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# Assessing Functional Outcomes in the Management of Tibial Plateau Fractures

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***ABSTRACT***
***BACKGROUND***

*Despite extensive research and documentation, there remains a contentious debate regarding the optimal treatment approach for tibial plateau fractures, namely surgical versus conservative methods. While some surgeons advocate for non-surgical options, suggesting that many cases can be effectively managed without surgery, others argue that conservative approaches may lack efficacy and advocate for surgical intervention in the majority of cases to achieve precise alignment and stable internal fixation. This study aims to elucidate the fundamental principles of managing tibial plateau fractures, with a particular emphasis on utilizing rigid fixation, and to present innovative clinical findings comparing outcomes between surgical and conservative strategies.*

***MATERIALS AND METHODS***

*This prospective cohort study was conducted at the Department of Orthopedics at Saveetha Medical College and Hospital in Thandalam from June 1, 2022, to June 31, 2023. All patients received treatment according to a standardized protocol. Of the 40 patients enrolled, 20 underwent surgical intervention while the remaining 20 received conservative management. Regular follow-up assessments were performed, including monthly check X-rays and evaluations of range of motion, angular deformity, and patient-reported complaints.*

***RESULTS***

*The study comprised 40 patients diagnosed with tibial plateau fractures, divided into two groups: 20 patients managed conservatively with skin traction and pop slab application, and 20 patients treated surgically with open reduction internal fixation using plate osteosynthesis. Of these patients, 17 were female and 23 were male, with right-sided injuries being more prevalent in 22 cases. Type-2 fractures were the most common, followed by type-1 fractures. Infections occurred in 6 patients treated conservatively and in 2 patients treated surgically. However, these infections were effectively addressed through appropriate antibiotic therapy and regular wound care.*

***CONCLUSIONS***

*In our study, we conclude that surgical management of proximal tibial fractures provides excellent functional outcomes compared to conservative management. Surgical intervention allows for early mobilization of patients with fewer complications and shorter hospital stays.*

***KEYWORDS***

*Proximal tibia fracture, tibial plateau fractures, conservative vs surgical management*

## INTRODUCTION

Knee alignment, stability, and motion are all impacted by tibial plateau fractures, which are one of the most important load-bearing regions in the human body. Most frequently, high-velocity injuries such as those sustained in auto accidents result in tibial plateau fractures. Two years later, in 1922, Server J.W. reported three more occurrences of tibial plateau fracture. Immobilization was used to treat the majority of fractures at this time. When a tibial plateau fracture occurs, a spike is used to elevate the depressed plateau and provide support for it using cancellous bone grafts. This procedure was first described by Barr J.S. in 1940.A group of patients treated with bone traction and early mobilization with outstanding outcomes was published by G. Apley in 1956. Additional experimental research carried out in 1939 by Haldeman K.O. Et al. shown that fibrocartilage replaces hyaline cartilage. It was established by Hohl M in 1956 that intra-articular adhesions form as a result of prolonged immobility. Following AO [ASIF] descriptions, surgical intervention is required for tibial plateau fractures in order to accomplish early mobilization, rigid internal fixation, and anatomical reduction. The management of this condition is a topic of controversy, with a clear trend towards surgical intervention over conservative measures.Many treatment approaches, including traction [1], closed treatment with bracing [2, 3], external fixation [4], percutaneous screw fixation, open reduction, internal fixation [5-8], and other techniques, have been employed for years with differing degrees of success. In both groups, excellent outcomes have been published. The following information should be taken into account before choosing a course of treatment:[9-11] When a tibial plateau fracture occurs, the extent of injury is frequently more than what is seen on an x-ray; malunion is very prevalent while non-union is unclear; The most dangerous and frequent side effects of a tibial plateau fracture are stiffness and painful knee. Our research aims to assess the functional outcome of treating Tibial Plateau fractures with conservative versus surgical methods.

