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Case Report

Stable ankle after modified brostrom technique using one anchor with double suture at Sanglah Hospital: a case report

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ABSTRACT

Ankle sprains are commonly seen injuries among athletic and young population, and it is necessary to stabilize the patient ankle as soon as possible. Authors report the cost-effective option of using a modified Brostrom technique with one suture anchor in a limited resource setting. Case a 24- year-old male came to the orthopaedic clinic with chief complaint of left ankle pain for the past 2 weeks after jumping and landing in a twisted position. Patient also complained of unstable ankle after the fall. On physical examination, the ankle showed tenderness and instability when anterior drawer test was performed. The patient was diagnosed with lateral ankle instability. This case report describes a modification to the original Brostrom procedure using one suture anchor to anatomically reconstruct the lateral ankle ligaments in treating high demand patient who have lateral ankle instability. After six months follow up, the patient has shown significant improvement on his left ankle. Despite of all the modifications of Brostrom procedure, the use of more suture anchors or sophisticated technique such as arthroscopy might result in increasing cost. Reasonably good outcome can still be achieved with modified Brostrom procedure that utilizes minimal incision, simple steps, and single suture anchor. Due to its cost-effectiveness, authors believe that modified Brostrom technique with one suture anchor is an effective and practical treatment option for lateral ankle instability. Brostrom technique using suture anchors as shown here can provide similarly good outcomes compared with other more complex techniques.

Keywords: Ankle stability, Anterior talofibular ligament, Brostrom technique, Case report, Lateral ankle, One suture anchor

INTRODUCTION

Lateral ankle sprains represent one of the most common musculoskeletal injuries.[1,2] The incident rate ranges around 2.15 per 1000 people and between five and seven per 1000 people in the United States and European, respectively.[1-4]

This number can be up to twenty-sevenfold greater in military and selected athletic cohorts than that reported in the general population.[3,5] According to secondary data obtained from Polyclinic KONI (Athlete Polyclinic) in Jakarta from September until October 2012, the population in this study are all athletes of the annual National Sport Event in Jakarta. The prevalence steadily increased from 85 injuries in 2009, 146 injuries in 2010, 353 injuries in 2011, and 419 injuries in 2012. The most commonly found injury in the data was ankle sprain (ligament injury) (41.1%), while the most commonly injured body part was the lower limb (60%). Acute injuries were found in 64.4% of cases, while the rest was chronic cases.[6]

In lateral ligament injury, the most commonly injured ligament is Anterior Talofibular Ligament (ATFL). Some techniques have been performed to repair ATFL ruptures, one of them is Brostrom technique. Over the period, Brostrom technique has been modified by some surgeons to enhance the quality of repair, such as utilizing suture anchor. Previous biomechanical study showed that suture anchor procedure resulted in the same strength and stiffness as conventional direct suture repair of ATFL. However, it only provides half the strength and stiffness of native ATFL at time zero.[7] Therefore, the technique was constantly improved with the use of more suture anchors or arthroscopy.[8,9] In this case report, authors performed modified Brostrom technique with minimal incision, simple steps, and only single suture anchor in academic setting.

CASE REPORT

A 24-year-old Southeast Asian male came to the orthopaedic clinic with chief complaint of left ankle pain for the past 2 weeks after traumatic incident. The patient was playing basketball when he jumped and landed in a twisting position with his left ankle. Patient also complained of ankle instability after the fall. No other significant past medical and surgical history were reported.

On physical examination, the ankle showed tenderness and instability when anterior drawer test was performed. Sulcus sign was observed (Figure 1). AOFAS score components were checked preoperatively: pain (30), functional (7), maximum walking distance (5), walking surfaces (0), gait abnormality (8), sagittal mobility (4), hindfoot mobility (0), ankle-hindfoot stability (0), alignment (10), with a total score of 64. His ankle range of motion was also limited due to pain with Visual Analogue Score (VAS) ranging between 3 and 4. No abnormalities were found on the conventional X-ray. The patient was diagnosed with lateral ankle instability.

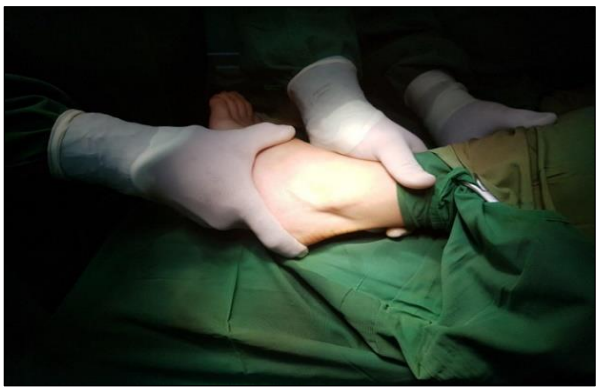

Figure 1: Sulcus sign on lateral ankle was observed during physical examination.

The patient then underwent operative treatment using Bostrom technique. An experienced foot and ankle surgeon performed the procedure. Epidural anesthesia, lateral decubitus position, and tourniquet were applied to the patient. Incision of 3 cm was performed along lateral ankle starting from talar end of the Anterior Talo Fibular Ligament (ATFL) (Figure 2), while preserving sural nerve and its branches. In order to reach the bone bed for suture anchor implantation, the soft tissue was bluntly dissected.

