Case Report

Closed Posteromedial Dislocation of the Ankle without Fracture: A Case Report

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Ankle dislocation without fracture is an extremely rare injury. Open dislocations were more common in the previous reports. The authors report a case of closed posteromedial dislocation of the ankle in a 24-year-old basketball player. Closed reduction was performed. The ankle was initially immobilized with the short leg cast before using the functional brace. Details of the rehabilitation program were described. Follow up examination at one-year demonstrated good clinical and functional results confirmed with the inversion stress radiographs. The patient can participate in sports activities at the same level as pre-injury.

Keywords: *Ankle dislocation, Sports injuries, Reduction, Treatment outcome*

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Case Report

A 24-year-old man sustained an ankle injury while playing basketball. He suddenly felt pain in his left ankle while he was landing from a jump. As for the accident, his left heel was on another player's foot, and the ankle was in plantar flexion and inversion position. He had no history of ankle injuries or dislocation of the other joints.

At the emergency room, he presented with marked deformity of the left ankle as shown in the Fig. 1. The foot was medially displaced, and the lateral malleolus was prominent beneath the thin soft tissue. Dorsal pedal pulse was present, and the patient reported paresthesia at the 1st web space. Examination of other joints revealed no abnormal ligament laxity. Radiographic imaging of the left ankle indicated a posteromedial ankle dislocation without associated fracture or widening of tibiofibular syndesmosis (Fig. 2).

Closed reduction of the ankle was performed urgently with the patient under general anesthesia because of impending skin necrosis. The patient lay in the supine position. The assistant held the leg to

Fig. 1 Deformity of the left ankle after injury showing the foot displaces medially. Note: the prominence of the lateral malleolus

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counter traction, and the knee was in flexion position to relax the triceps surae muscle. Longitudinal traction force was applied while the ankle was in plantar flexion position. After reduction, joint alignment was checked with the image intensifier. The inversion stress view demonstrates a severe injury of the lateral ligamentous complex (Fig. 3), whereas the medial ligamentous complex was intact in the eversion stress test. Sensation at the 1st web space returned to normal the next day after reduction.

The ankle was immobilized with the short leg cast in neutral position. The patient was advised to elevate his leg, perform isometric exercise of the calf muscles, and ambulate in non-weight bearing manner for 3 weeks.

After cast removal, the ankle was protected with the functional brace (Air Cast) while progressive weight bearing was encouraged until full weight bearing can be achieved. The patient began both passive and active range of motion exercises within his pain tolerance. He was instructed to do strengthening exercises of the muscles around the ankle especially peroneal muscles, and progressed from isometric exercise to isotonic exercise with different resistances (self-resistance, rubber tube, weights, and bodyweight exercise). Ice compression was used after exercise activities.

The functional brace was used until 8 weeks after the injury, then the ankle orthosis was used to support during daily activities. Proprioceptive and balance training was subsequently performed using the wobble board. Three months after the injury, the patient began running activity without pain. He returned to play tennis and basketball 5 months after the injury.

Follow-up examination at one-year post injury, the patient had full range of motion of the injured ankle compared to the contralateral side. Anterior drawer test indicated mild laxity of the left ankle. Radiographs showed a small calcification in the area of the lateral collateral ligamentous complex without signs of osteoarthritis. The inversion stress radiographs revealed a talar tilt of 4 degrees on the injured side compared with 2 degrees of the opposite side. (Fig. 4) He frequently plays tennis and basketball at the same level as before injury without pain or instability.

Discussion

Although ankle sprain and malleolar fractures are common ankle injuries, ankle dislocation without associated fracture is extremely rare. As for anatomical

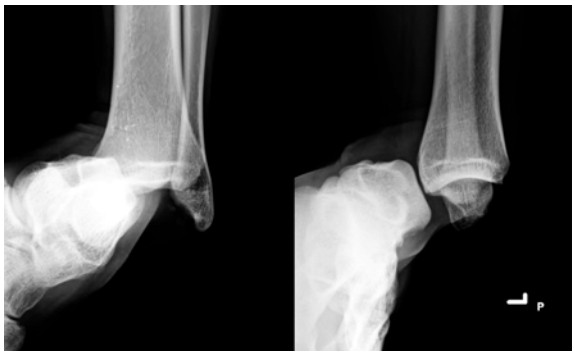
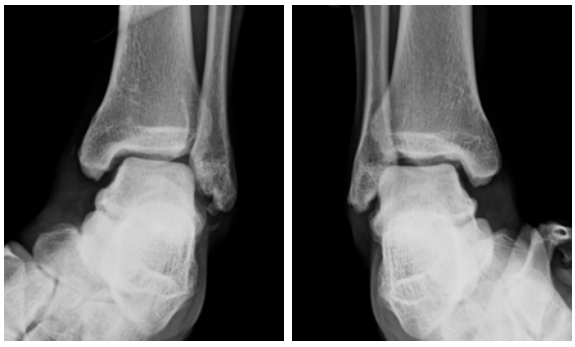