## MATERIALS AND METHODS

This prospective cohort study conducted from June 1, 2022, to June 31, 2023, at Saveetha Medical College and Hospital in Thandalam, at the Department of Orthopaedics. Standardized protocols were followed in the management of every patient. Analgesics and anti-inflammatory medications were administered to the patients, who also had posterior casts placed for support and underwent AP and lateral X-rays. Broken bones were categorized using the AO classification system, and any related injuries were treated appropriately. Decisions about treatment were taken in light of the patient's general status, the type of fracture, and the extent of displacement and depression. Of the forty participants in the research, twenty had surgery and the other twenty had conservative care. Anatomical reduction, firm internal fixation, and early mobilization were the goals of surgical management treatments for patients with displaced or depressed fractures. Individuals who were prescribed conservative care because of linear or undisplaced fractures were either advised against surgery or were judged medically unsuitable. Patients undergoing conservative management received a sterile procedure in the operating room where a Steinman pin was inserted in the lower portion of the tibia. Hemarthrosis was aspirated if it was present, and a Jones bandage was put on. After that, the patients were sent to the ward, where traction was given and a Bohler's splint was placed on the injured limb. workouts for the quadriceps started the next day, and on the seventh day, there were workouts including guarded knee bending.The typical duration of skeletal traction was 4-6 weeks. Range of motion, angular deformity, and check X-rays were evaluated before to discharge. Patients were told not to bear any weight and were given exercises for their quadriceps and knee bending to do before being released from the hospital. Every month, follow-up evaluations were carried out, which included patient complaints, range of motion assessments, and angular deformity assessments in addition to check X-rays. Usually, partial weight-bearing began between weeks 10 and 12, while complete weight-bearing began between weeks 12 and 16. Thorough pre-operative studies were conducted on surgical patients, and spinal anaesthesia and tourniquet were used during the procedure. It was recommended to use a parapatellar approach (lateral or medial), with

fracture care customized for each type of fracture. Quadriceps exercises, analgesics, and antibiotics were part of the post-operative treatment. Seventy-two hours later, gentle knee bending exercises started, then crutch walking and more strenuous workouts were permitted once the stitches were taken out. Check X-rays were taken monthly, along with follow-up visits every fifteen days. Assessments of knee range of motion, discomfort, loss of extension, and angular deformity were performed. It was usual to continue not bearing any weight for ten to twelve weeks, and then begin bearing weight fully at that point.

## RESULTS

We performed a study with 40 patients who had fractures of the tibial plateau between June 1, 2022, and June 31, 2023. Twenty of the patients were treated conservatively with skin traction and pop slab application, while the remaining twenty patients had surgery with open reduction internal fixation using plate osteosynthesis. 23 men and 17 women made up this patient group[Table-2,Figure-1], with 22 of the patients having injuries to their right side more commonly than any other [Table-3,Figure-2]. The age range of the patients was 34 to 68 years, with a mean age of 50[Table-1].The two most frequent ways people were hurt were via falls from height and traffic accidents [Table-4]. Of these, falls from height caused 14 proximal tibia fractures and traffic accidents caused 26. Type-2 proximal tibia fractures were the most prevalent, with type-1 fractures coming in second. Two patients experienced medial collateral ligament damage, while four patients had lateral meniscus injuries. Two individuals with varus deformity and three with valgus deformity among those receiving conservative treatment with traction and pop application. There was one case of varus collapse among patients receiving surgical care. Six patients receiving conservative care and two receiving surgical care both had infections.The infections were treated conservatively using the right medications and consistent dressings for the wounds. Three patients in the conservative treatment group also experienced bed sores, which were treated conservatively after consulting with a plastic surgeon. Analgesics, frequent position changes, frequent dressings with Hydroheal ointments, and the use of an alpha bed were all part of this therapy. Patients treated with conservative therapy typically stay in the hospital for [4-6 weeks] on average, while those treated with surgical management typically stay in the hospital for [1-3 weeks] on average.The patients in the conservative management group who experienced the following functional outcomes were: 4 with a fair outcome, 1 with a poor outcome, and 15 with a good outcome. The following were the functional outcomes for the surgical management group: Eleven patients had a good functional outcome, one patient had a mediocre functional outcome, and three patients had an excellent result. In our study, no patient was lost to follow-up.

