

## Case Report

# Simultaneous Bilateral Traumatic Tibial Post Fracture in Total Knee Arthroplasties: A Case Report

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## Keywords

Tibial post fracture · Posterior stabilized total knee arthroplasty · Bilateral

## Abstract

Fracture of tibial post after a posterior stabilized total knee arthroplasty (TKA) is an uncommon complication. We report a case of a patient who presented with simultaneous bilateral TKA tibial post fractures after a fall from height. To our knowledge, this is the first report of bilateral traumatic TKA tibial post fractures. We also demonstrate the utility of MRI scans in diagnosing this injury; an imaging modality which may not be considered by most surgeons due to metal artifact. There are also implications regarding the availability of prosthetic components after a TKA design is no longer marketed.

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## Introduction

Fracture of tibial post after a posterior stabilized total knee arthroplasty (TKA) is an uncommon complication. We report a case of a patient who presented with simultaneous bilateral TKA tibial post fractures after a fall from height. To our knowledge, this is the first report of bilateral traumatic TKA tibial post fractures. We also demonstrate the utility of MRI scans in diagnosing this injury; an imaging modality which may not be considered by most surgeons due to metal artifact. There are also implications regarding the availability of prosthetic components after a TKA design is no longer marketed.

## Case Report

### Background

Posterior cruciate ligament substituting total knee arthroplasty (TKA) designs have been successfully used for over 30 years [1]. Posterior cruciate ligament substituting

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designs have a polyethylene tibial post that engages on a metal cam on the femoral component intercondylar notch during knee flexion to induce femoral “roll-back” which was perceived necessary for optimal knee function. Despite the perceived advantages, they have been associated at times with problems [1–4].

### Case Presentation

A 60-year-old man with a background of Type 2 diabetes, ischemic heart disease, and obesity (BMI 35) underwent a left TKA (Smith and Nephew Journey BCS–“Journey I”) in 2008 and then a right TKA 12 months later with the same prosthesis. Both surgeries were carried out by the senior author, using a standard technique with identical implant sizes, and no patellar resurfacing. His recovery from the surgeries was uneventful and he had well-functioning knee replacements for 9 and 10 years although he did report bilateral persistent anterior knee pain for a few years prior to his current presentation.

In 2018 the patient, now 70 years old, fell approximately 3 m from a ladder landing onto the anterior aspect of both knees. Initially, he recovered quickly from soft tissue bruising and knee swelling, but over the next few months developed symptoms especially on his right knee. He is very stoical and only represented 18 months after the fall, complaining of worsened bilateral anterior knee pain and intermittent sharp catching as well as swelling and locking in the right knee. He reported feeling a “lump” on lateral aspect of his right knee intermittently. Examination of both knees revealed an effusion in the right knee, symmetric range of motion from 5 to 100°, and there was no obvious prosthetic instability in either tibiofemoral or patella-femoral joints.

Radiographs showed well-aligned prostheses with no signs of loosening, but some patellar wear especially the lateral facets (Fig. 1, 2). MRI scans showed, in both knees, erosion of the lateral facets of the patellae, and in the right knee showed what appeared to be a loose body and the senior author considered the possibility of a broken-off bone cement fragment (Fig. 3). The patient was offered bilateral patellar resurfacing in view of the anterior knee pain preceded by arthroscopy of the right knee to ensure localization and removal of the loose body, which can be difficult with open surgery if the loose body has moved to the posterior recesses of the knee.

However, with review the evening before surgery, a similar loose body was partly visualized at the edge of an image in the left knee (Fig. 4). On the morning of surgery, the patient

