy to perform and ensures uniform accuracy in treating Achilles tendon rupture (7). This technique is the optimum suture method for safe and early active mobilization, and good clinical results have been re-

ported in the treatment of acute Achilles tendon rupture using this technique (8). The use of this technique can result in safe and early rehabilitation after surgery for patients with spontaneous Achilles tendon rupture.

We report 3 cases of spontaneous Achilles tendon rupture treated using the modified SLLS technique in which early rehabilitation after surgery was achieved.

Surgical Technique of SLLS

The patient was placed in the prone position on an operating table under spinal anesthesia. Although an air tourniquet was placed on the thigh of the affected side, it was not used. We exposed the ruptured Achilles tendon with a slightly medial, curved skin incision. First, any abnormal fibrous tissue at the rupture site was removed until normal tendon fibers were exposed on the stumps. Next, the ruptured Achilles tendon was sutured using the modified SLLS technique. For the core suture, the stumps of the ruptured Achilles tendon were sutured using the 2-strand SLLS technique with U.S. Pharmacopeia Convention (USP) size 5 braided polyethylene and polyester suture thread (FiberWire; Arthrex Co., Naples, FL; Fig. 1). The core sutures were tightened with a force of ~10 kgf to avoid any slack in the locking loop. The core sutures were tied using an antislip knot between the stumps with the ankle at 15° of dorsiflexion (Fig. 2) (9). After these sutures have been tied, one should ensure that the range of ankle dorsiflexion is maintained at >20°. These values are approximately standard,

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Address correspondence to: Shinji Imade, MD, PhD, Department of Orthopaedic Surgery, Shimane University Faculty of Medicine, 89-1, Enya, Izumo, Shimane 693-8501, Japan.

E-mail address: imades@med.shimane-u.ac.jp (S. Imade).

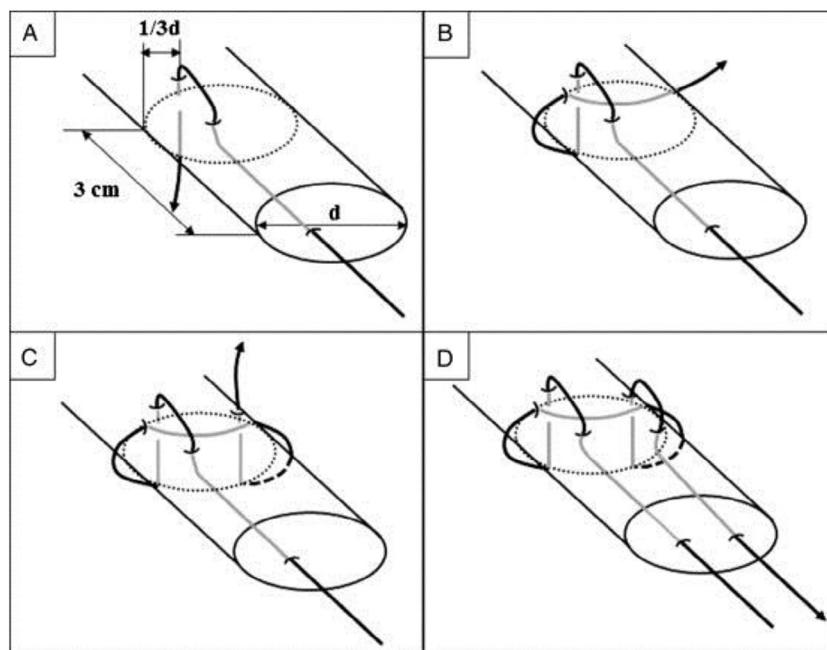


Fig. 1. Side-locking loop suture technique. (A) A suture thread is passed from the stump to the front side of the Achilles tendon 3 cm from the stump and one third of the tendon's width. The needle is inserted just ahead of that point and directed toward the back side. (B) A loop is made in the side of the tendon, and the transverse component of the suture penetrates the tendon from side to side, slightly apart from the vertical component. (C) The same technique is performed on the other side. (D) The suture thread is then pulled through the stump again. Reproduced, with permission, from Imade et al (7).

however, and the goal is to ensure that the range of ankle dorsiflexion after suture tying is consistent with that of the healthy side. A peripheral suture was made of cross-stitches formed with 4 strands of USP 4-0 size monofilament nylon suture thread. At this point, some gaps were present between the stumps; however, the sutured Achilles tendon was covered with aponeurosis without any augmentation.

Postoperative Management

The postoperative management program was modified according to each patient's situation. The duration of immobilization and the timing of partial or full weightbearing were determined individually for each patient. Active range of motion (ROM) exercises without re-

striction were permitted the day after the day of surgery or after removal of the cast.

Magnetic resonance imaging (MRI) was performed to evaluate the sutured Achilles tendon at 6 months after surgery. We performed a clinical evaluation using the Japanese Society for Surgery of the Foot (JSSF) ankle-hindfoot scale and compared the preoperative results with the final survey results. The JSSF ankle-hindfoot scale was created by modifying the clinical rating systems established by the American Orthopaedic Foot and Ankle Society scales and the Japanese Orthopaedic Association's foot rating scale, and the reliability of the JSSF ankle-hindfoot scale has been verified (10,11).

Case Report

Institutional review board approval was not required owing to the limited number of patients reviewed in the present study, as long as their health information details were kept confidential. All the patients provided written informed consent preoperatively. From December 2010 through July 2014, the lower extremity of 3 patients with atraumatic spontaneous Achilles tendon rupture were identified in our hospital. None of the patients had a history of trauma, but they all had some symptoms in the affected foot. They had been given oral prednisolone to treat various underlying diseases, including rheumatoid arthritis in patient 1, radiation pneumonitis, which had resulted from radiation therapy for lung cancer in patient 2, and systematic lupus erythematosus in patient 3. The mean duration of administration and the applied dose were 15 (range, 3 to 36) months and 23.3 (range, 5 to 60) mg/day. The details of each case are presented in Table 1. The Achilles tendon rupture was diagnosed in all patients by physical examination and imaging studies, including MRI or ultrasonography. The physical examinations showed palpable defects over the affected Achilles tendon and positive Simmonds-Thompson test results (12). In all cases, the ruptured Achilles tendons were sutured using the modified SLLS technique as described. The mean length of

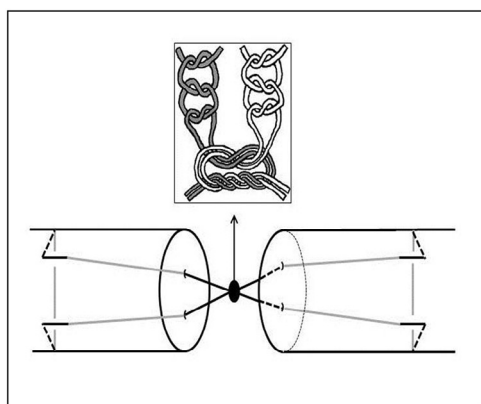


Fig. 2. Antislip suture technique. Both core sutures are tied using an antislip knot. First, a surgeon's knot is made using a pair of core sutures. Next, both ends are connected with 3 throws in the manner of a reef knot. Reproduced, with permission, from Nishimura et al (9).

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