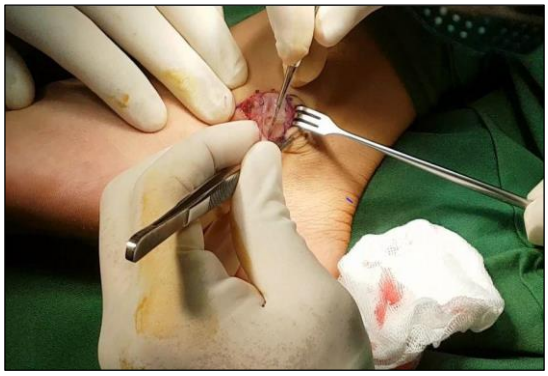

Figure 2: Incision along lateral ankle.

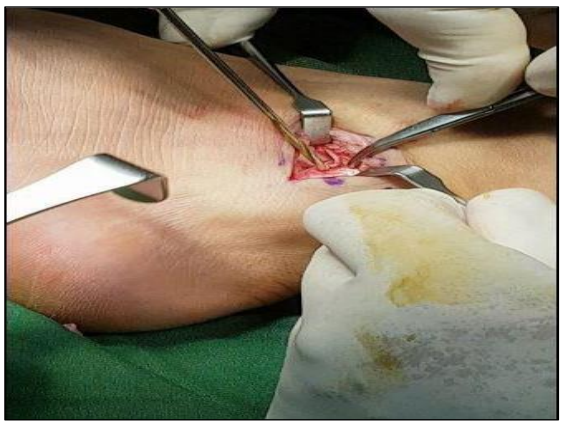

Figure 3: Drilling.

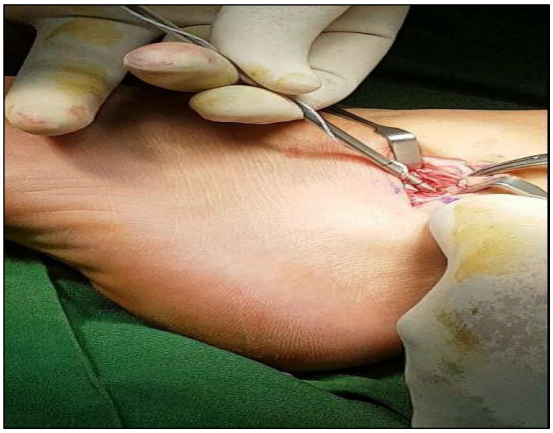

Figure 4: Suture anchor insertion.

The proximal side of original ATFL attachment site was identified and drilled (Figure 3). Single suture anchor was then implanted at the site (Figure 4). And then knotting

was handled with hand (Figure 5). After thorough irrigation, the wound was closed layer by layer (Figure 6). The postoperative x-ray examination was done and showed single suture anchor and otherwise normal appearing x-ray of ankle (Figure 7). The blood loss was minimal, with 1-hour operative time, and no other intraoperative complications.

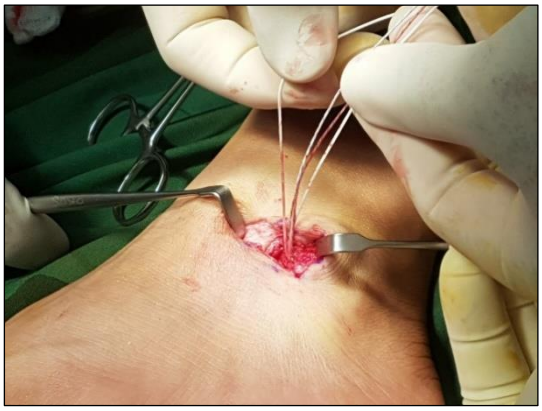

Figure 5: Knotting was handled with hand.

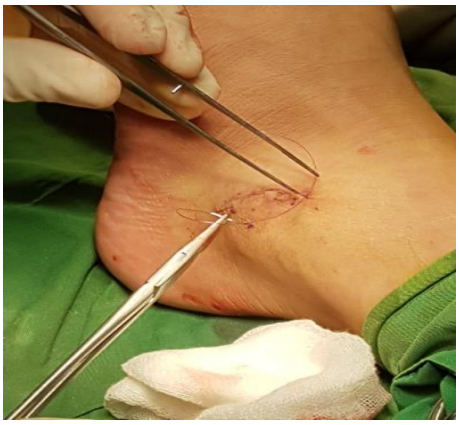

Figure 6: Skin closure.

