



## Comparative Study Of Proximal Tibial Fractures Treated With Various Modalities

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### Abstract:

#### Background:

**Background:** Proximal Tibial Fractures Are Complex Injuries That Often Pose Significant Challenges In Management Due To Their Involvement Of The Knee Joint And Surrounding Soft Tissues. Various Treatment Modalities, Including Conservative Management, Open Reduction, And Internal Fixation (Orif) With Plating, And External Fixation, Have Been Employed With Varying Outcomes.

**Aim And Objectives:** This Study Aims To Compare The Clinical And Functional Outcomes Of Proximal Tibial Fractures Treated Using Different Treatment Modalities, Evaluating Union Rates, Complication Rates, Range Of Motion, And Functional Scores.

**Methods:** A Prospective Comparative Study Was Conducted On Patients With Proximal Tibial Fractures Treated With Conservative Methods, Locking Compression Plating, Or External Fixation. Patients Were Followed Up For A Minimum Of Six Months. Outcomes Were Assessed Based On Radiological Union, Knee Range Of Motion, Complications, And Functional Outcome Scores Such As The Rasmussen Functional Grading System.

**Results:** Preliminary Findings Suggest That Orif With Locking Compression Plating Provides Better Anatomical Reduction And Early Mobilization, Resulting In Superior Functional Outcomes Compared To Conservative And External Fixation Methods. However, External Fixation Showed Advantages In High-Grade Open Fractures And Cases With Severe Soft Tissue Compromise.

**Conclusion:** The Choice Of Treatment Modality For Proximal Tibial Fractures Should Be Individualized Based On Fracture Pattern, Soft Tissue Condition, And Patient Factors. Locking Compression Plating Remains The Gold Standard For Displaced Fractures With Good Soft Tissue Conditions, While External Fixation Is A Valuable Alternative In Complex Open Fractures.

**Keywords:** Proximal Tibial Fractures, Orif, Plating, External Fixation, Conservative Management.

### Introduction:

Tibial Condylar Fractures Are Specially Challenging To The Orthopedic Surgeons Because Of Their Number, Variety, Complexity, Different Concepts Of Management And Injuries Associated With It. As Proximal Tibia Gives Attachment To The Various Elements Of Knee Stabilizers And Being An Integral Part Of The Knee Mechanism, Alteration Of Anatomy Caused By Injury, Results In Functional Impairment. Though Many Articles Were Written Over Past 100 Years Addressing The Problems Of Classification, Indication And Results Of



Various Modalities Of Treatment Still Final Answer Is Not Yet Reached. In India More Than Anything Extreme Flexion Is Very Important As Far As Our Living Habits Are Concerned. Tibial Plateau Fracture Whether Treated Conservatively Or Operatively Is Known To Cause Limitation Of Knee Flexion Of Varying Degrees. Earlier, Most Of Tibial Plateau Fractures Were Treated Conservatively Which Resulted In Joint Incongruity, Early Osteoarthritis, And Knee Stiffness. Now Treatment Of These Fractures Has Changed Radically Over The Years, As Our Ability To Achieve Near Anatomic Reduction And Fixation Has Improved. There By Reducing The Incidence Of Early Osteoarthrosis. But Varying Amount Of Knee Stiffness Was Noticed And Surgery Was Blamed For It, Which Is Being Done On Already Traumatized Knee. Different Types Of Knee Instability Were Encountered In Earlier Studies Depending Upon The Type Of Fracture Unless Meticulous Repair Of Ligaments And Other Soft Tissues Were Done. Taking All These Facts Into Consideration, A Study Is Being Carried Out To Know Encountered And Associated Injuries.

