

**Tension Band Wiring in Management of Fracture of the Patella: An Original Article**Deepak Lamture<sup>1</sup>, Namdev June<sup>2</sup>, Sachin Suryavanshi<sup>3</sup>, Balasaheb Sanap<sup>4</sup>, Yashwant Lamture<sup>5</sup><sup>1</sup>Associate Professor, Dept. of Orthopaedics, S.R.T.R. Government Medical College, Ambajogai<sup>2</sup>Associate Professor, Dept. of Orthopaedics, S.R.T.R. Government Medical College, Ambajogai<sup>3</sup>Junior Resident, Dept. of Orthopaedics, S.R.T.R. Government Medical College, Ambajogai<sup>4</sup>Junior Resident, Dept. of Orthopaedics, S.R.T.R. Government Medical College, Ambajogai<sup>5</sup>Professor, Dept. of Surgery, AIIMS, Nagpur

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Conflict of interest: Nil

**Abstract****Background:** The patella is the body's biggest bone of the sesamoid variety, located in the leg and a part of the knee joint. Because of the increase in accidents, patellar fractures are becoming more common in clinical practice. The present study was done to determine the effect of tension band wiring in treating patella fractures.**Methods and Materials:** This research was carried out from July 2020 to July 2021. All of the patients had experienced trauma and were treated, monitored, and studied by a predetermined procedure. All patients' histories were obtained, and local, general, and radiological tests were performed. Patients were temporarily stabilized with plaster cast or slab. Following that, the patient was given fitness after a preoperative evaluation. They were operated on after obtaining fitness. Tension band wiring was done, and an x-ray of the knee confirmed the fracture reduction.**Result:** After tension band wiring, most of the patients experienced uneventful recovery; none had either malunion or non-union. 4% of the patient had a minor surgical site infection.**Conclusion:** tension band wiring is a good option for treating fractured patella.**Keywords:** non-union, mal union, knee flexion.

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**Introduction**

The patella is the body's giant sesamoid bone, an integral part of the knee joint. It is a phylogenetically inherited component of the skeleton. The patella develops autonomously rather than in the quadriceps tendon, as previously thought. It forms behind the anterior thigh muscle tendon (quadriceps) [1].

Patellar fractures account for 1% of all body fractures [2]. Patellar fractures are broadly categorized into open and closed categories and then further classified into various fracture patterns. The patella should be kept as much as feasible because complete removal of this bone often fails to preserve the power of extension of the knee normally. According to the findings, total patellectomy generates a variety of post-patellectomy symptoms as well as considerable handicaps [3].

Pauwel first applied this idea in treating misplaced fractures of the patella. The early phases of the T.B.W. technique were done through the bone and tendon of the patella. nowadays, this is enhanced by making a loop of k-wire parallel and a figure of 8 runs. As this wire resists tension, compressive

pressures are created at the dorsal part of the fracture gap, increasing articular surface stability [4].

**Aim**

To determine the efficacy of tension band wiring (T.B.W.) in patella fracture.

**Objectives**

1. To estimate surgical site infection.
2. To estimate malunion or non-union.
3. To estimate the range of knee movement.

**Materials and Methods****Study Design –**

Cross-sectional study.

**Study Duration –** One year**Study Population –**

A total of 50 patients from July 2020 to July 2021 with closed transverse patella fractures admitted to the Ambajogai tertiary care center were included in the study.

**Inclusion Criteria**

1. age 18 to 60 years.
2. Patient with closed transverse patella fracture.

#### Exclusion Criteria

1. Patient with pathological fracture.
2. Fracture with neurovascular injury.
3. immunocompromised like diabetes, malignancy, connective tissue disorders.
4. Compound and comminuted fracture.

#### Operational definitions (Study outcome)

Surgical site infection  
Non-union or malunion  
Range of knee movement

#### Sample Size –

The sample size was calculated by employing openepi.com, a single proportion according to the following assumptions: 20% of patients operated for patella fracture were by T.B.W. in most studies[2], with a 95% confidence interval and 5% margin of error. The calculated sample size was 48. The sample size used in the study was N=50 patients. Forty of them were male, and 10 of them were females.