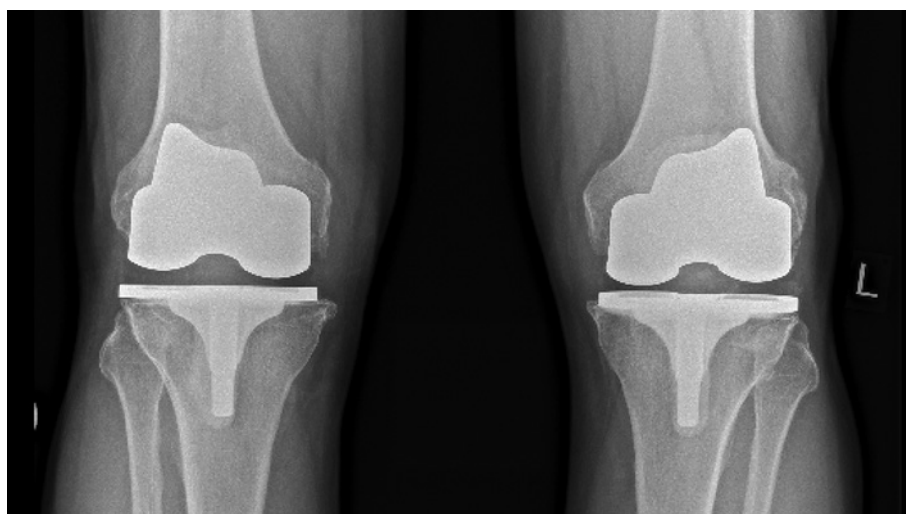
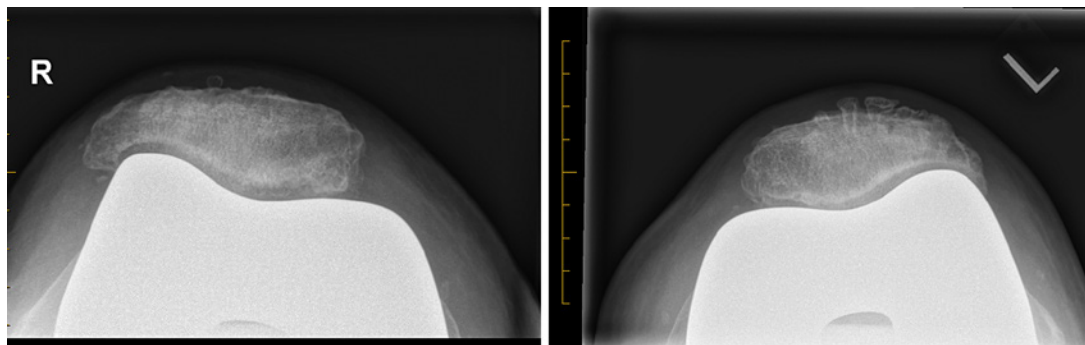
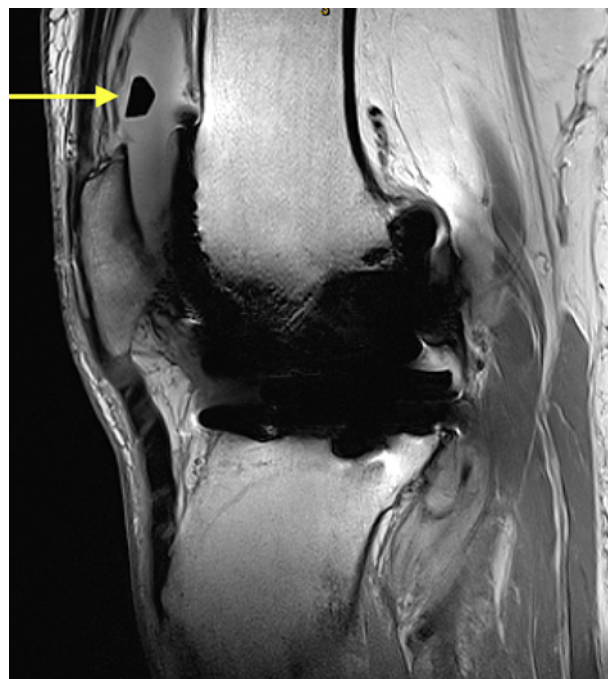


Fig. 1. AP X-rays of both knees.



**Fig. 2.** Axial X-rays of both knees.



**Fig. 3.** Sagittal MRI of right knee. Fractured tip indicated by arrow.

was advised to have an arthroscopy also of the left knee. Once again, it was assumed that the loose body might be a cement fragment, but it was thought odd to have these in both knees.

During the arthroscopies in January 2020, the true diagnosis was made. It was confirmed that in both knees there was a fracture of the polyethylene post close to the tip. The fractured post tips were found in the lateral gutter in the right knee and the suprapatellar pouch in the left knee and removed (Fig. 5). In the left knee, the “loose” body was embedded in synovial tissue which accounted for the lack of swelling, locking, and sharp pain. Open resurfacing of both patellae was undertaken. This allowed thorough examination of the prostheses. The original components were well fixed in both knees, and despite the post fractures with consequent loss of their height, the knees were stable on stress testing in both AP and ML directions, and it was not possible to distract the joints sufficiently to allow the femoral components to “jump” over the remaining polyethylene posts. The rest of the polyethylene was healthy. Prior to surgery direct contact with the TKA manufacturer was made and the senior author was told that since the Journey I prosthesis has been super-



**Fig. 4.** Coronal MRI of left knee. Fractured tip indicated by arrow.



**Fig. 5.** Clinical photograph of fractured tips.

sed by Journey II TKA, no polyethylene components were available for exchange in Journey I TKAs.