### **Aim And Objectives:**

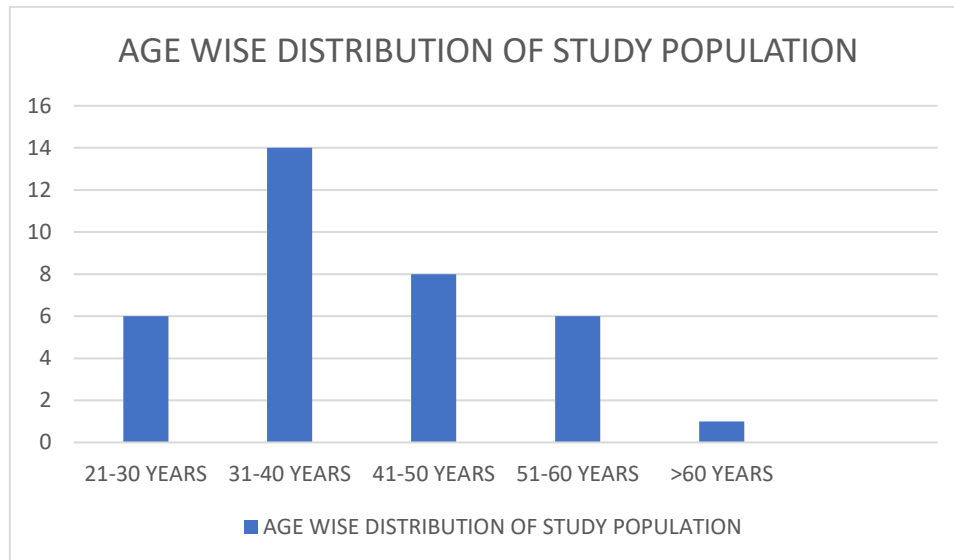
- 1.Evaluating The Age Group Affected, Mechanism Of Injury And Type Of Fracture Based On Schatzker's Classification.
- 2.To Study The Duration Of Union In Differentiated Fracture.
- 3.To Compare The Outcome Of Surgical And Conservative Management In Tibial Condylar Fractures.
- 4.To Study The Complications In Both Methods Of Treatment.
- 5.To Study The Functional Outcome Of Knee Post Operatively.

### **Materials And Methods:**

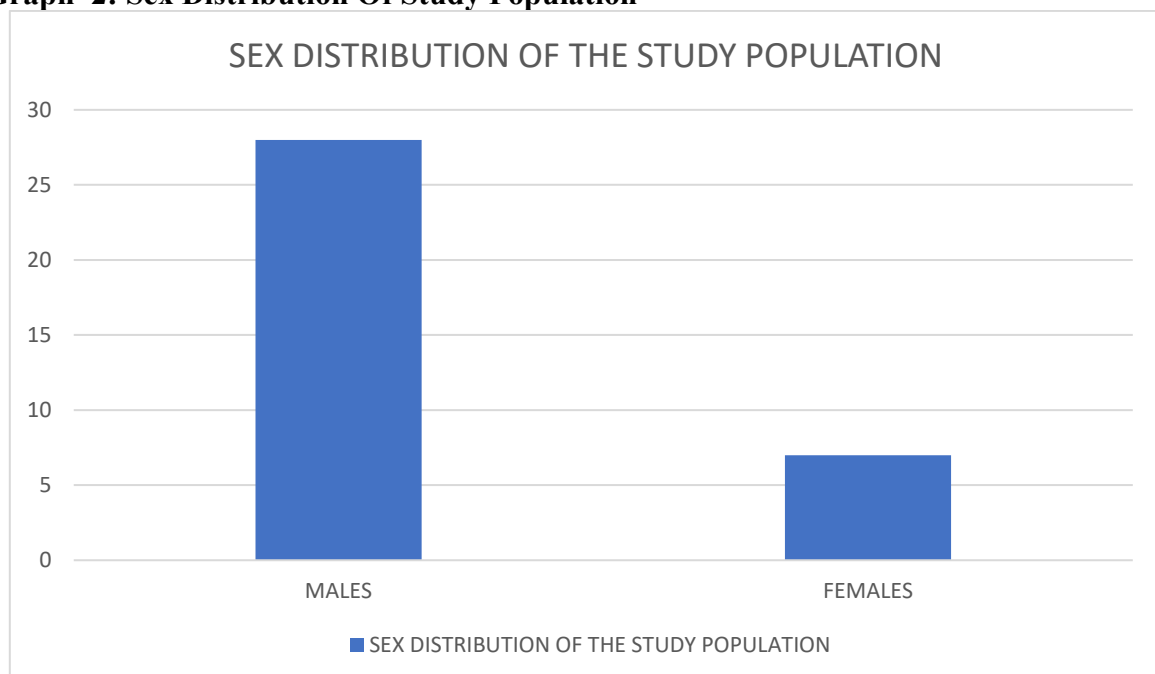
This Study Of Management Of Tibial Condylar Fractures In Adults Was Conducted At The Department Of Orthopedics Vinayaka Missions Kirubanadha Variyar Medical College And Hospital, Salem For The Duration Of 2 Years. During This Period 36 Patients Were Treated For Tibial Condylar Fractures Of Which 13 Patients Were Treated By Conservative Methods And 23 Patients Were Treated By Surgical Methods.1 Cases Was Excluded, As The Patients Did Not Come For Follow Up. All Patients With Tibial Condylar Fractures In The Age Group 20-65 Years Were Included In The Study. Fractures In Children, Compound Fractures And Those Associated With Fracture Of Distal End Of Femur And Patellar Fracture Were Excluded From The Study.