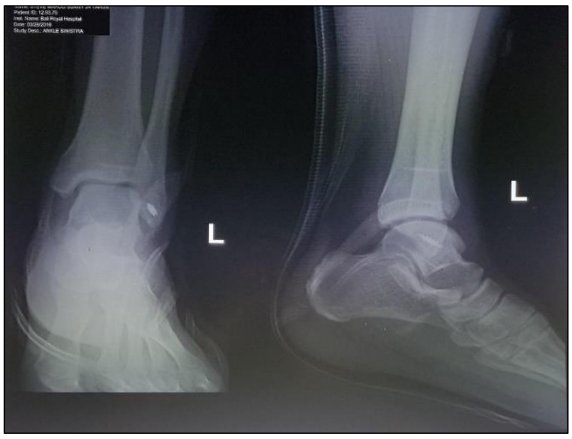

Figure 7: Postoperative x-ray of patient showing single suture anchor and otherwise normal appearing x-ray of ankle.

Postoperatively, ankle x-ray of patient showed an otherwise normal image and an implanted suture anchor. In one month, follow-up, patient reported no complication and satisfactory outcome with a full 100 point on AOFAS scoring and VAS of 0.

DISCUSSION

This case report describes a modification to the original Brostrom procedure using one suture anchor to anatomically reconstruct the lateral ankle ligaments in treating high demand patient who have lateral ankle instability.

Lateral ankle sprains are one of the most common musculoskeletal injuries. Some techniques have been performed to repair ATFL ruptures, one of them is Brostrom technique. Indications for surgical treatment of lateral ankle instability include young to middle-aged active patients who have failed a well-designed nonoperative treatment program. The symptoms and signs are most critical for diagnosis. Contraindications to surgery include other causes of instability (collagen diseases, tarsal coalitions, neuromuscular diseases, neurologic disorders, or functional instability), lateral ankle pain without documented lateral instability, history of complex regional pain syndrome, or degenerative arthritis. A relative contraindication is failure of the patient to participate in a preoperative rehabilitation program.

Over the period, Brostrom technique has been modified by some surgeons to enhance the quality of repair. Traditionally Brostrom technique uses nonabsorbable, continuous braided polyethylene/polyester multifilament sutures. This technique sutures the ATFL ligament in a pants-over-vest fashion in an imbricated position. The foot was held in a slightly plantar flexed and everted position with a bump placed under the tibia, allowing the foot to reduce under the ankle mortise.[10]

The initial modification of this technique includes Brostrom-Gould technique which focuses on subtalar instability beside the main purpose of primary ligament repair. This technique mobilizes the lateral portion of the extensor retinaculum and attach it to the distal fibula, superficial to the ligament repair. This procedure is proved to preserve subtalar joint range of motion, as well as peroneal muscle function and strength.[10]

Over the years, this technique has been modified with the use of suture anchors. Suture anchors are known to be simple, yet also provide excellent outcome. In anatomic suture anchor technique, the suture anchors were placed an average of 11 mm proximal to the distal tip of the fibula. It uses nonabsorbable, continuous braided polyethylene/polyester multifilament sutures that were passed through the ligament and tied over the top in a purse string manner. This technique produces a repair that can withstand loads to failure similar to that of the traditional Brostrom repair.[7]

Brostrom technique with suture anchors uses tourniquet application in contralateral decubitus position. In the neutral and mild varus position of the ankle, the broken anterior talofibular ligament was sutured, while the joint capsule was tightened at the same time and the lateral tenaculum was repaired to strengthen the stability. The addition of suture anchors to Brostrom method here is proved to be more effective than Brostrom method alone, resulting in more powerful biomechanical strength and tenacity.

Suture anchors have also been used with nonanatomic technique, such as Brostrom-Evans technique. In this technique, the anterior part of the hemisection of the peroneus brevis is harvested, preserving the distal insertion at the base of the 5th metatarsal. Both the elongated or avulsed calcaneofibular ligament along with ATFL are repaired without completing the suture, if necessary, the surgeon can also employ one or two suture anchors to fixate the ligaments. This technique is proved to solve the chronic ankle instability problem at the expense of a decrease in normal hindfoot movement, although this will not cause limitation for the patients.[8]

With the rising of minimal invasive technique, Brostrom technique has been combined frequently with arthroscopy. The arthroscopy was done using standard anteromedial and anterolateral portals. Anterolateral portal becomes the access point to the distal anterior fibula for anchor placement. It uses 2 anchors, where the first anchor was inserted at 1 cm superior to its position on the fibula and the second anchor was placed into the fibula more superiorly and level with the lateral shoulder of the talus. The fibular tunnel was created for suture tape insertion in the fibula between two all-suture anchors through the anterolateral portal. Because of the significantly smaller incisions, the arthroscopic technique provides a lower chance of wound dehiscence and complications compared with an open procedure, as well as allowing early return to activity and sports.[9]

Despite of all the modifications of Brostrom procedure, the use of more suture anchors or sophisticated technique such as arthroscopy might result in increasing cost. Reasonably good outcome can still be achieved with modified Brostrom procedure that utilizes minimal incision, simple steps, and single suture anchor. Due to this cost-effectiveness, authors believe that modified Brostrom technique with suture anchor is an effective and practical treatment option for lateral ankle instability.

CONCLUSION

In this case report, authors performed modified Brostrom procedure with minimal incision, simple steps, and single anchor double suture. After six months follow up, the patient has shown significant improvement on his left ankle. Brostrom technique using suture anchors as shown here can provide similarly good outcomes compared with other more complex techniques.

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