The Journal of Foot & Ankle Surgery ■■ (2018) ■■–■■

Contents lists available at ScienceDirect

The Journal of Foot & Ankle Surgery

journal homepage: www.jfas.org

Original Research

Treatment of Chronic Subluxation of the Peroneal Tendons Using a Modified Posteromedial Peroneal Tendon Groove Deepening Technique

Mu Hu, MD [1], Xiangyang Xu, MD, PhD [2]

[1]*Surgeon, Department of Orthopaedics, Shanghai Ruijin Hospital North, Shanghai Jiao Tong University School of Medicine, Shanghai, China*
[2]*Professor and Surgeon, Department of Orthopaedics, Shanghai Ruijin Hospital North, Shanghai Jiao Tong University School of Medicine, Shanghai, China*

ARTICLE INFO

Level of Clinical Evidence: 4

Keywords:
fibula
peroneus brevis
peroneus longus
retinaculum
subluxation
tendon sheath

ABSTRACT

The present study investigated the clinical efficacy of a modified approach for the treatment of chronic subluxation of the peroneal tendons using posteromedial peroneal tendon groove deepening. We retrospectively analyzed the data from 21 patients who had undergone posteromedial peroneal tendon groove deepening combined with repair of the tendon sheath for the treatment of chronic subluxation of the peroneal tendons from March 2006 to October 2012. The lateral edge of the peroneal tendon groove was left untouched. A posterior osteocartilaginous flap was detached from the posterior fibula from medially to laterally. The retromalleolar groove was deepened through impaction of the posterior fibula. A visual analog scale and the American Orthopaedic Foot and Ankle Society ankle-hindfoot scale were used. All patients achieved healing after the first surgery. No postoperative complications developed. Sixteen patients were followed up for 24 to 69 months. The mean American Orthopaedic Foot and Ankle Society ankle-hindfoot scale score improved from 55.0 to 93.6 points after surgery. The mean visual analog scale score decreased from 5.3 to 1.2 points. Five patients had moderate hindfoot rigidity and achieved improvements after rehabilitation training. None of the patients had specific requirements for shoes and ground flatness. All patients had a normal gait. No case of recurrent subluxation developed. These results indicate that posteromedial peroneal tendon groove deepening combined with repair of the tendon sheath can achieve satisfactory efficacy.

Subluxation of the peroneal tendon is rare and mainly occurs in young people. With this injury, the peroneal tendon slips from the fibular groove in the posterior lateral malleolus, removing the supporting point from the peroneal tendon and resulting in instability, pain, and lateral malleolus (1). However, this injury has often been misdiagnosed as a sprain of the lateral ankle ligaments. The causes of subluxation of the peroneal tendons include (1) forceful contraction of the peroneus longus tendon and peroneus brevis tendon, making the superior peroneal retinaculum become slack or rupture when the forefoot is in the position of dorsiflexion/valgus (97% of patients) (2); (2) dysplasia of the fibular groove; (3) weakness or deficiency of the superior or inferior peroneal retinacula and ligaments in the lateral malleolus; and (4) malunion of the lateral malleolus and stretching or fully extroversive deformity. Recurrent subluxation is inevitable if early diagnosis and effective therapy have not been achieved (3).

A number of different surgical methods for chronic subluxation of the peroneal tendon have been described (4–12). These approaches usually include bone deepening, as suggested in 1979 by Zoellner and Clancy (11), rerouting the tendons beneath the calcaneofibular ligament, and soft tissue repair. Shawen and Anderson (8) also suggested preserving the fibrocartilaginous gliding mechanism. However, these methods were mainly described for patients with acute subluxation of the peroneal tendons. In addition, these approaches have been associated with problems such as long open exposure, scar formation, adhesions, nerve entrapment, and prolonged immobilization (13,14).

Based on the long-term experience of our center, we used the posteromedial peroneal tendon groove deepening approach; however, the long-term outcomes of this approach are unknown. Therefore, in the present study, we retrospectively analyzed the data from 21 patients who had undergone posteromedial peroneal tendon groove deepening combined with repair of the tendon sheath in our department from March 2006 to October 2012. We evaluated the efficacy, safety, and limb function of these patients.

Financial Disclosure: None reported.
Conflict of Interest: None reported.
Address correspondence to: Xiangyang Xu, MD, PhD, Department of Orthopaedics, Shanghai Ruijin Hospital North, Shanghai Jiao Tong University School of Medicine, Shanghai 200025, China.
E-mail address: xu664531@hotmail.com (X. Xu).

1067-2516/$ - see front matter © 2018 by the American College of Foot and Ankle Surgeons. All rights reserved.
https://doi.org/10.1053/j.jfas.2018.03.009

Patients and Methods

Patients

We performed a retrospective study of 21 patients who had undergone posteromedial peroneal tendon groove deepening combined with repair of the tendon sheath for the treatment of chronic subluxation of the peroneal tendons from March 2006 to October 2012. The ethical committee of our hospital approved the present study, and the informed consent requirement was waived by the committee because of the retrospective nature of the study. All patients underwent radiography and magnetic resonance imaging (MRI). None of the patients experienced an ankle fracture, and none of the patients showed any structural injury of the ligament or soft tissues in the medial side of the ankle joints. The diagnosis was confirmed by identifying the sliding strip-like structure using either MRI or dynamic ultrasonography at the tip of the lateral malleolus. MRI was used more often. Ultrasound examination detected a bursa at the tip of the lateral malleolus, with a hypoechoic strip-like structure (dislocated peroneal tendon sheath and peroneal tendon) visible. This strip-like structure moved with the flexion and extension of ankle joint (tendon detachment and reset).