### **Results:**

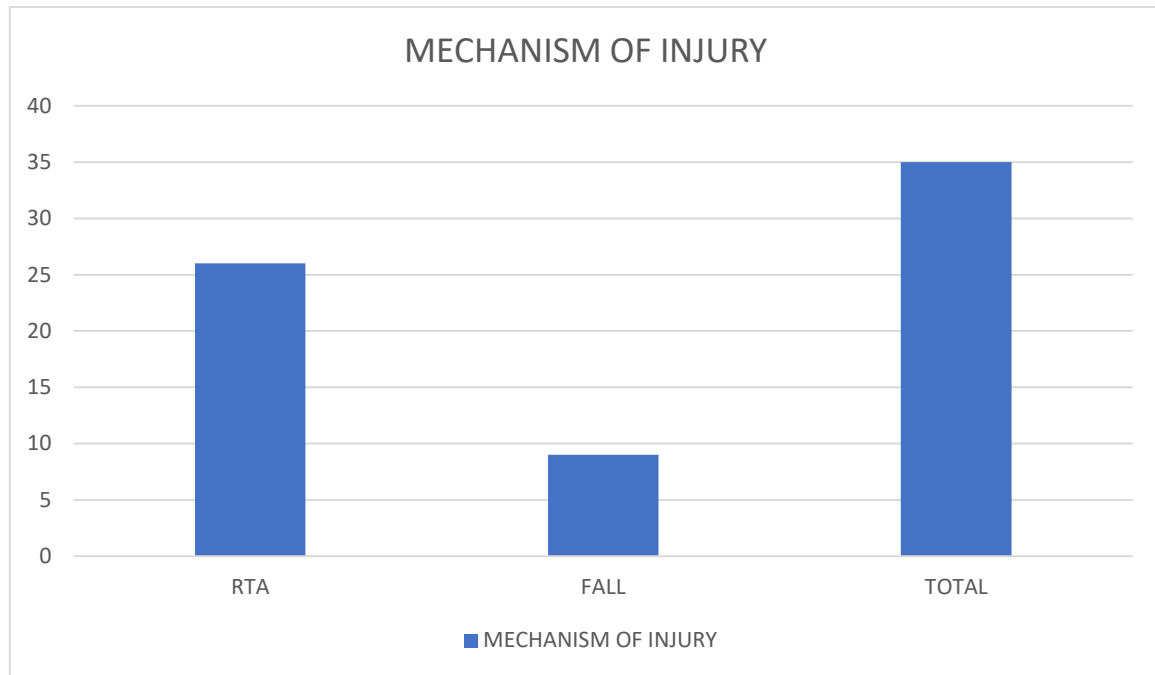
#### **Graph 1: Age Wise Distribution Of Study Population**



