

## CASE REPORT

# Extremely rare combination of open dislocation of the ankle with superior type anterior hip dislocation without bone fracture: A case report

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## Abstract

Open dislocation of the ankle without associated fracture is extremely rare. Epstein's superior type of hip dislocation is the rarest type of hip dislocation. We reported a case of 50 years Nepalese gentleman who presented with a combination of these two rare orthopedic emergencies with the newly reported mechanism of injury by a garden tractor. Early extensive debridement of the wound with broad spectrum antibiotics coverage, reduction with delta frame external fixator, and postoperative rehabilitation helps in saving limb along with its function.

## KEYWORDS

ankle, case report, open dislocation, superior dislocation of the hip

## 1 | BACKGROUND

The ankle is a complex hinge joint with strong ligamentous support with comparatively weaker bones so open ankle dislocation without associated fracture is extremely rare.<sup>1</sup> It was reported first time in 1913 AD.<sup>2</sup> In reported few cases, injury was with very high force. Most common cause being road traffic accident followed by sports injuries. So, open dislocation without associated fractures may occur with unexplained complex mechanism.<sup>3</sup> Anterior dislocation of the hip is rarer in comparison to posterior dislocation. Epstein's superior types of anterior dislocation are even rarer.<sup>4</sup> Combination of them without any associated fracture is exceptional. Here, we reported a case of open dislocation of the ankle with a superior type of anterior dislocation of the hip without any associated fracture.

## 2 | CASE REPORT

Fifty years Nepalese farmer presented to our center with an alleged history of crushing and twisting injury of his left lower limb by his own tractor while he was working on his field. The patient was complaining of pain and was unable to bear weight. There was no history of loss of consciousness, headache, vomiting, and bleeding from the ear, nose, and throat. There was no history of comorbidities. He was a smoker but non-alcoholic.

The patient was presented to our center 14h after the incident after being managed in the local center where saline soaked gauzes were used to cover the wound and hemostasis was secured by compression bandages without application of tourniquet. He was also given intramuscular 0.5 ml of tetanus toxoid, intravenous ketorolac 30 mg, and cefuroxime 750 mg and was referred to our center. At

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the time of presentation, his airway was intact, he was breathing spontaneously and was stable hemodynamically; his Glasgow coma scale (GCS) was E4V5M6. There were no visible external injuries in the head, neck, chest, back, abdomen, bilateral upper limbs, and right lower limb. There was no tenderness in the head, neck, chest, compression, and pelvic compression. Cervical, thoracic, and lumbar spine tenderness were absent.

On examination of the left lower limb, there was an open wound size of approximately 12 cm × 5 cm at the left ankle with grossly exposed, dislocated, and protruding both tibia and fibula over the lateral aspects of the ankle to the external environment with gross deformity as shown in Figure 1. The attitude of the left lower limb was shortened with hip and knee slightly flexed and his hip was tender with palpable femoral head anteriorly and superiorly. His left lower limb popliteal and posterior tibial artery were palpable with truncated visible pulsations likely of the anterior tibial artery without active bleeding. Capillary

refill time was less than 3 s. Dorsalis pedis could not be palpated, and the sensation was intact but due to severe pain, his motor examination could not be performed. There was no repairable vascular injury identified.

Non-contrast head computed tomography (NCCT), chest X-ray, X-ray cervical, dorsal, and lumbosacral images were unremarkable. X-ray left ankle anteroposterior (AP) and lateral view images showed anterolateral dislocation of the ankle joint without any fracture as shown in Figure 2. X-ray left hip AP and lateral view showed superior type anterior dislocation which was not associated with fracture as shown in CT scan images Figure 3A,B. Arterial Doppler ultrasonography of the lower limb showed normal flow in the tibialis anterior and dorsalis pedis arteries and he was planned for emergency surgery.

Intraoperatively under general anesthesia, close reduction of the anterior dislocation of the hip was done by axial traction and internal rotation. Open dislocation of the ankle was managed based on the principle of management



**FIGURE 1** Preoperative photograph of left ankle showing open dislocation of left ankle with protruding tibia and fibula anterolateral through the approximately 12 cm × 5 cm wound



**FIGURE 2** (A) X-ray left ankle anteroposterior view showing medial dislocation breaching soft tissue and anterior dislocation of tibia and fibula without any associated fractures. (B) X-ray left ankle lateral view showing complete medial dislocation breaching soft tissue and anterior dislocation of tibia and fibula without any associated fractures

of open fractures. Extensive debridement and washing with 15 L of normal saline were done. Reduction of the dislocated joint was done by delta frame external fixator as shown in Figure 4A along with that torn ligament were not repaired. Skin closure was possible and postoperative skin necrosis did not occur. Postoperatively, he was admitted to the orthopedic high dependency unit for monitoring and was transfused with two units of packed RBCs to correct low hematocrit. Postoperatively, he was managed with intravenous cefuroxime 750 mg twice daily for 14 days, intravenous gentamycin 150 mg three times a day for 7 days, intravenous metronidazole 500 mg 3 times daily for 7 days, analgesics, alternate day dressing, and skin traction left lower limb. His postoperative period was uneventful.

