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**Dr. Kiran Kumar MN**  
 Senior consultant, DNB Pg.  
 teacher, DNB academic Centre,  
 District hospital, BH Road,  
 Tumkur, Karnataka, India

## A study of management of fracture proximal tibia by different modalities

**Dr. Kiran Kumar MN**

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### Abstract

The knee joint is one of the three major weight bearing joint in the lower extremity. Fractures that involve proximal tibia affect knee function and stability. These fractures can either be intra-articular or Extra-articular. Intra-articular fractures of proximal tibia are difficult to treat. Age, skin conditions, osteoporosis further increase the obstacles in the healing process. Various modalities of treatment are available but no ideal treatment has yet evolved. At the Chicago Orthopedic society in 1956 Manson Hole has rightly mentioned that “these fractures are tough” Complex kinematics of its weight bearing position and complex ligamentous stability and articular congruency are the main reason why these fractures are of concern to surgeon and cause disability to the patients. The mobility and stability of the lower limbs mostly depends upon a stable and functional knee joint. In most instances, intramedullary nailing has become the method of choice for the fixation of diaphyseal tibial fractures and has been extended to the treatment of proximal fractures. Reports have shown a high incidence of malalignment and loss of fixation associated with intramedullary nailing of proximal metaphyseal fractures.<sup>7</sup> Minimally invasive plate osteosynthesis techniques have recently been applied to fractures of proximal and distal tibia. Recently, the use of plate fixation utilizing minimally invasive techniques has been put forward as one way maintaining alignment in proximal tibial fractures. The purpose of this study is to study the available modalities of treatment of proximal tibia fracture in this institute and observe their functional result.

**Keywords:** Proximal, tibia, modalities of treatment, fracture

### Introduction

The knee joint is complex joint and is also commonly injured joint because of increased vehicular trauma and sports related injuries. Being superficial joint and more exposed to external forces, this joint easily gets injured <sup>[1]</sup>. The knee joint is one of the three major weights bearing joint in the lower extremity. Fractures that involve proximal tibia affect knee function and stability. These fracture can either be intra-articular or Extraarticular <sup>[2]</sup>. Intra-articular fractures of proximal tibia are difficult to treat. Age, skin conditions, osteoporosis further increase the obstacles in the healing process. Various modalities of treatment are available but no ideal treatment has yet evolved. At the Chicago Orthopaedic society in 1956 Manson Hole has rightly mentioned that “these fractures are tough” Complex kinematics of its weight bearing position and complex ligamentous stability and articular congruency are the main reason why these fractures are of concern to surgeon and cause disability to the patients. The mobility and stability of the lower limbs mostly depends upon a stable and functional knee joint. Various studies have been carried out and different treatment modalities have been advised, consensus has not been reached. Emphasizing on good functional outcome being most satisfying for the patient, we started our study with an aim to study different available modalities for treatment of intra-articular proximal tibia fracture and observe functional outcome after their implication. Extra-articular fractures of proximal tibia occur only in 5% to 11% of all tibial shaft fractures. As they often are the consequence of high energy transfer, a highly unstable situation with bone fragmentation and extensive soft tissue damage may result <sup>[3]</sup>. Treatment of these injuries is challenging and is associated with higher rates of complications than diaphyseal tibia fractures <sup>[4]</sup>. The goals of surgical management include correction and maintenance of sagittal and coronal alignment, restoration of length and rotation, and early functional knee and ankle range of motion.

**Corresponding Author:**  
**Dr. Kiran Kumar MN**  
 Senior consultant, DNB Pg.  
 teacher, DNB academic Centre,  
 District hospital, BH Road,  
 Tumkur, Karnataka, India

Treatment options include medullary implants, half pin external fixation, hybrid or thin wire external fixations, plate fixations, or combination techniques [5]. Recent design changes to intramedullary nails (IMNs) and adjunctive fixation techniques have definitely increased the popularity of IMN for the treatment of this fracture. Similarly the development of percutaneous biological plating has allowed surgeons to treat these complex fractures without the need for large incisions or fear of soft tissue stripping with subsequent failure due to infection and non-union [6]. In most instances, intramedullary nailing has become the method of choice for the fixation of diaphyseal tibial fractures and has been extended to the treatment of proximal fractures. Reports have show a high incidence of malalignment and loss of fixation associated with intramedullary nailing of proximal metaphyseal fractures [7]. Minimally invasive plate osteosynthesis techniques have recently been applied to fractures of proximal and distal tibia. Recently, the use of plate fixation utilizing minimally invasive techniques has been put forward as one way maintaining alignment in proximal tibial fractures [8]. The purpose of this study is to study the available modalities of treatment of proximal tibia fracture in this institute and observe their functional result.