Fig. 2 Anteroposterior and lateral radiographs demonstrate a posteromedial ankle dislocation without fracture

Fig. 3 Inversion stress test demonstrates a severe lateral instability of the ankle after reduction



A **B**

Fig. 4 Inversion stress radiograph of the injured ankle (A) compare with the normal contralateral side (B) at 1-year follow-up. Note a small calcification in the area of the lateral ligamentous complex of the injured ankle

characteristic, tibiotalar joint has strong structural supports in medial and lateral sides. The rhomboidal shape of the superior articular surface of the talus, wider in anterior part, makes the tibiotalar articulation more stable in dorsiflexion position. Whereas the ankle joint is relatively unstable in maximal plantar flexion position because the narrowest part of talus lies in the ankle mortise. Therefore, plantar flexion is the main component in combined movements causing ankle dislocation.

Posteromedial dislocation is the most common type of ankle dislocation classified by the direction of displacement[1]. The mechanism is a combination of plantar flexion, inversion, and axial loading that is also described in the presented case[2]. Open dislocation is more common than closed injury due to the characteristic of thin soft tissue covering the bony prominence, and severity of the injury[2]. Some associated neurovascular injuries were reported such as dorsal pedal artery[2], superficial peroneal nerve[2,3] and deep peroneal nerve[4]. In the presented case, the patient described paresthesia in the distribution of the deep peroneal nerve that resolved after reduction. Predisposing factors of this type of injury are internal malleolar hypoplasia, ligamentous laxity, weakness of the peroneal muscles, and previous ankle sprains. However, this patient does not have these predisposing conditions.

Reduction of the ankle should be done to the patient under general anesthesia for adequate muscle relaxation. Positions of the knee and ankle are also mentioned: the knee was positioned in flexion position, and the ankle was held in plantar flexion position to relax the triceps surae muscle while the traction force was applied. The treatment options for ankle dislocation are controversial. Operative method is a preferred treatment in open injury that can perform both joint debridement and repair of the disrupted ligaments[5-8]. Whereas closed dislocations are usually treated by non-operative method with satisfactory results[5-10].

Non-operative treatment after reduction starts with cast immobilization in different durations that vary from 4-9 weeks in the previous reports[5-9]. The duration of cast immobilization was decreased to 3 weeks in the presented case. The ankle was immobilized with the removable functional brace (Air Cast) after cast removal. The brace provides stability to the ankle and compression force that assists in decreasing effusion[11]. The patient can remove the brace to perform a range of motion and strengthening exercises. Controlled joint motions promote ligament healing and stimulate collagen bundle orientation[12].

Strengthening exercise should be done as early as possible within pain tolerance. Isometric exercise can be used in the early phase to prevent muscle atrophy. Isotonic exercise with various resistance should be done later and gradually progress. Musculotendionous complex around the ankle especially peroneal muscles will provide dynamic stability and prevent reinjury to the ankle.

Proprioceptive training is also important before the patient goes through the functional recovery phase and should be progressed from bi-directional to multi-directional movements. The functional drills also progress from running, jumping, pivoting, and specific sports training.

Conclusion

Ankle dislocation without fracture is a rare injury. Non-operative treatment is preferred in closed injury. After reduction and progressive rehabilitation, good results can be achieved. The treatment protocol can be adapted from the treatment guideline for grade III ankle sprains.

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ข้อเท้าเคลื่อนด้าน posteromedial โดยไม่มีกระดูกหักชนิดไม่มีบาดแผลเปิด: รายงานผู้ป่วย 1 ราย

พิสิฏฐ์ เลิศวานิช, พลสันต์ สันธนพิพัฒน์กุล, ทศศาสตร์ หาญรุ่งโรจน์

ภาวะข้อเท้าเคลื่อนโดยไม่มีกระดูกหักเป็นลักษณะการบาดเจ็บที่พบได้น้อยมากและส่วนใหญ่ที่มีรายงานมักเป็นการบาดเจ็บชนิดที่มีแผลเปิด ผู้แต่งรายงานการรักษาภาวะข้อเท้าเคลื่อนด้าน posteromedial ซึ่งไม่มีแผลเปิดในผู้ป่วยอายุ 24 ปี ผู้ป่วยได้รับการจัดข้อเท้าให้เข้าที่และดามด้วยเฝือก ก่อนจะเปลี่ยนเป็น functional brace ในเวลาต่อมา และบรรยายถึงกระบวนการฟื้นฟูสภาพของผู้ป่วยโดยละเอียด จากการประเมินผลการรักษาภายหลังการบาดเจ็บที่เวลา 1 ปี ให้ผลการรักษาที่ดี จากการยืนยันด้วยภาพเอกซเรย์ข้อเท้าในท่า inversion stress ผู้ป่วยสามารถกลับไปเล่นกีฬาได้ในระดับเดียวกับก่อนการบาดเจ็บ