Preoperative Preparation

After admission, the patients were queried regarding their disease history, including peripheral angiopathy, smoking, diabetes, and other chronic diseases. Surgery was performed after the swelling of the affected limb, local soft tissue, and skin had diminished and stabilized.

Intervention

The patients were placed in the lateral position, with the affected limb upward, and underwent nerve blocking or general anesthesia. An air pressure tourniquet was applied to the thigh, and a longitudinal incision of ~5 cm was made along the posterior margin of the lateral malleolus, with an arc shape slightly ahead of the distal end. The posterior lateral malleolus was exposed layer by layer. The superior peroneal retinaculum and periosteum were cut open 0.5 cm anterior to the posterior margin of the lateral malleolus, and the peroneal tendon sheath at the subluxated area was cut open to expose the peroneal tendon. The periosteum was isolated, and the periosteum and peroneal tendon were pulled back to reveal the peroneal tendon groove. An osteotomy was performed to the posterior medial edge of the peroneal groove using a sagittal saw. A mallet was used to impact the posterior surface of the fibula to deepen the retromalleolar groove by ~3 to 5 mm (Figs. 1–8). Because the lateral edge of the peroneal tendon groove was left untouched, the hammer only generated a new peroneal tendon groove with a depression gradually deepening from outside-in. The deepest medial side of the groove was ~5 mm, the width was ~8 mm, and the length was ~25 mm. Next, 2 to 3 bone holes with pitch of ~5 mm were drilled in the posterior edge of the fibula using a Kirschner wire with a diameter of 1.5 cm. The peroneal tendon was then reduced into the deepened concave groove. The superior peroneal retinaculum, tendon sheaths, and periosteum tissue were horizontally mattress-sutured to the lateral edge of the fibular malleolus by way of the bone holes using 3-0 absorbable suture or anchor. Repeated plantarflexion of the ankle and forefoot valgus were performed to ensure that no subluxation of the peroneal tendon remained. Finally, the wound was closed after a thorough washing.

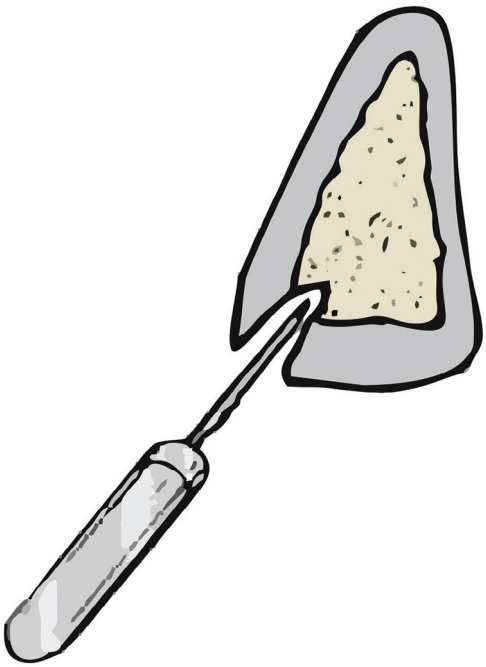

Fig. 1. The cancellous bone on the medial side of the posterior wall of fibula is cut through to generate an open door. (Drawn by X.X.)

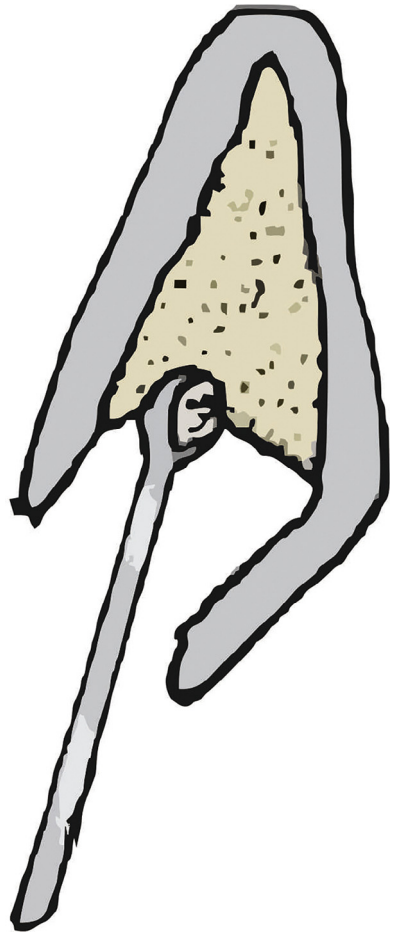

Fig. 2. Part of the cancellous bone in posteromedial fibula is excavated. (Drawn by X.X.)

Postoperative Management

The patients and people living with them were required to abstain from smoking postoperatively. The patients' leg was positioned in functional dorsiflexion and a mild valgus position with a leg brace (i.e., a neutral position of the ankle joint) and received routine antibiotics for 24 hours. The drainage tube was retracted when the drainage flow was <10 mL/day. The patients' leg was fixed in a walking brace (DJO, LLC, Vista CA; or OPED, Oberlaindern, Germany) for the first 4 weeks postoperatively. On the third postoperative day, the patients were encouraged to conduct functional exercises of the toes and ankle to reduce the rigidity of the subtalar joint. The patients underwent radiographic review 1 month after surgery. The cast was removed 4 weeks later, and they began to perform weightbearing activities. After 6 weeks, the patients were asked to perform light jogging. The patients were required to perform functional exercises such as ankle varus/valgus, dorsiflexion, and plantarflexion.

Outcomes

The visual analog scale (VAS) for pain and the American Orthopaedic Foot and Ankle Society (AOFAS) ankle-hindfoot scale were used preoperatively and postoperatively to evaluate the postoperative efficacy. The scoring included pain, function, and alignment, with a full mark of 100 points. A score of 90 to 100 was considered excellent, 75 to 89 was considered good, 50 to 75 was considered moderate, and <50 was