#### Sampling Method-

The probability sampling method was used

A simple random method was used.

#### Data Collection, Including Data Tools

Data for the study was collected using a personal interview technique with the help of a structured questionnaire, hospital case records, follow-ups, etc.

#### Project Implementation Plan

As soon as the patient was admitted to the outpatient department(O.P.D.) or emergency department(E.D.), a detailed history was taken, with generous time spent on general and local examination; a radiological examination was performed in the form of an x-ray to confirm the evidence of fracture patella. After reviewing the inclusion and exclusion criteria, the patient was planned for T.B.W. as an elective surgery.

The standard tension band wiring technique includes four steps: patient placement, tourniquet application, the figure of eight T.B.W. of the patella, and closure.

Patients were monitored for six months. Only instances with a minimum follow-up period of five months were included in the analysis. All of the patients had experienced trauma and were treated, monitored, and studied by a predetermined procedure.

#### Data Analysis

Data entry was manually done. Coding and recoding were done. Prevalence was calculated. Descriptive statistics (percentage, mean, standard deviation (S.D.), and range) were used to summarize baseline characteristics of the study subjects. The data was collected over six months using Epicollect 5 and was analyzed in Excel Sheet.

**Human Subject Protection-** institutional Ethics committee approval was obtained

#### Results

In the present research, the males were in large numbers by four times as per the following figure (figure-1).

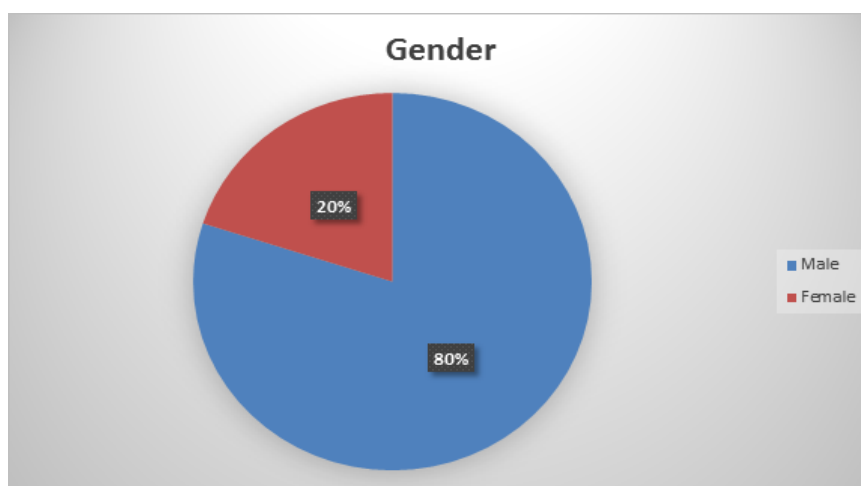


Figure 1: Gender-wise distribution of patients

The highest number of patients were middle-aged and were from both genders. The outcome of the surgery was as per the following figure (see Figure 2)