Limb knee range of motion and crutch mobilization was started on the 12th postoperative day. He was discharged on the 12th postoperative day after suture removal with an external fixator in situ and advised to follow-up after 6 weeks. The external fixator was removed at 6 weeks and ankle range of motion and physiotherapy were increased. Physiotherapy was continued and the patient had a good functional recovery in 3 months and started working in the field. He could do squat and his knee, hip, along with ankle range of motion were full with restricted dorsiflexion of the ankle. There was no evidence

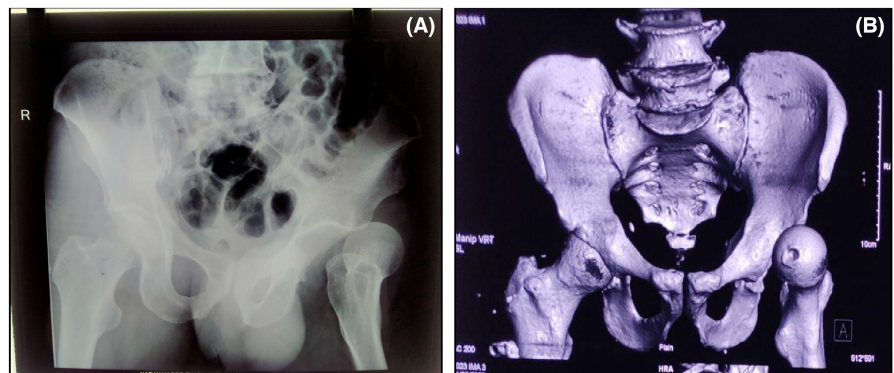
of avascular necrosis in the X-ray of the hip and had no complaints of pain. Ankle joint alignment was normal as shown in Figure 5A.

### 3 | DISCUSSION AND CONCLUSION

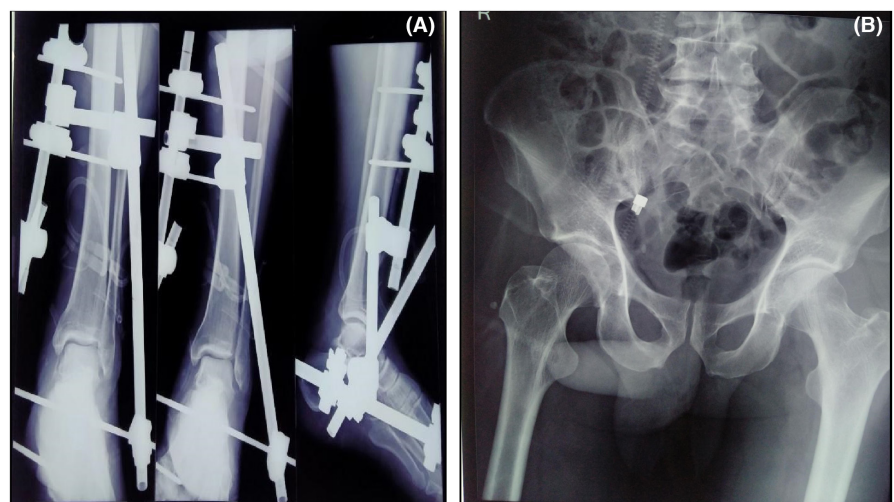
Pure ankle dislocation is an extremely rare ankle injury with a reported incidence of 0.065% of total ankle injuries.<sup>5</sup> In this case, there was pure open ankle dislocation without any associated fracture which is specifically rare. Prevalence and incidence of open ankle dislocation without associated fracture are not well established due to rarity. Anterior dislocation of the hip is rarer in comparison with posterior contributing 10% of total hip dislocation. It is even exceptional to have Epstein's superior type of anterior hip dislocation. This case is a combination of these two rare orthopedic emergencies.<sup>4,6</sup>

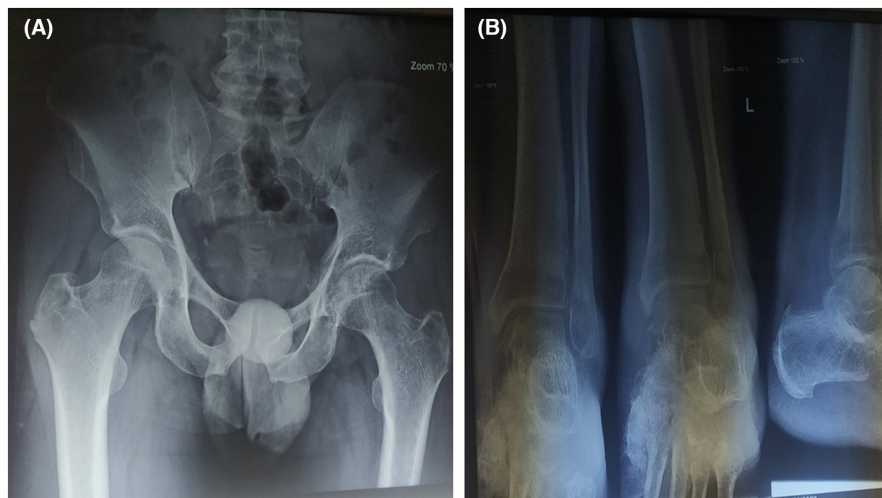
The most common cause and mechanism involving open ankle dislocation are sports injuries followed by road traffic accidents.<sup>7</sup> There was a newly reported mechanism that is crushing and twisting at the left ankle possibly by valgus and extension stress force by a farmer's garden tractor followed by hyperextension

