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## An isolated cuboid dislocation. A case report



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## ABSTRACT

**INTRODUCTION:** Isolated cuboid dislocations are rare injuries Jacobson (1990). It is clinically significant and important in surgical education, as it is an injury and a source of lateral foot pain that can be misdiagnosed at the time of initial presentation and may be difficult to identify clinically or with imaging Drummond and Hastings (1969).

**PRESENTATION OF CASE:** We present a case report in a 33 year old rugby player, who was injured during a match after a tackle. The patient had ongoing concerns that he was not recovering following initial discharge, as he was unable to weight bear since his initial presentation to the Emergency Department (E.D.), and he had ongoing lateral foot pain.

**DISCUSSION:** Important clinical findings include lateral foot pain, a palpable gap at the cuboid level and difficulty weight-bearing. Closed reduction is usually difficult as it can be blocked mechanically by the extensor digitorum brevis muscle or peroneus longus tendon Dobbs et al. (1969). Initial X-Rays may be inconclusive with this presentation. CT scanning is indicated if suspicion for pathology is high. Open reduction and internal fixation with Kirschner wires are usually necessary for isolated cuboid dislocations.

**CONCLUSION:** Our take home message from this case report is that cuboid dislocations are rare injuries and are important to be aware of in reviewing X-rays in the E.D. Particularly in patients with inversion and plantar flexion type injuries to their foot and ankle joint, with an inability to weight bear and lateral midfoot pain following their injury.

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## 1. Introduction

Cuboid dislocations are rare injuries and are frequently overlooked and misdiagnosed on initial presentation [1]. It is a unique injury with only a few case reports in the surgical literature. [1–5]. The mechanism of injury is postulated to include a forced inversion and plantar flexion movement of the foot. We report our experience of a patient, who presented with an isolated inferomedial dislocation of the cuboid, who underwent open reduction and internal fixation in a busy Midlands Regional Trauma Centre in the Republic of Ireland. This work has been reported in line with the SCARE criteria [6].

## 2. Case report

## 2.1. Patient information

A 33 year old carpenter suffered a twisting injury to his left foot while playing rugby. He was a non-smoker, with a BMI of 26, with

no past medical or surgical history and was not taking any regular medications.

He was attempting to tackle an opposition player who subsequently landed with force on his planted foot. The mechanism of injury was inversion and plantar flexion of the left foot. He immediately experienced severe pain on the lateral aspect of the left midfoot, and he was unable to weight bear after the injury. He was brought to the nearest E.D. of a Regional Hospital by ambulance and was subsequently discharged with an initial diagnosis of an ankle sprain. Rest and analgesia were advised.

Three days later he re-attended the E.D. due to ongoing pain and swelling of his left midfoot, and an inability to bear weight. His radiographs were re-examined and he was referred to our Trauma Unit for Orthopaedic evaluation.

## 2.2. Clinical findings

On examination there was significant swelling around the mid-foot and tenderness on the dorsolateral aspect of the foot with a palpable gap at the level of the cuboid bone.

## 2.3. Diagnostic assessment

Imaging (Fig. 1) revealed an inferomedial isolated cuboid displacement without concomitant fracture. A CT scan was performed

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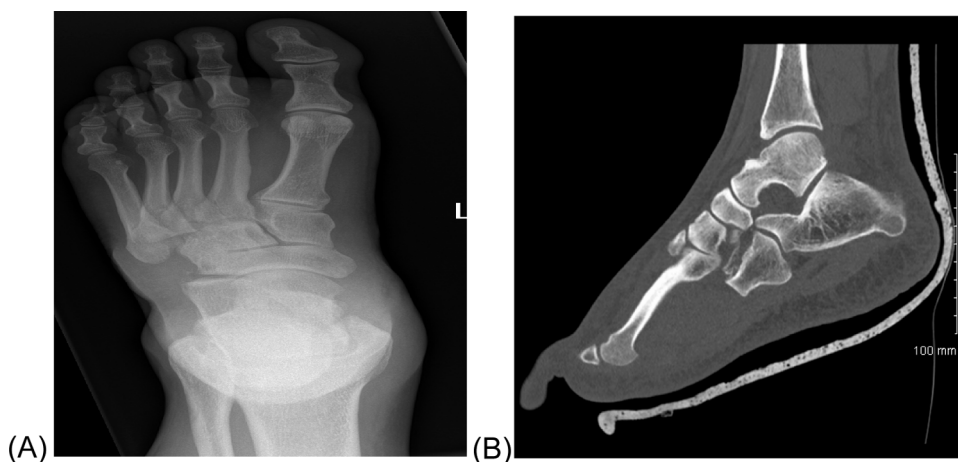


Fig. 1. X ray (A) and CT scan (B) showing an isolated inferomedial dislocation of the cuboid without fracture.