The operative findings were fortunate as any need to revise the polyethylene components would have entailed a complete revision of all components, and thankfully, a decision could be reasonably made to retain the original polyethylene components. The patient has been warned of the risk of future episodes of instability. The patient recovered well from surgery and was discharged home 2 days later. At his 12-month follow-up, the patient reported complete resolution of symptoms.

### Discussion

This case report is notable for 3 reasons:

1. This is the first report of simultaneous bilateral traumatic tibial post fractures.

2. MRI was critical in establishing the diagnosis prior to surgery. MRI is often not considered to evaluate problematic knee arthroplasty due to the perception of many surgeons that metal artifact renders it not useful.
3. Despite the prosthesis concerned having been used until relatively recently, it is surprising that the manufacturers seem not to have to continue keeping replacement components available.

This report documents a case of bilateral tibial post fractures after a fall from height onto the front of the knee, mimicking the injury mechanism of a PCL injury in a native knee. This is the second reported case of tibial post fractures in a Journey BCS knee that we could find in the literature [2] and the only ever report of simultaneous bilateral traumatic tibial post fractures.

The Smith and Nephew Journey BCS total knee replacement was designed with a unique dual cam-post mechanism which substitutes both the anterior and posterior cruciate ligaments. The 2 femoral cams engage on the anterior and posterior aspect of the tibial post at different points in the flexion arc [2]. The prosthesis was introduced in 2005 but was identified as having a higher than normal failure rate mainly due to component loosening (more than double the average revision rate in both the UK and Australian Joint registries) [5, 6]. The prosthesis was phased out in 2013/2014 and officially withdrawn in 2018 [7]. The only other published case report of tibial post fracture in the Journey knee is of an 81-year-old man with recurrent dislocations of his right knee, but no prior history of trauma. The patient underwent revision surgery with exchange of the polyethylene to a bigger component and was reported to have recovered well [2].

Reports of tibial post fractures have been previously published in the literature with an incidence of less than 1% [1]. The most common presenting symptoms include pain, effusion, instability or dislocation, and patella clunk syndrome [4, 8]. Exchange of the polyethylene liner is the most common treatment described, but there are no published long-term follow-up data to prove its utility [1, 9].

As most reported cases were atraumatic, if the diagnosis was not clear on clinical examination, arthroscopic evaluation was often used to confirm the diagnosis [2]. There is a paucity of literature on the utility of different imaging modalities in the diagnosis of tibial post fractures. Radiographs can detect polyethylene bodies, but this is unreliable [3]. Most clinicians do not even consider using MRI to evaluate problems with knee joint replacements as they believe that metal artifact makes it fruitless. However, advances in MRI hardware and software have resulted in improved image quality in the presence of ferromagnetic materials. Various techniques can be utilized including different spin echo-based sequences, view-angle tilting, and magnetic field strength [10]. These techniques lead to substantial metallic artifact reduction and improved visualization of bone, implant-tissue interfaces, and periprosthetic soft tissue. The resultant images produced, as in this case, can be very useful.

Finally, the experience in this case of not having the option of polyethylene liner exchange, questions whether manufacturers should have an obligation to continue having components available for revision of prostheses that have been withdrawn from the market for a minimum period of time. It is clear that simply exchanging a polyethylene liner is much more preferable to a full revision procedure.

## Conclusion

Tibial post fracture is a rare complication in posterior stabilized TKA. This case report describes a case of bilateral simultaneous tibial post fractures after a fall from height. We also demonstrate the utility of MRI scans in diagnosing this injury and highlight the difficulty of dealing with the revision of obsolete prostheses due to lack of component availability.

## Statement of Ethics

Approval to undertake the study was given by the institution involved in line with UK Health Research Authority guidance. Written informed consent was obtained from the patient for publication of this case report and the accompanying images.

## Conflict of Interest Statement

Neither author has any conflicts of interest to declare.

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## Author Contributions

Both G.B. and A.W. were involved with collecting the relevant data and writing the manuscript.

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