**Graph 2: Sex Distribution Of Study Population**



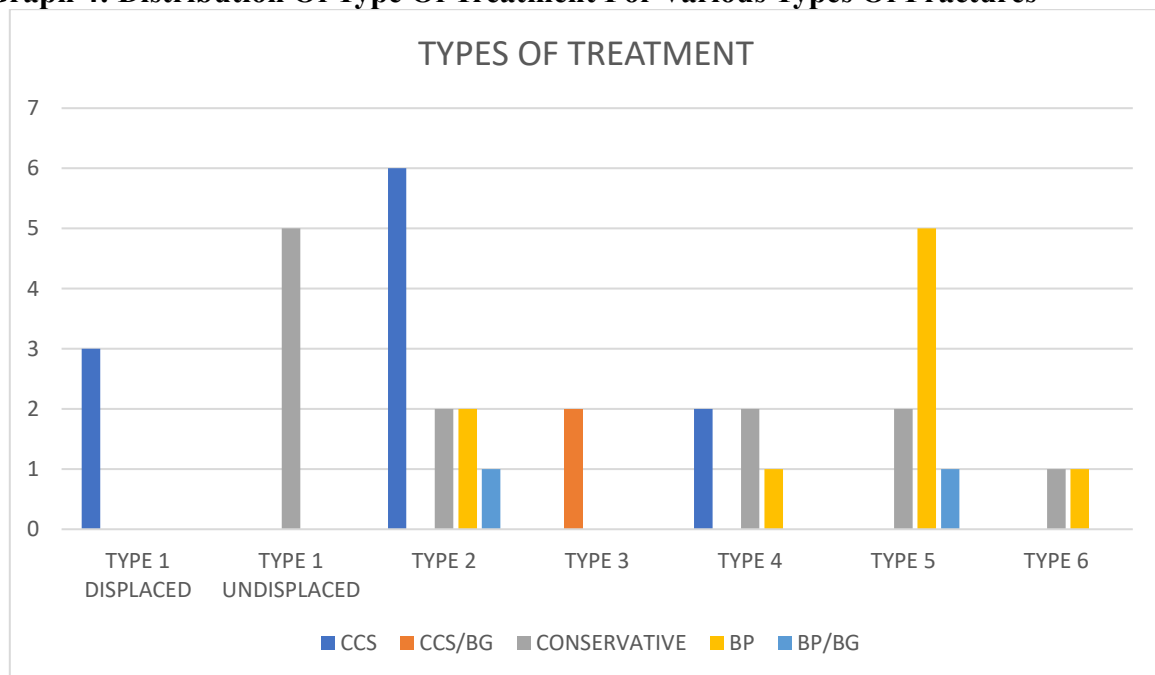
**Graph 3: Distribution Of Study Population Based On Mechanism Of Injury**



**Table 1: Distribution Of Study Population Based On The Type Of Fracture**

Type Of Fracture	Number	Percentage
Type 1-Displaced	3	8.5%
Type 1 Undisplaced	5	14.2%
Type 2	11	31.4%
Type 3	2	5.7%
Type 4	5	14.2%
Type 5	7	20%
Type 6	2	5.7%
Total	35	100%

**Graph 4: Distribution Of Type Of Treatment For Various Types Of Fractures**



**Table 2: Treatment Wise Early Complication Among Study Subjects**

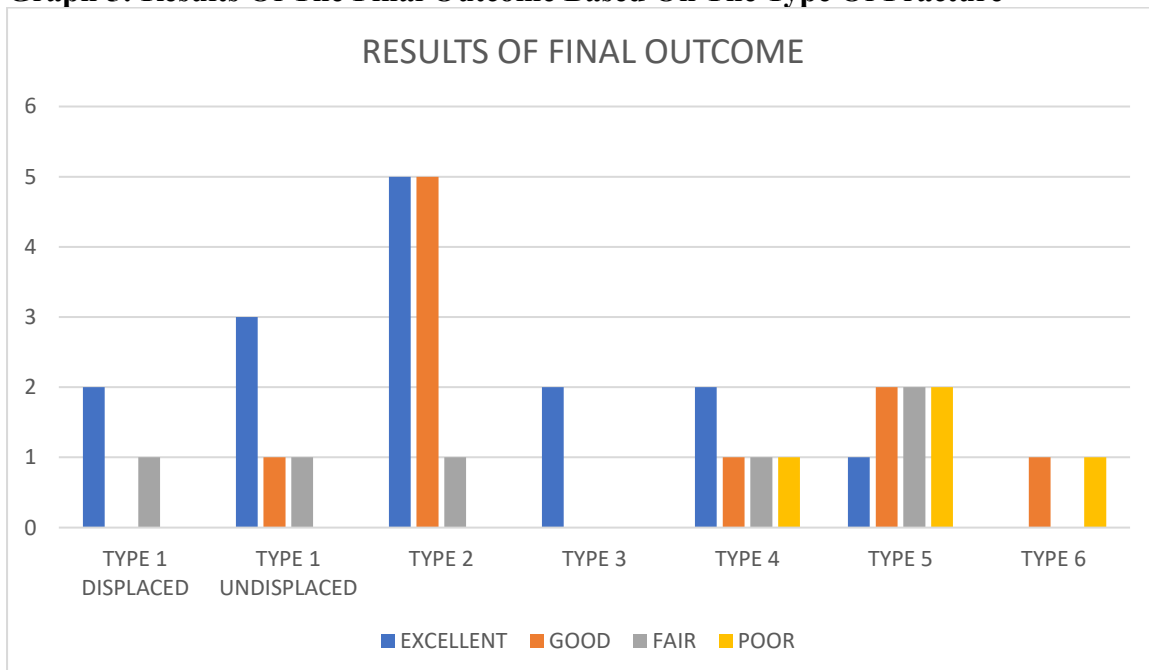


Type Of Treatment	Inf	Lor	Nil	Total	P-Value
Conservative	0	4(33.3%)	8(66.6%)	12(100%)	<0.05
Ccs	0	0	11(100%)	11(100%)	<0.001
Ccs/Bg	1(50%)	0	1(50%)	2(100%)	0.523
Bp	4(44.4%)	0	5(55.5%)	9(100%)	0.416
Bp/Bg	0	0	1(100%)	1(100%)	0.248
Total	5(14.2%)	4(11.4%)	26(74.2%)	3(100%)	

