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# A case of ankle osteoarthritis associated with lateral premalleolar bursitis caused by chronic ankle instability

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## ABSTRACT

**INTRODUCTION:** Lateral premalleolar bursitis develops on the dorsolateral aspect of the foot anterior to the lateral malleolus, distinct from lateral malleolar bursitis located just around the lateral malleolus.

**PRESENTATION OF CASE:** A 71-year-old woman visited an orthopedic clinic about 40 years after an episode of ankle sprain and was diagnosed with lateral premalleolar bursitis and osteoarthritis of the left ankle. Stress radiography revealed left ankle anterolateral malleolar bursitis with varus and anterior instability. We opted for less invasive arthroscopic ankle arthrodesis over open resection to stop the communication of the bursitis with the ankle joint. The lateral premalleolar bursitis was located just over the anterolateral portal. The remaining cartilage in the talotibial joint was removed and the subchondral surface was exposed and curetted down to a bleeding surface by ankle arthroscopy. The talotibial joint was fixed with 3 6.0-mm cannulated cancellous screws. The foot and ankle were immobilized by cast for 4 weeks. Bony union was achieved about 8 weeks postoperatively. The patient could perform daily activities without pain and with no recurrence of the lateral premalleolar bursitis at the 1.5-year follow-up.

**DISCUSSION:** To our knowledge, this is the first report on arthroscopic arthrodesis for ankle osteoarthritis with recalcitrant lateral premalleolar bursitis caused by the check valve mechanism of chronic ankle instability after old ankle sprain.

**CONCLUSION:** We report a case of arthroscopic arthrodesis for osteoarthritis of the ankle associated with lateral premalleolar bursitis caused by the check valve mechanism of chronic ankle instability after old ankle sprain.

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## 1. Introduction

Bursitis is a common disease entity and can develop anywhere in the body. A bursa is a fluid-containing capsule lined with synovial cells, usually located over a bony prominence [1]. Adventitious bursa develops by abnormal shear force and is usually located in subcutaneous tissue [2] around the lateral malleolus. Symptoms are mild unless infection occurs, and thus conservative management such as aspiration, compression, and injection is first-line treatment. However, the recurrence rate is high [3–5].

Bursae can be divided into two categories based on the presence or absence of communication with the adjacent joint, namely, communicating or non-communicating bursa. Some communicating bursae become enlarged and recalcitrant because the communicating tunnel acts as a check valve; articular fluid fills the bursa,

and the flow moves in one direction from the articular cavity to the bursal cavity. Anterior cruciate ligament insufficiency was reported in approximately 30 % of knees with popliteal cyst [6], suggesting that joint instability results in a one-way check valve mechanism and distension of the bursa. Bursitis around the ankle caused by ankle instability has been reported [7], although the foot and ankle is one of the commonest regions for adventitious bursitis [8]. No studies have described arthroscopic arthrodesis for osteoarthritis with bursitis.

We report a case of arthroscopic arthrodesis for ankle osteoarthritis associated with recalcitrant lateral premalleolar bursitis caused by the check valve mechanism of chronic ankle instability after old ankle sprain. This work has been reported in line with the SCARE criteria [9].

## 2. Presentation of case

A 71-year-old woman developed severe left ankle sprain while playing volleyball around age 30 years; she received conservative treatment at a local clinic. She had no family history of relevant genetic information and psychosocial history.

**Abbreviations:** ATFL, anterior talofibular ligament; JSSF, Japanese Society for Surgery of the Foot; MRI, magnetic resonance imagery.

