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Case Report

A Novel Percutaneous Screw Fixation of Postero-lateral Tibial Plateau Fracture using Posterior Cruciate Ligament Reconstruction Femoral Template: Technical Note

使用後交叉韌帶重建股骨模板重建後外側脛骨平台骨折的一種新的經皮螺釘固定法:技術說明

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ABSTRACT

Percutaneous fixation method has been applied in Schatzker type III joint depressed-type lateral tibial plateau fracture. We report a 76-year-old man suffering from a small joint depressed-type posterolateral tibial plateau fracture with surgical reduction and fixation with a novel guidance of posterior cruciate ligament (PCL) reconstruction femoral template under X-ray and arthroscopic assistance. The concept of sequential tunnel drilling in ligament reconstruction has been applied in bone impaction tunnel creation beneath the articular step with the PCL jig. Avoidance of multiple bone guide pin drilling and accurate guide pin insertion and hence screw fixation was also achieved by use of the PCL template. As illustrated, we believe that the PCL jig is a good armamentarium and adjunct equipment to achieve a more precise minimally invasive operation in special anatomical positions such as the postero-lateral tibial plateau under careful surgical planning.

中 文 摘 要

經皮內固定方法早已在外側脛骨平台骨折 (Schatzker type 3)中得到應用。我們的報告中，一個76歲男子患了小關節凹陷型後外側脛骨平台骨折。我們在放射線和關節鏡的輔助下使用後交叉韌帶重建股骨模板(Posterior Cruciate Ligament Jig)做了手術復位和固定。使用後交叉韌帶重建股骨模板鑽探韌帶隧道(sequential tunnel drilling) 的概念早已應用在建立骨嵌塞的隧道了。這種模板固定法可以避免多發性骨導針鑽孔並允許準確的導銷插入。我們認為這種方法是一個很好的固定法以實現在特殊解剖位置更精確的微創手術。我們在文章中提到的後外側脛骨平台骨折，就是一個很好的例子。

Introduction

Tibial plateau fractures represent only 1% of all fractures and 5–8% of lower limb fractures.[1,2] The incidence of this fracture shows a bimodal distribution—first peak in the 2nd–5th decade seen in motor vehicle accidents, while a second in the 5th–7th decade in osteoporotic fractures.[2]

The most widely accepted classification for tibial plateau fracture is the Schatzker classification.[3] Types I–III are the most commonly associated with lower- to middle-energy trauma involving the lateral plateau with type II being the most frequent subtype.[2]

Managing tibial plateau fractures in osteoporotic patients can be very challenging with the need to address adequate grafting of the bone defect, restoring the anatomic joint congruency, and ensuring a stable fracture fixation. Percutaneous treatment of this type of fracture can be performed using arthroscopy as well as image intensification to achieve reduction of the joint surface.[4] This is a known successful approach since it has a short operative time and minimal soft tissue damage.[5] However, situations like posterolateral corner tibial plateau fractures may sometimes pose extra technical challenges in articular surface restoration and trajectory of implant fixation with the close vicinity of fibular head. Extra

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instrumentation such as an external jig may help to achieve better accuracy in articular reduction and fixation. We would like to share our experience of percutaneous fixation of posterolateral tibial plateau fracture with the aid of a posterior cruciate ligament (PCL) reconstruction femoral template under X-ray and arthroscopic guidance.

Case Report

A 76-year-old man, with premorbid independent walking ability and hypertension, fell from a one metre platform and landed on his left knee which resulted in valgus sprain injury. He could not bear any weight on it. On clinical examination, he had left knee joint effusion and tenderness over the lateral joint line. The knee was stable on varus and valgus stress examination and Lachman tests, with intact neurovascular status of the left lower limb and without sign of compartment syndrome. Plain X-ray showed a Schatzker type III left tibial plateau fracture at the posterolateral corner (Figures 1A and 1B), which was confirmed on computed tomography (CT) scan and the bone defect measured 15 mm × 15mm in axial cut and 6-mm depth on sagittal cut (Figures 1C–F).