**Aims and Objectives**

To observe functional outcome of each modality used for treatment of intra-articular and extra capsular proximal tibia fractures.

**Materials and Methods**

**Table 1:** Intra-articular fractures

Sex	Males	Females	Total
No	18	9	27

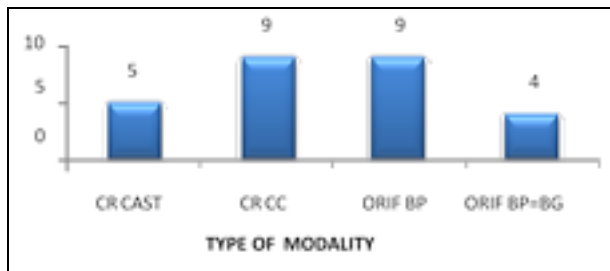
**Table 2:** Extra-articular fracture

Sex	Males	Females	Total
No	16	7	23

**Treatment Modalities**

**Table 3:** Intra- articular fractures

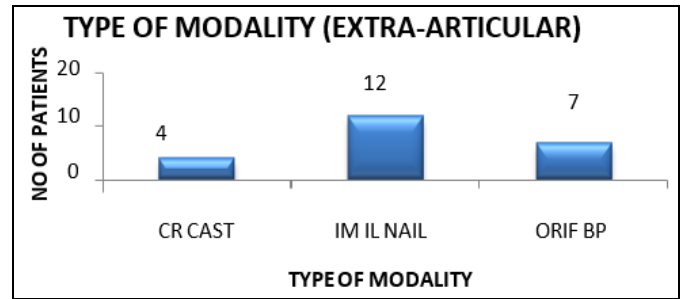
Type of Modality	CR CAST	CR CC	ORIF BP	ORIF BP+BG	Total
No	5	9	9	4	27



**Graph 1:** Type of Modality (Intra-articular)

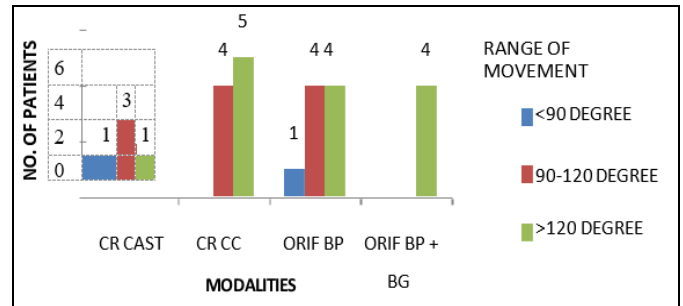
**Table 4:** Extra-articular fractures

Type Of Modality	CR CAST	IMIL Nail	ORIF BP	Total
No	4	23	8	23



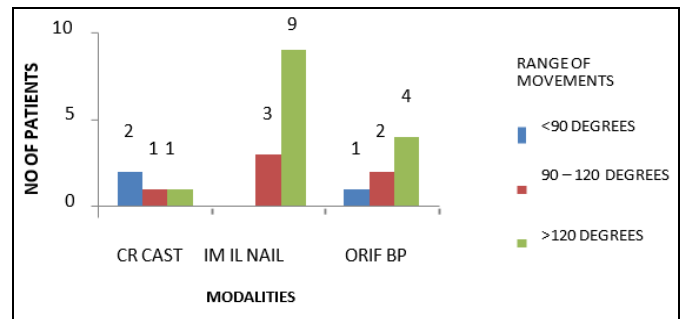
**Graph 2:** Extra-articular fractures

**Range of Movements**



**Graph 3:** Intra-articular

**Range of movements (Extra-articular)**



**Graph 4:** Extra-articular fracture

**Functional Outcome**

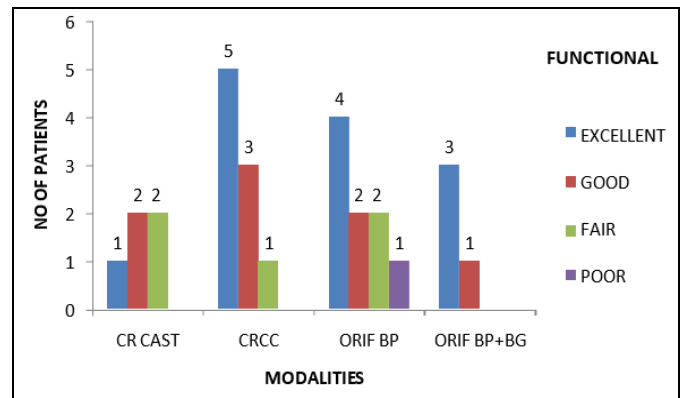
Functional outcome was evaluated by modified hohl m. And luck