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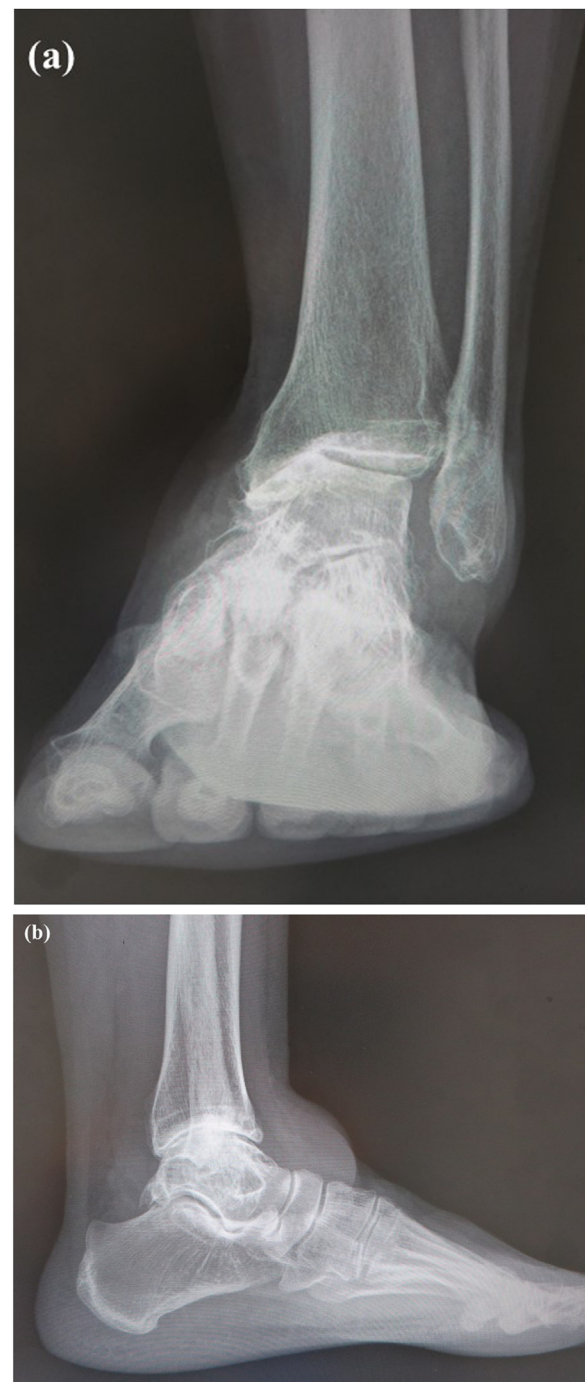
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**Fig. 1.** Photographs showing cystic swelling anterior to the lateral malleolus in anteroposterior view (a) and anterolateral view (b).

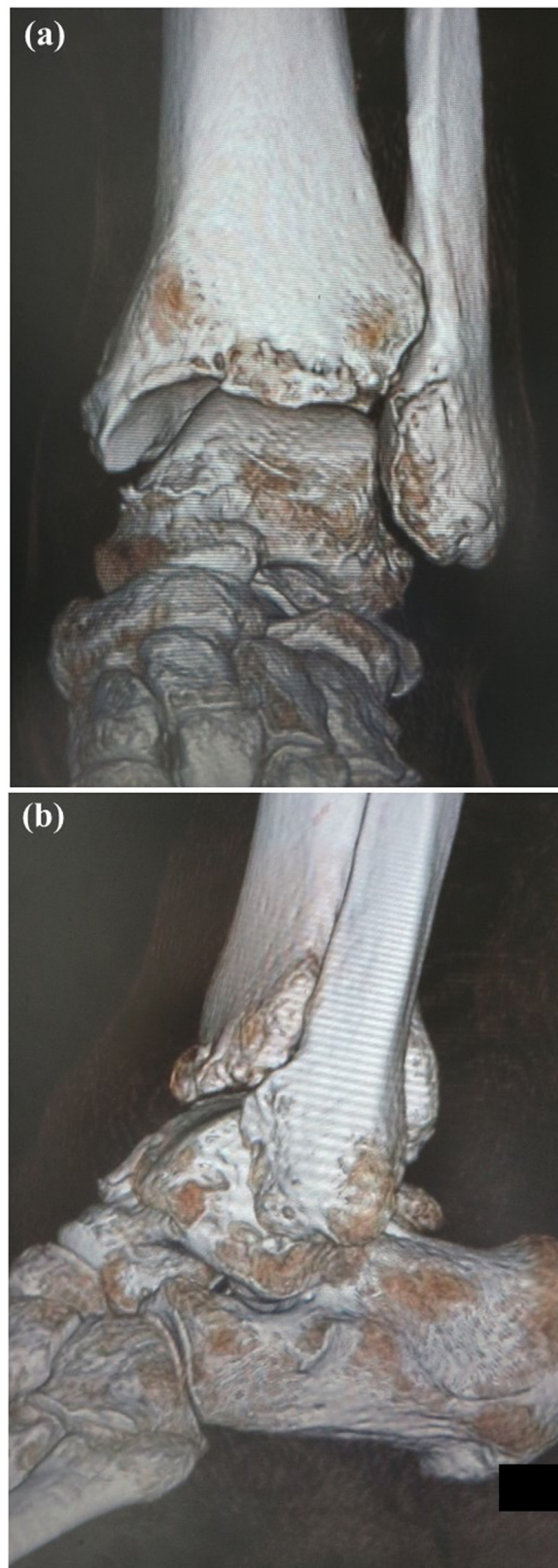
Approximately 10 years before presentation, she developed gradually worsening left ankle pain; 8 years prior, she noticed gradually increasing swelling in the left lateral pre-malleolar area. She received conservative treatment at a local clinic, involving repeated aspirations to reduce the size of the bursa. Aspiration was effective for only a few days, and she was referred to us for surgery. She visited our hospital on foot, not via ambulance.