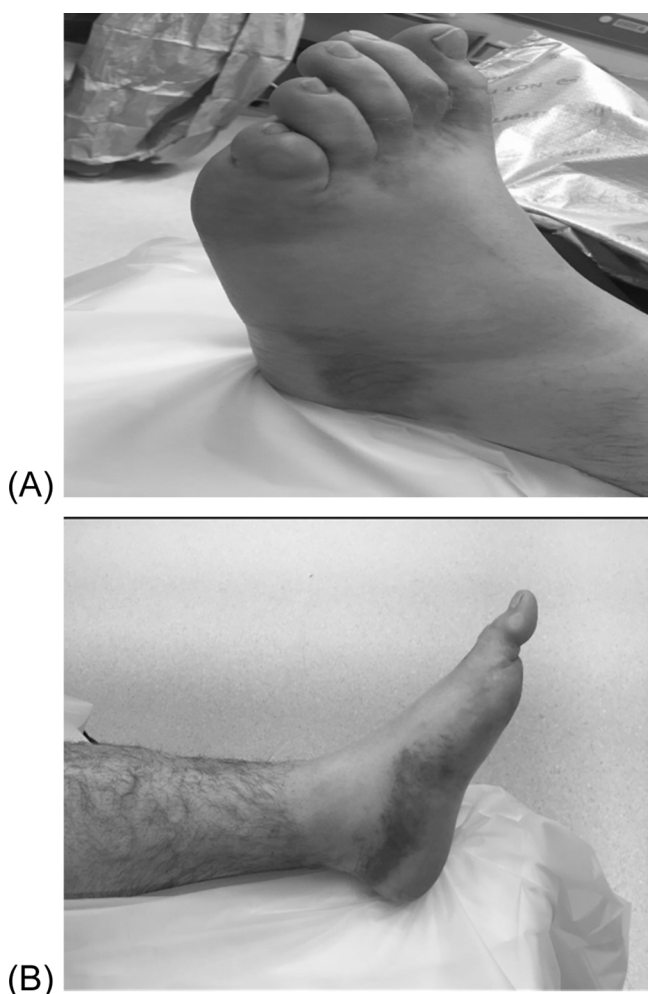


Fig. 2. Pre-operative images showing swelling and bruising of (A) lateral and (B) medial aspects of the injured left foot.

to provide pre-operative planning and to ensure there was no further pathology other than the isolate cuboid dislocation (Fig. 2).

#### 2.4. Therapeutic intervention

The patient was immobilised in a below knee cast, given analgesia and following imaging of his left foot, operative intervention

was offered to the patient. With the patients consent, he was taken to the operating theatre on the same day of admission.

In the operating theatre, under general anaesthesia, the patient was placed in a supine position. Attempted closed reduction failed. Subsequently, with the use of a tourniquet around his left thigh, an incision was made over the dorsolateral aspect of the foot at the calcaneocuboid joint. Extensor digitorum brevis interposition was noted and a Hohmann retractor was used to lever the cuboid in its anatomical position while reversing the mechanism of injury. Three 1.6 mm Kirschner-wires were used to preserve the anatomical position with *trans*-fixation to the cuneiform bone and the calcaneocuboid joint. The wires were buried under the skin. He was given three doses of intravenous antibiotics 8 h apart (cefuroxime 750 mg), one dose of subcutaneous venous thromboembolic prophylaxis and discharged the following day (Fig. 3).

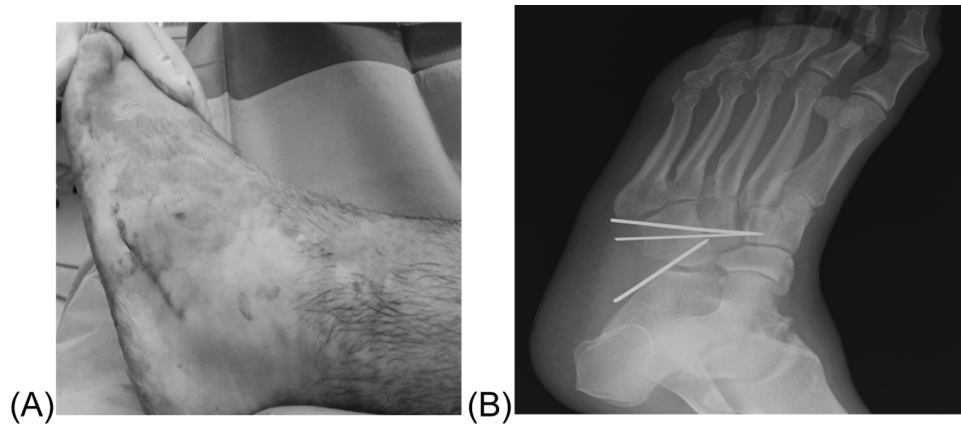
#### 2.5. Follow up and outcomes

The patient was advised to weight-bear as tolerated in a functional boot for six weeks. His wound was reviewed at 2 weeks at his first post-operative visit in the outpatient department. At six weeks postoperatively, the Kirschner wires were removed, under general anaesthesia, and the patient was encouraged to return to normal footwear (Fig. 4).