**FIGURE 3** (A) X-ray pelvis with B/L hip showing the anterior superior type of hip dislocation without any associated fractures. (B) 3D reconstruction of CT scan image showing the anterior superior type of hip dislocation without any associated fractures



**FIGURE 4** (A) Post reduction left ankle X-ray of anteroposterior, lateral, and mortise view showing anatomical reduction of left ankle joint with delta frame external fixator in situ. (B) Postreduction X-ray pelvis with bilateral hips showing anatomically reduced left hip joint





**FIGURE 5** (A) X-ray pelvis with bilateral hips, 3 months post reduction showing no signs of avascular necrosis of femoral head. (B) X-ray left ankle AP, lateral, and mortise view, 3 months postsurgery showing the normal alignment of the ankle

of the left lower limb at the hip joint in this case. Our team proposed possible mechanism of injury as it was due to axial loading of his left lower limb after trapping at fore end of garden tractor in ankle plantarflexion and eversion followed by hyperextension of left lower limb. But multiple factors may be responsible for it because of unique end result of injury.

Diagnosis is straightforward and can be confirmed by plain radiography. Associated vascular injury can be ruled out by arteriovenous doppler. In case of anterior dislocation of the hip plain, CT scan can rule out acetabular fracture and femoral head impaction.<sup>8</sup>

Both open dislocation of the ankle and anterior dislocation of the hip are orthopedic emergencies. Open dislocation of the ankle needs to be managed as early as possible to prevent limb loss and life-threatening infections.<sup>9</sup> Due to the rarity of open dislocation of the ankle its management protocol is not well established. Early extensive debridement is required based on the principle of management of open fracture to prevent infection. Based on that we managed this case by extensive debridement and washing of wounds to prevent infection.<sup>7</sup> There was a large open wound with grossly exposed bones happened at farmer's field with a high risk of infection, accompanied by extensive soft tissue swelling; so, we decided to do reduction by delta frame external fixator in comparison to the other reported treatment option like reduction followed by casting.<sup>7,8,10</sup> Subsequently patients improved without infection postoperatively. Due to insufficient study, the outcome of ligament repair is controversial and the reported reports also support the outcome not affected by ligament repair for which reason we did not perform ligament repair. It has been reported that people with ligament repair return early to sports activities, but it needs to be established based on further

study.<sup>5,10</sup> Subsequently, in our case, patient improved without infection of the wound. A superior type of anterior dislocation of the hip is rare though there are controversies regarding treatment and complications. We managed with closed reduction followed by immobilization by skin traction. Despite the delay of more than 12 h reduction of hip avascular necrosis did not occur in our case.<sup>11,12</sup> Though MRI can be best modality for diagnosis of avascular necrosis affordability and availability limits its use in our setting.<sup>13</sup> We chose the period of immobilization as 6 weeks by external fixator, same as cases because of swelling but we started crutch mobilization after the 12th postoperative day.<sup>14</sup> Physiotherapy is an important modality for the treatment and good functional outcomes.

Open medial dislocation of the ankle without associated fracture of bone occurred in background of farmer's field is a rare limb and life-threatening orthopedic emergency. Early extensive debridement of wound, broad-spectrum antibiotics, reduction with delta frame external fixator, and postoperative rehabilitation helps in saving limb along with its function, but the management of this condition needs to be established with well-designed study despite rarity.

#### **AUTHOR CONTRIBUTIONS**

Dr. Krishna Timilsina had taken history and performed physical examinations. Dr. Shiris Adhikari, Dr. Krishna Timilsina, and Dr. Prawesh Singh Bhandary were involved in the management of the patient. Dr. Padam Raj Joshi and Dr. Shivaji Karki were involved in writing the manuscript. Dr. Suresh Uprety, Dr. Prawesh Singh Bhandari, Dr. Sirish Adhikari, and Dr. Krishna Timilsina edited and revised the manuscript. All authors have read and approved the final version of the manuscript.

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None.

## CONFLICT OF INTERESTS

None.

## DATA AVAILABILITY STATEMENT

All the data generated during this study can be accessed through direct communication with the corresponding author and the agreement of all research team members.

## CONSENT

A written, informed consent was obtained from patient to publish this report in accordance with the journal's patient consent policy.

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