At presentation, she complained of right ankle and lateral pre-malleolar pain, irritation and discomfort, and abnormal sensation around the lateral malleolus suggesting circulatory disturbance. Physical examination revealed a fluctuant mass over the anterolateral aspect of the right ankle (Fig. 1a, b) with no local heat or redness. Tenderness was localized around the anterior talofibular ligament (ATFL), and the anterior drawer test evoked instability and apprehension. Clear yellowish fluid was aspirated from the mass and culture yielded no growth. Therefore, although septic or non-septic bursitis was considered as differentials in this case, we ruled out septic bursitis and she was diagnosed as having non-septic bursitis. Plain standing radiographs revealed osteoarthritic change in the left ankle, varus talar tilt in anteroposterior view (Fig. 2a), and a round soft tissue shadow corresponding to the lesion in the anterolateral aspect of the ankle in lateral view (Fig. 2b). Three-dimensional computed tomography showed osteophyte of the anterolateral aspect of the tibial plafond in anteroposterior view (Fig. 3a) and the anterior aspect of the distal fibula in lateral view (Fig. 3b). Magnetic resonance imaging (MRI) of the left



**Fig. 2.** Standing radiographs showing (a) osteoarthritic change in the left ankle in anteroposterior view and (b) a round soft tissue shadow corresponding to the mass in the anterolateral aspect of the ankle in lateral view.

ankle revealed a homogeneous cystic lesion continuous with the anterolateral capsule of the ankle joint with high intensity on T2-weighting in the axial plane (Fig. 4a) and T2-weighting and short T1 inversion recovery in the sagittal plane (Fig. 4b), indicating fluid collection in the lateral pre-malleolar bursa measuring  $21 \times 26 \times 17$  mm. Our diagnosis was ankle osteoarthritis with lateral pre-malleolar bursitis caused by the check valve mechanism of chronic ankle instability after old ankle sprain. We selected ankle arthroscopic arthrodesis to stop the communication between the bursa and ankle joint, and because endoscopic techniques allow quicker recovery and reduced morbidity versus open procedure.