Evaluation Method. Outcome was classified as

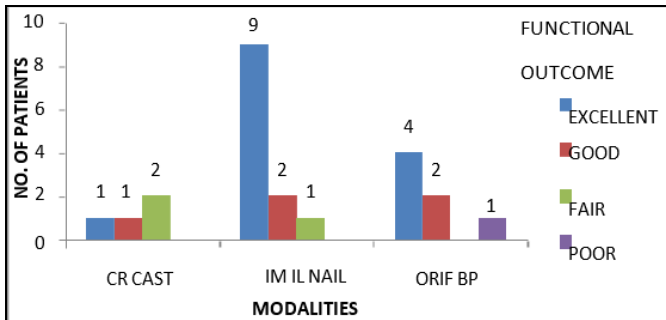
Excellent > Good > Fair > Poor

Acceptable: Excellent + Good

Unacceptable: Fair + Poor



**Graph 5:** Intra articular fracture



**Graph 6:** Extra-articular fracture



**Image 1:** Varus and Valgus

## Discussion

Various modalities for the treatment of tibial plateau fractures have been proposed. Earlier the treatment of these fractures was mostly by closed reduction and immobilization with plaster cast. LaMotte<sup>6</sup> in 1890 treated oblique tibial intra articular fractures with wires and screws. Keetley<sup>6</sup> in 1899 described open reduction and wires for lateral condylar fractures. Sir Robert Jones<sup>7</sup> in 1920 noted in an article by W.H. Threthowan, the importance of realigning the intra articular fractures of proximal tibia by open reduction and fixation by bone pegs and long screws. He also mentioned the need for elevating the depressed fragments from the tibial shaft. Wilsons and Jacobs<sup>8</sup> in 1952 used the articular surface of the patella for replacing the severely depressed comminuted fractures of lateral condyle. Graham Apley<sup>9</sup> in 1956 studied 60 cases of lateral condyle fractures with long term results. He managed these fractures conservatively with skeletal traction and physiotherapy without any internal fixation. One year follow up of 41 patients, 22 were excellent, 15 good and 7 fair and 1 poor. He recommended early motion with traction as a satisfactory method for the management of lateral condyle fractures. Rasmussen S. Poul<sup>10</sup> and Gothenburg in 1973 followed a series of 260 fractures of one or both condyles. The main indication for surgical treatment was evidence of instability of extended knee. They treated 44% of patients with either closed traction reduction or internal

fixation using a wire loop or open reconstruction of joint surface using autogenous bone grafts. Follow up of 87% of these had an acceptable knee function. Moore and Harvey<sup>11</sup> in 1974 demonstrated the use of tibial plateau view with central ray directed at angle of 105° to the tibial crest. This permits more accurate assessment of the initial depression of the articular surface. Schatzker and McBroom<sup>7</sup> in 1979 considered that open reduction with anatomical restoration of articular cartilage produces best results. In their study of 70 patients they obtained 78% acceptable results in the operated group as compared 58% in the non-operated group. Drennan D.B<sup>12</sup>, *et al* in 1979 reviewed 61 displaced fracture of tibial plateau treated by closed manipulation, reduction and immobilization for 6 weeks in a well molded hip spica. He observed that 85% of patients achieved good or excellent results objectively. Bowes in 1982 and Hohl<sup>13</sup> reviewed 52 tibial plateaus out of 110 fractures for more than one year. Non-surgical treatment was used in 72% of fractures; cast in 51% and traction in 21% ORIF was used in 28%. Overall results were acceptable in 84% of patients. They mentioned the use of cast bracing in 31% of cases either as a primary treatment or after open reduction. Blokker *et al.*<sup>14</sup> in 1984 reviewed 60 tibial plateau fractures 38 of these fractures were treated by open reduction and internal fixation and 22 treated by closed methods. 75% of the patients had satisfactory results. They considered that the single most important factor in predicting the outcome in a patient with tibial plateau fracture was adequacy of reduction. The method of achieving the reduction and the length of immobilization period of the knee was not crucial.

## Conclusion

ORIF BP is an effective modality for treatment of Extra-articular proximal tibia fractures, if used for less comminuted fracture types. Although detailed study with larger sample size will be necessary to confirm our result.

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## Author's Contribution

Not available

## Conflict of Interest

Not available

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Not available

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