## DISCUSSION

About one percent of fractures are tibial plateau fractures.15 The combination of axial stress and varus or valgus force results in malalignment, a depressed articular surface, and an increased risk of osteoarthritis in cases of tibial plateau fractures. In 1825, Sir Astley Cooper published his tibial plateau fracture treatment protocol for the first time. In addition to emphasizing the importance of early joint rehabilitation, Apley created effective traction techniques that allowed for early joint range of motion while preserving enough immobilization to allow for fracture union. Apley also reported on the satisfactory outcome of tibial plateau fractures when compared to surgical outcomes. The most frequent ways that people got hurt were in car accidents, falls from heights, and slips on floors.There were more Type I and II fractures than Type III, IV, V, and VI. The 40 patients in our study were split into two groups: 20 patients received skin traction and pop slab application as conservative treatment, and the remaining 20 patients underwent open reduction internal fixation with plate osteosynthesis as a surgical intervention. 23 men and 17 women made up this patient group, with 22 of the patients having injuries to their right side more commonly than any other. The age range of the patients was 34 to 68 years, with a mean age of 50.Patients treated with surgical care typically stay in the hospital for 1-3 weeks, with an average of 2 weeks, whereas patients under conservative management typically stay for [4-6 weeks] on average. For the conservative management group, the following were the functional outcomes: Fifteen patients experienced good outcomes, one patient had a poor outcome, and four patients had a fair outcome. The following were the functional results for the

surgical management group: Eleven patients showed good functional results, one patient showed medium functional results, and three patients had exceptional results.Similar to our investigation, a number of other research have demonstrated a clear correlation between articular depression and the clinical result [12-14]. Several studies have found that treating tibial plateau fractures with closed reduction and immobilization in a well-molded cast for six weeks produces acceptable functional and clinical outcomes [15-17]. Two patients had injuries to their medial collateral ligament, while four patients had injuries to their lateral meniscus. Three patients experienced valgus deformity and two patients experienced varus deformity after receiving conservative treatment with traction and pop application. One patient who received surgical care experienced varus collapse. Two patients who underwent surgery and six individuals who received conservative treatment both had infections.The infections were treated conservatively using the right medications and consistent dressings for the wounds. Three patients in the conservative treatment group also experienced bed sores, which were treated conservatively after consulting with a plastic surgeon. Analgesics, frequent position changes, frequent Hydroheal ointment dressings, and the use of an alpha bed were all part of this therapy.

## CONCLUSION

Based on our research, we have determined that, when compared to conservative approach, surgical treatment of proximal tibial fractures results in outstanding functional outcomes. Patients can be mobilized earlier and stay in the hospital for shorter periods of time when surgical intervention is used.

## DECLARATIONS

Funding : None
Conflict of Interest : None declared
Ethical Approval : Not required

## TABLES AND FIGURES

| S.NO | PATIENTS AGE (YEARS) | NUMBER OF PATIENTS | TOTAL PERCENTAGE (%) |
|---|---|---|---|
| 1. | 30-40 | 6 | 15 |
| 2. | 40-50 | 13 | 33 |
| 3. | 50-60 | 14 | 35 |
| 4. | 60-70 | 7 | 17 |

TABLE – 1 SHOWING PATIENTS AGE DISTRIBUTION AND PERCENTAGE

| S.NO | PATIENTS SEX | NUMBER OF PATIENTS | TOTAL PERCENTAGE (%) |
|---|---|---|---|
| 1. | MALES | 23 | 58 |
| 2. | FEMALES | 17 | 42 |