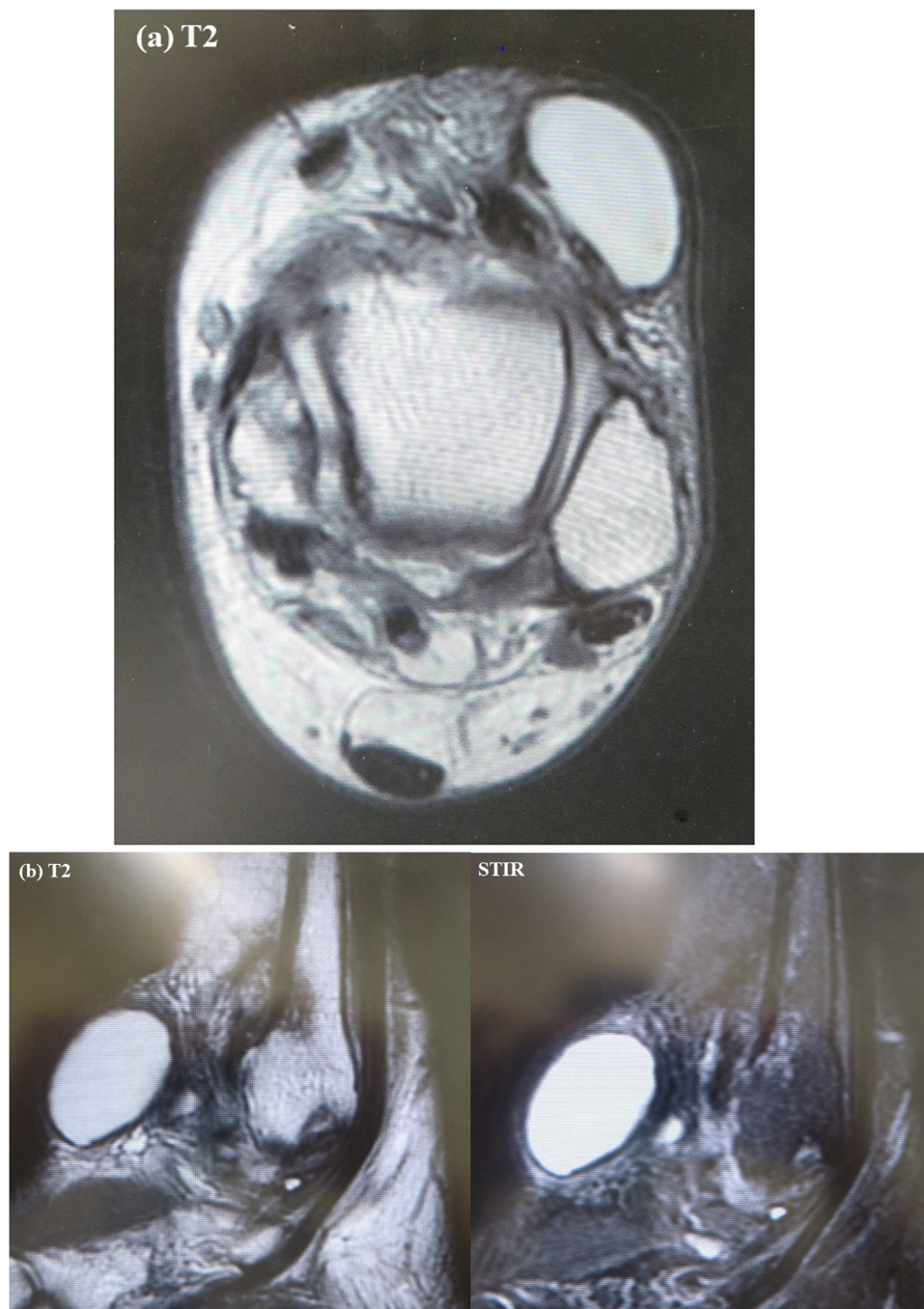
**Fig. 3.** Three-dimensional computed tomography images revealing osteophyte of (a) the anterolateral aspect of the left tibial plafond in anteroposterior view and (b) the anterior aspect of the distal fibula in lateral view.

Preoperative Japanese Society for Surgery of the Foot (JSSF) score was 48/100 points (pain 20/40, function 23/50, alignment 5/10).

The surgery was performed by I.T. who graduated from the medical university in 2004 and was a foot and ankle surgeon.

