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Dr. Mohd Irfan Banday
Orthopaedic Surgeon Jammu
and Kashmir Health Service,
Jammu and Kashmir, India

Dr. Ashish Jaiman
Associate Professor, Central
Institute of Orthopedics, VMMC
& Safdarjung Hospital, New
Delhi, India

Dr. Jabreel Muzaffar
Senior Resident, Indresh
Hospital, Dehradun,
Uttarakhand, India

Hybrid external fixator for proximal tibia fractures- tips and tricks

Dr. Mohd Irfan Banday, Dr. Ashish Jaiman and Dr. Jabreel Muzaffar

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Abstract

Proximal tibia fractures are usually caused by high energy mechanisms. These fractures are associated with many problems; one of the most common being contusion or crush injury to the soft tissues. One of the recommended methods of management is the Hybrid external fixator as a definitive management in these complex fractures, where soft tissue compromise may limit open reduction as a modality. Wire introduction under C-arm and confirmation using different conventional and modified views to check their placement has been discussed in this paper.

To check the exact placement of wires within the joint even when the antero-posterior view may show the wires to be away from the joint, this modified view is more confirmative.

Keywords: Proximal tibia fractures, hybrid external fixator, wire placement, proximal tibia

Introduction

Proximal tibia fractures are usually caused by high energy mechanisms [1] and are associated with many problems; one of the most common being contusion or crush injury to the soft tissues. The operative fixation of these fractures requires skilful decision making; as open reduction internal fixation with plating is always not the answer. Various techniques have been developed to avoid additional crushing of soft tissues during the course of treatment and to avoid catastrophic complications [2, 3]. Operative fixation includes internal or external fixation using a simple or hybrid external fixator [4]. One of the recommended methods of management is the Hybrid external fixator. Hybrid external fixator system consists of tensioned wires in the proximal tibial fracture fragments (proximal to fibular head) which are connected to Schanz pins placed in the tibial diaphysis. Literature widely supports the use of hybrid external fixator as a definitive management in these complex fractures, where soft tissue compromise may limit open reduction as a modality [5].

Advantages

- Tensioned wires can be used in a manner similar to lag screws and can aid in reduction and fixation.
- Maintenance of articular reduction and axial alignment is as good as plating.
- Allows early range of motion even in presence of significant soft tissue contusion.
- Minimal soft tissue dissection.

Disadvantages

- Pin tract infection.
- Septic Arthritis
- Inadvertent placement of wires within the knee joint.

Capsular reflection on proximal tibia can extend up to 14mm from the tibia joint line. Proximal wires in a hybrid fixator go through an area that is just above the fibular head and may erroneously enter the knee joint.

Corresponding Author:
Dr. Mohd Irfan Banday
Orthopaedic Surgeon Jammu
and Kashmir Health Service,
Jammu and Kashmir, India

Research

The conventional per-operative AP and Lateral views taken under C-ARM may show the wires outside the joint even when the wires may have entered the joint. To overcome this limitation a modified view of the knee joint is taken (figs. 1, 2). By keeping the knee joint flexed to about 20 degrees, C-arm is tilted from the antero-posterior position in such a way

that the beam is angled on to the knee from the foot end of the patient, like an inlet view and the exposure is taken (fig 3). The image reveals the exact position of the wire, whether within the joint or outside it. Even when the antero-posterior view may show the wires to be away from the joint, this modified view is more confirmative, as evident from the picture shown.

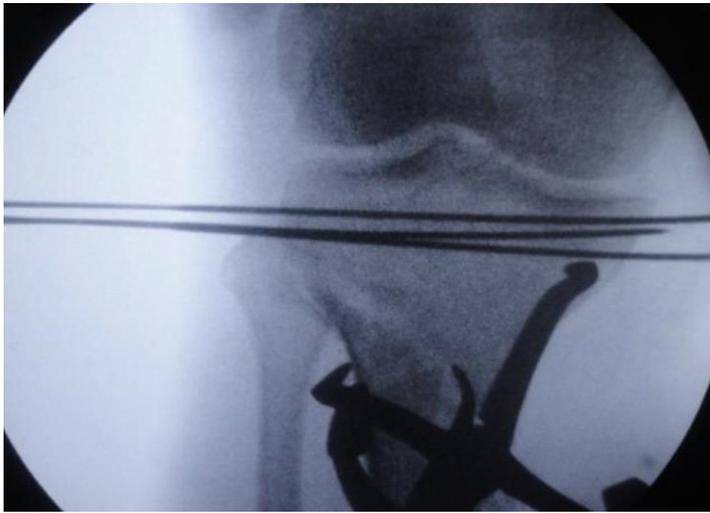


Fig 1: AP view of knee showing wires are extraarticular

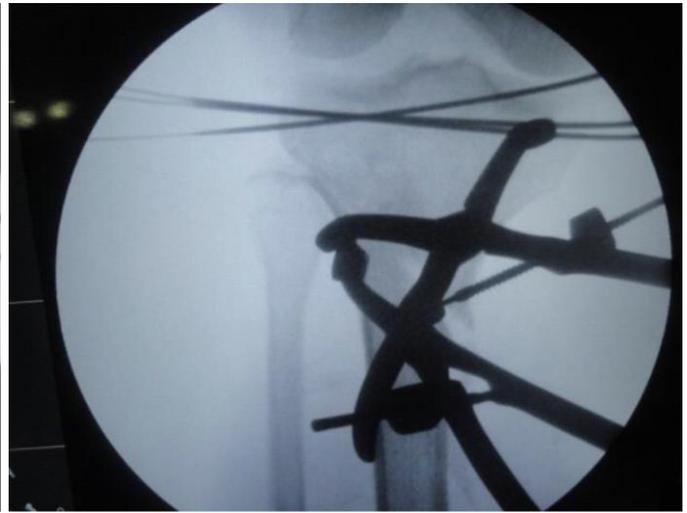


Fig 2: Modified view of knee showing the same wire intra-articular



Fig 3: C-arm machine position while taking the modified view

Result and Discussion

Even when the antero-posterior view may show the wires to be away from the joint, this modified view is more confirmative, as evident from the picture shown. This modified view helps to confirm whether the wire is within the joint or not even when the anteroposterior view shows that the wire is not entering the joint, thus preventing the disadvantages of entering the knee joint while fixing proximal tibia with wires.

Conclusion

This simple modified view helps in detecting the intra operative erroneous intra-articular wire placement into proximal tibia.

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