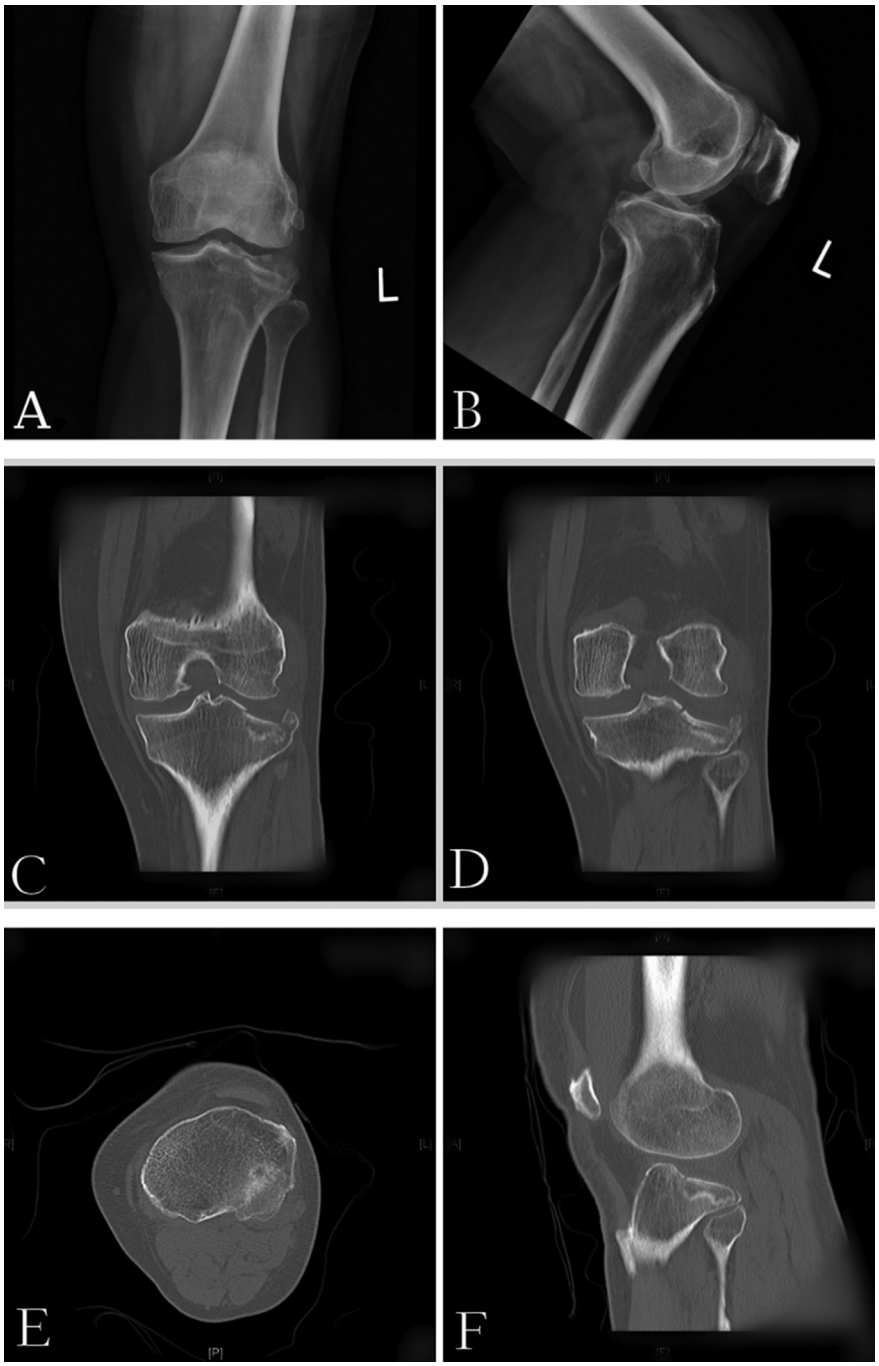

Figure 1. (A, B) Anteroposterior and lateral X-ray of the left knee showing joint-depression type tibial plateau fracture at the postero-lateral corner; (C, D) coronal; (E) axial; and (F) sagittal reconstruction demonstrating the anatomical location of the fracture.