A standard 2-portal technique was used with the anterolateral portal over the lateral premalleolar bursa; a clear yellowish fluid was discharged. A 2.7-mm, 30° arthroscope was introduced into the ankle for aggressive debridement with a shaver. Sclerotic



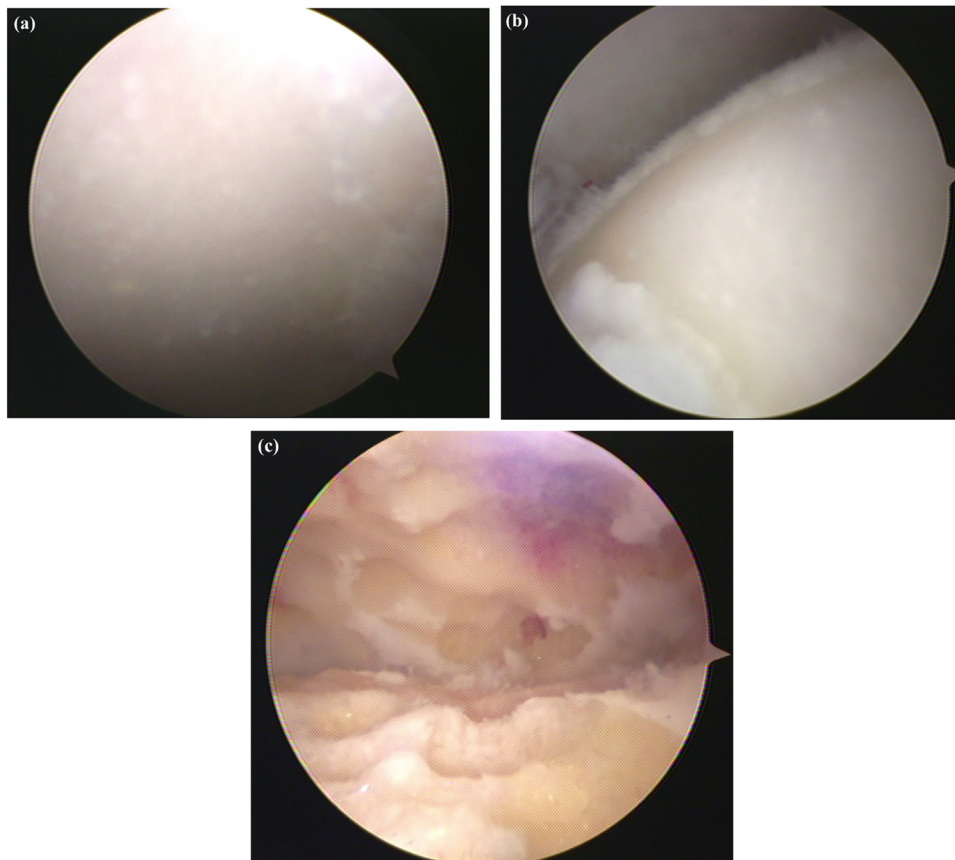


**Fig. 4.** Magnetic resonance images of the left ankle. (a) Axial image showing fluid collection in the lateral premalleolar bursa on T1 imaging. (b) Sagittal image also showing fluid collection in the lateral premalleolar bursa on T2 and short T1 inversion recovery imaging.

subchondral bone was exposed at the medial aspect of the tibial plafond (Fig. 5a) and the medial talar shoulder (Fig. 5b). The sclerotic subchondral bone was curetted down to subchondral bleeding bone using a high-speed bur (Fig. 5c). The ankle was positioned in neutral, 0–5° hindfoot valgus, and external rotation equal to the contralateral side. Proper bony apposition was confirmed using direct visualization and image intensification fluoroscopy. Arthrodesis was stabilized with three 6.0-mm, cannulated, cancellous compression screws placed percutaneously through the medial malleolus, inserted over guidewires under fluoroscopic guidance. Screw 1 was placed from the medial tibia into the central talus, screw 2 from the medial tibia to the talar neck, and screw 3 from the medial tibia to the posterior talus. The wound

was closed with absorbable sutures at the subcutaneous level and nylon at the epidermis level. A non-weightbearing below-knee cast was applied for 2 weeks to immobilize the foot and ankle, followed by weightbearing for another 2 weeks. After the cast was removed, an ankle brace was applied. A mobilization protocol was started with progressive passive and active range of motion exercises.