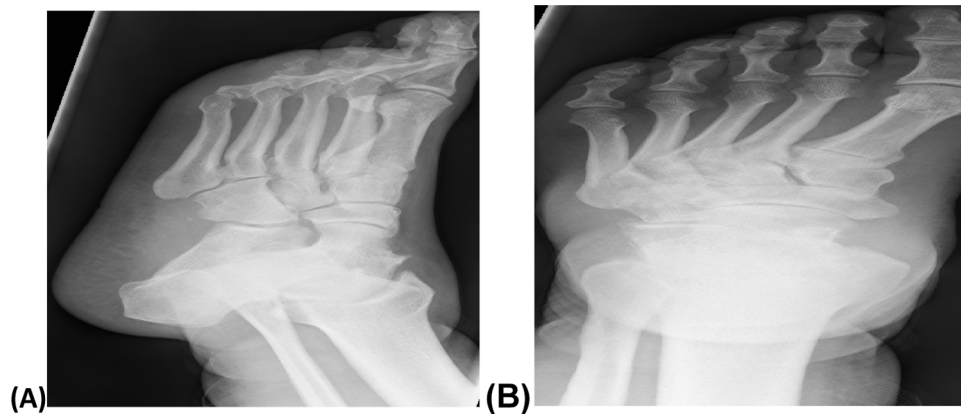
He had no further issues with his post-operative rehabilitation and had returned to full activity at 3 months and was pain free at 12 months post injury.

### 3. Discussion

The cuboid stabilises the lateral column of the foot. It is the only bone to articulate with both the midtarsal and tarsometatarsal joints. These articulations give the cuboid marked stability, which is reinforced by multiple ligamentous, tendinous, and soft tissue attachments, that include the dorsal and plantar ligaments, the peroneus longus tendon, and the plantar fascia. Therefore, dislocation or subluxation of the cuboid bone is uncommon. The cuboid is strongly supported by ligamentous attachments to its five adjacent bones and further stabilisation is given by tendon fibres of the peroneus tertius, the peroneus brevis, the flexor digitorum brevis muscle to the fifth toe, the tibialis posterior tendon, and the peroneus longus [7]. There have been only a few case reports of isolated cuboid dislocations or subluxations since the first reported case by Penhallow in 1937 [4]. This report was followed in 1969 by the study of Drummond and Hastings of an inferomedial cuboid dislocation [2]. They postulated that a force directed medially and



**Fig. 3.** (A) Lateral view of the lateral incision made over the calcaneocuboid joint and (B) Oblique view intraoperative fluoroscopy showing kirschner wire *trans*-fixation.



**Fig. 4.** (A) Radiographs following removal of kirschner wires and (B) 12 weeks postoperatively.

plantarly on the forefoot expels the cuboid in a plantar direction, tearing the interosseous ligaments.

Radiographic evaluation of the region is often difficult because of overlap and superimposition of the bones, and a cuboid dislocation can easily be overlooked, as it was initially in this case. AP, lateral and oblique radiographs should be obtained and CT may be necessary to further define the injury pattern and look for associated fractures. In the majority of case reports, the force is directed medially and plantarly on the outside of the foot.

Open reduction is usually required. Only one case of successful closed reduction has been reported [5]. Soft tissue interposition can often prevent reduction, and there are reports of the peroneus longus tendon specifically preventing reduction [3]. Kirschner wires were chosen for this young patient to minimise joint damage and stiffness.

The Kirschner wires were left in for 6 weeks to allow for adequate ligamentous healing, stability and to prevent arthrofibrosis of the inherently mobile lateral column.

Based on our experience and the published literature on the subject, cuboid dislocations can often be misdiagnosed as ankle sprains on initial presentation. We would urge physicians assessing these patients, to be aware that injuries to the midfoot can be difficult to diagnose on radiographs, and if there is a high index of suspicion, CT scanning and referral to an orthopaedic surgeon may be required for definitive diagnosis and treatment.

In conclusion, isolated cuboid dislocations are rare injuries and are important to be aware of in reviewing X-rays in Emergency Departments. Particularly, in patients with inversion and plantar flexion type injuries to their foot and ankle joint with lateral foot pain, a palpable gap and/or an inability to weight bear.

#### Conflicts of interest

There are no conflicts of interest.

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#### Ethical approval

N/A.

#### Consent

The patient has provided written consent and gives permission to publication. This has been documented in the paper/manuscript.

#### Author contribution

The corresponding author, Mr. Kevin Sheahan, performed the literature search writing of the case report, obtained patient consent, and collected the images for this case report. Mr Eoghan Pomeroy provided guidance in the literature search and writing of the case report. Mr. Thomas Bayer, as supervising Consultant, provided editing and guidance to writing of the case report and follow up of the patient.

## Registration of research studies

N/A.

## Guarantor

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

We agree with: the plan to submit to the *International Journal of Surgery Case Reports* contents of the manuscript; to being listed as an author; and to the conflicts of interest statement as summarized above. We have had access to all the data in the study and accept responsibility for its validity.

We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). He is responsible for commu-

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