TABLE – 2 SHOWING PATIENTS SEX DISTRIBUTION AND PERCENTAGE

| S.NO | SIDE | NUMBER OF PATIENTS | TOTAL PERCENTAGE (%) |
|---|---|---|---|
| 1. | RIGHT | 22 | 55 |
| 2. | LEFT | 18 | 45 |

TABLE – 3 SHOWING PATIENTS SIDE INVOLVEMENT AND PERCENTAGE

| S.NO | MODE OF INJURY | NUMBER OF PATIENTS | TOTAL PERCENTAGE (%) |
|---|---|---|---|
| 1. | RTA | 25 | 63 |

| 2. | FALL FROM HEIGHT | 15 | 37 |
|---|---|---|---|

TABLE – 4 SHOWING PATIENTS MODE OF INJURY AND PERCENTAGE

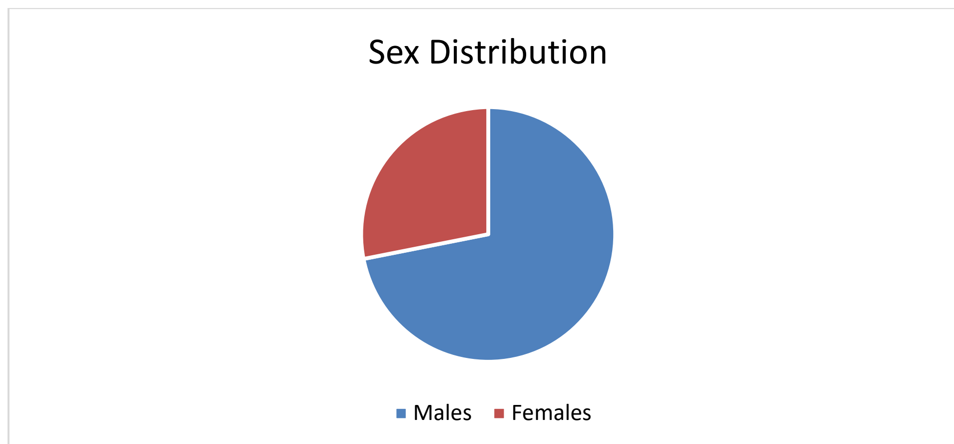


Figure – 1 Thereby showing Sex distribution in our study

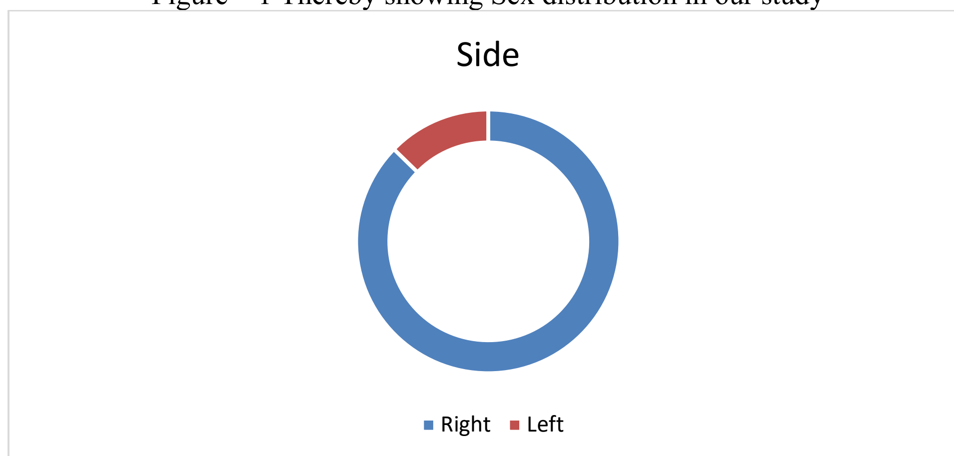


Figure – 2 Thereby showing Side determination in our study

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