Bony union of the ankle was achieved 8 weeks postoperatively. At 1.5 years postoperatively, she reported no pain during daily activities; radiographs showed complete tibio-talar union with improved varus talar tilt with weightbearing in the anteroposterior (Fig. 6a) and lateral views (Fig. 6b). JSSF score improved to 92/100 points (pain 40/40, function 42/50, alignment 10/10). Her



**Fig. 5.** Arthroscopic findings showing the exposed subchondral sclerotic bone at (a) the medial aspect of the tibial plafond and (b) the medial talar shoulder. (c) The subchondral sclerotic bone is denuded, down to subchondral bleeding bone.

results were satisfactory with no recurrence of lateral premalleolar bursitis (Fig. 7).

### 3. Discussion

We performed arthroscopic ankle arthrodesis for a 71-year-old woman with ankle osteoarthritis and recalcitrant lateral premalleolar bursitis caused by check valve mechanism of chronic ankle instability after old ankle sprain. There is only one report on bursitis around the ankle caused by ankle instability [7], and no studies have described arthroscopic arthrodesis for ankle osteoarthritis with bursitis.

A case of recurrent lateral premalleolar bursitis recalcitrant to conservative treatment was reported by Naito et al., which was a communicating bursa associated with ankle instability [7]. Although they did not perform ankle arthrodesis, that pathology seemed consistent with our case. MRI and physical stress examination revealed communication between the lateral premalleolar bursa and articular cavity in ankle instability due to ATFL tear. In the present case, ankle instability with ATFL tear is thought to have pushed articular fluid into the bursa, which did not return to the intraarticular space because of the check valve of the bursitis.

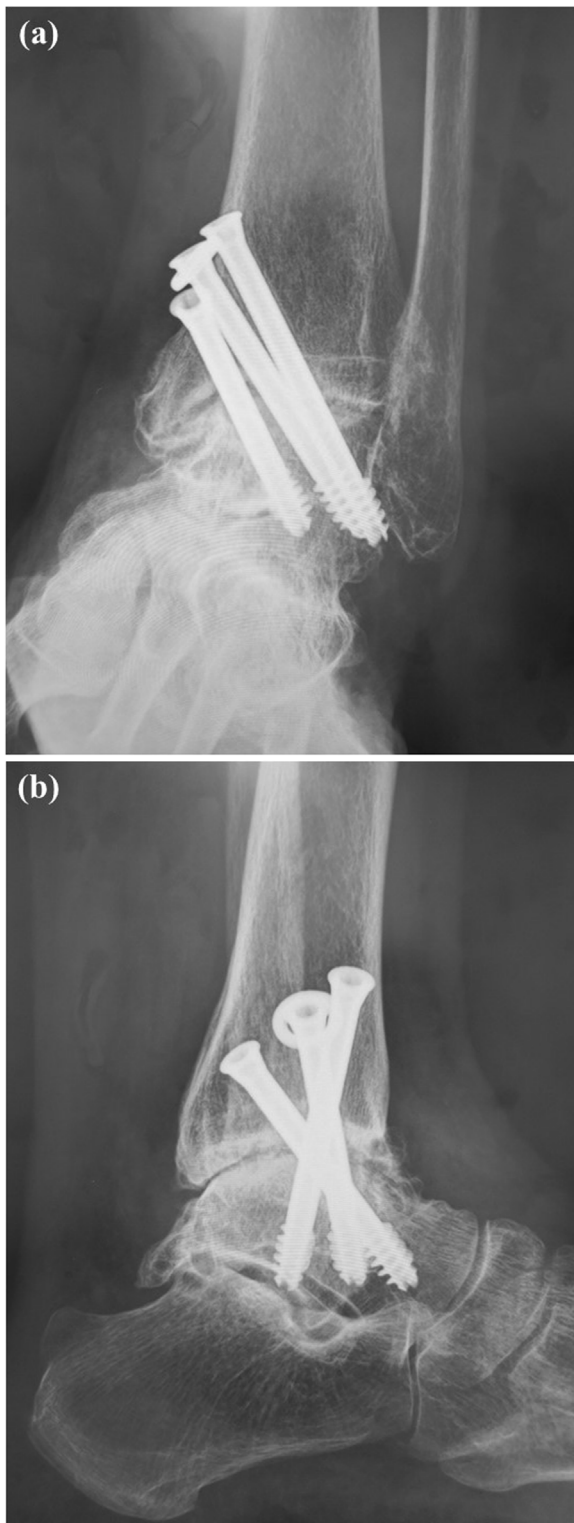
Most cases of bursitis are managed conservatively with local protection against stimuli, aspiration, compressive wrap, and corticosteroid injection [2,5]. Failed conservative treatment could lead to surgical intervention [2,3]. Our patient had an 8-year history of lateral premalleolar bursitis, so conservative treatment seemed ineffective. Ageing and arterial insufficiency cause thinning of the soft tissue around the ankle and decreased circulatory dynamics in the leg [4]. These factors likely contributed to this recalcitrant bur-