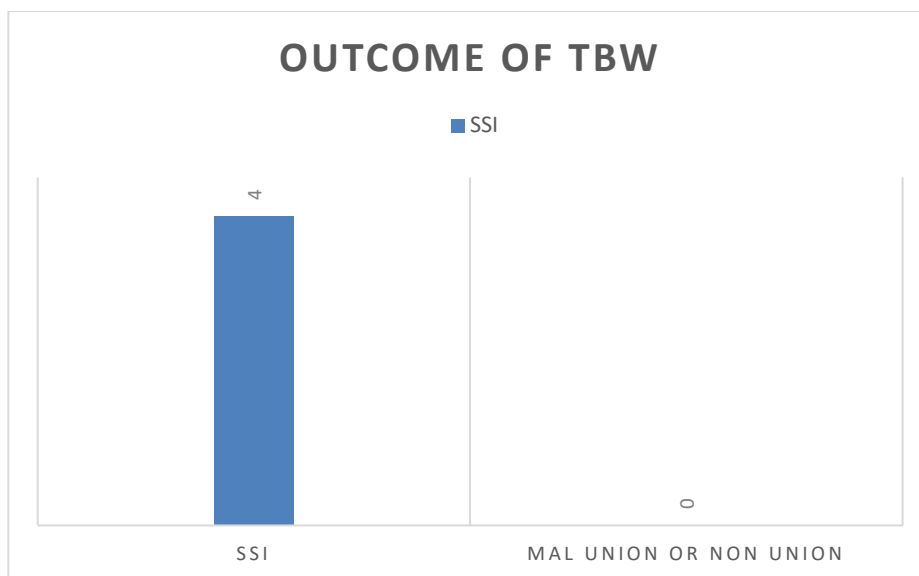


Figure 2 Outcome of T.B.W.

Surgical site infection was found in 2 patients(4%), and mal-union or non-union was found in 0%.

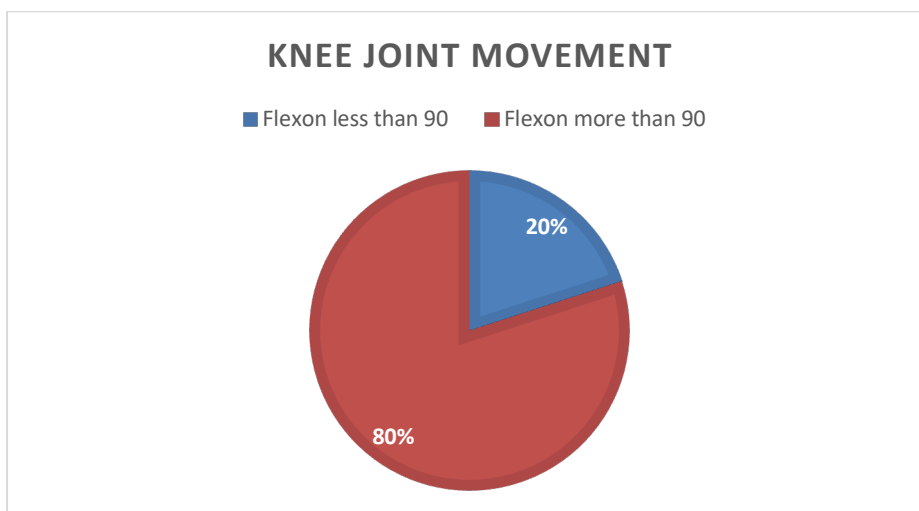


Figure 3 Knee joint movement

Most patients, around 80%, have a range of movement of knee joints more than 90 degrees.

**Discussion**

Surgical treatment of displaced patella fractures is common, with tension band fixation being the current therapeutic standard. However, because of the complexities of patella fracture, there is currently no uniform consensus on the optimal clinical treatment scheme. This study evaluated the therapeutic benefits of a cannulated screw tension band and a Kirschner wire tension band on patella fracture and discovered that the cannulated screw tension band had more advantages in treating patella fracture, with patients recovering faster and experiencing fewer problems[3,5].

In the present study, male preponderance was found(80%), which is not similar to the studies by

Levack et al. [4] and Siddaram N Patil [6]. This can be explained by India's working pattern, especially in rural areas where most laborers are male.

Patella fractures are prevalent in all age groups and have no age bar. Most patients who suffered this fracture in the present study were middle-aged. This was similar to the study done by Thakkar CV et al. [7]

The range of knee movements after T.B.W. was quite adequate after surgery in the present study

In 80% of cases, it was more than 90 degrees. These results were similar to the results of Liu C et al. [3].

However, various issues must be addressed when employing a T.B.W., like the size and bone penetration of the screw, as this screw has a vital role in the fixation and the friction of wire with bone, resulting in lower complications.

## Conclusion

Based on our findings, T.B.W. offers excellent outcomes in noncomminuted fractures. Physiotherapy contributes to improving the range of movement of knee joints.

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