sitis and the check valve mechanism of chronic ankle instability. Therefore, we selected surgical treatment.

One surgical option for bursitis is open resection, which was found to cause poor wound healing in 27% (10/37 cases) and recurrence in 22% (22/37 cases) when 37 cases of resection of bursa were reviewed respectively [10]. In another study on open excision of malleolar bursitis by Choi et al., associated complications occurred, including poor wound healing and skin necrosis in 1 of 11 patients, and superficial peroneal nerve injury in 2 of 11 patients [5]. We did not select open resection of bursitis, considering the poor wound healing and high recurrence rate. If simple suturing is not possible due to soft tissue defect, skin graft, pedicled tissue transfer, or free tissue transfer can cover exposed bone [4,11–13]. We avoided these procedures because of their invasiveness.

Studies have reported treatments for bursitis without recurrence including endoscopic bursectomy and sclerotherapy [14]. Our report involved ankle osteoarthritis with lateral premalleolar bursitis caused by the check valve mechanism of chronic ankle instability. Treating the ankle osteoarthritis in addition to the lateral malleolar bursitis and stopping the communication between the bursitis and ankle joint was vital. Therefore, we opted for arthroscopic arthrodesis because it is less invasive than the open procedure and the lateral premalleolar bursitis was located over the anterolateral portal.

This report has some limitations. First is the short follow-up duration. There was no recurrence of lateral premalleolar bursitis at follow-up 1.5 years after surgery. Further follow-up is necessary because of the high recurrence of premalleolar bursitis. Second, we did not perform ankle arthrography. In retrospect, ankle arthrography might have helped to confirm communication between the bursitis and the ankle joint using kinematics. Third, in addition to



**Fig. 6.** Postoperative standing radiographs 1.5 years after surgery showing complete bony union between the tibia and the talus with improved varus talar tilt in (a) antero-posterior view and (b) lateral view.



**Fig. 7.** Postoperative photograph 1.5 years after surgery showing no recurrence of the lateral premalleolar bursitis.

ankle instability, other factors might have exacerbated the bursitis in this case because adventitious bursae develop following repetitive compression and excessive friction, and chronic stimulation from footwear [15].

#### 4. Conclusion

We encountered a rare case of ankle osteoarthritis with recalcitrant lateral premalleolar bursitis caused by the check valve mechanism of chronic ankle instability after old ankle sprain. Treatment was instituted with arthroscopic arthrodesis, suggesting the importance of stopping the communication between the bursa and ankle joint.

#### Declaration of Competing Interest

The authors report no declarations of interest.

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#### Ethical approval

A clinical case report is exempt from ethical approval in our institution.

#### Consent

A written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Author contribution

IT was responsible for this study, and managed this study. IT performed surgery. Dr. KS supervised this study. All authors read and approved the final manuscript.

#### Registration of research studies

Not applicable.



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