Table 3: Treatment Wise Late Complications Among The Study Subjects

Type Of Treatment	Ks	Ptoa	Malunion	Ki	Nil	Total	P-Value
Conservative	6(50%)	3(25%)	1(50%)	1(8.3%)	1(8.3%)	12	<0.0001
Ccs	0	1(9%)	1(9%)	2(18.1%)	7(63.6%)	11	0.156
Ccs/Bg	0	0	0	0	2(100%)	2	0.146
Bp	0	1(11.1%)	0	0	8(88.8%)	9	0.028
Bp/Bg	0	0	0	0	1(100%)	1	0.216
Total	6(17.1%)	5(14.2%)	2(5.7%)	3(8.5%)		35	

Graph 5: Results Of The Final Outcome Based On The Type Of Fracture



P-Value <0.005 (Statistically Significant).



**Table 3: Results Of The Final Outcome Based On The Type Of Treatment**

Type Of Fracture	Excellent	Good	Fair	Poor	Total	P-Value
Conservative	3(25%)	6(50%)	2(12.5%)	1(6.25)	12(100%)	<0.023
Ccs	5(45.4%)	3(27.2%)	2(18.1%)	1(9%)	11(100%)	<0.05
Ccs/Bg	2(100%)	0	0	0	2(100%)	<0.01
Bp	3(33.3%)	3(33.3%)	2(22.2%)	1(11.1%)	9(100%)	0.174
Bp/Bg	1(100%)	0	0	0	1(100%)	0.312
Total	14(40%)	12(34.2%)	6(17.1%)	3(8.5%)	35(100%)	

### Discussion:

Despite Many Advances In The Care Of Intra-Articular Fractures, Tibial Condylar Fractures Continue To Be A Difficult Surgical Problem. A Survey Of The Literature Indicates That Many Authors Report Only Significantly Better Than 50% Satisfactory Results With Either Closed Or Operative Methods Of Treatment. The Management Of Tibial Plateau Fracture Has Always Been A Subject Of Debate Because Of Their Variety And Complexity. When Reviewing Previous Studies, It Is Apparent That The Results Are Reported Collectively Without Regard To The Severity Of The Fracture Type. A Comparison Of Contemporary Retrospective Studies Is Difficult. However, It Is Possible To Separate Out These Injuries That Are Described As “Severe Or Complex.” The Results Of The Non-Operative Management Of These Injuries Have Historically Been Unsatisfactory. “A Review Of Literature Suggested That The Current Series Has Some Similarities With Other Published Series. In The Current Series, The Average Age Group Was 41 Years ,57% Were Between 31-50 Years. Porter In 1970 Reported An Average Age Of 47 Years In His Study Of 68 Cases. Bowes And Hohl In 1982 And Duvelius And Conolly In 1988 Reported Average Age Group Of 48 Years. This Study Had Male Preponderance. Most Of The Studies By Bowes And Hohl, Marwah Et Al And Duvelius And Conolly Showed A Male Preponderance. In This Study,16 Patients Sustained Injury To The Right And 19 Patients To The Left Rasmussen D.S Reported The Fractures Were Equally Distributed In The Right And Left Knee That Is 131 On Right And 129 On Left.

Road Traffic Accident Was The Commonest Mode Of Injury (74.2%) And Fall From A Height (25.7%). Chaix Et Al In 1982 Reported 71.6 Of Their Cases Were Due To R.T.A 16% Due To Fall From Height,12% Due To Fall From Level Surfaces And 1% Due To Sports Injuries. Blokker Et Al In 1984 Reported The Most Common Mechanism Of Injury Were Motor Vehicle Accidents 43.7%. Rasmusse Reported Most Common Cause Was By Rta That Is 45% Of The Cases. Lansinger O Reported 31% Of The Patients Injured Due To Direct Trauma ,33% Due To Fall From Height And 36% Fall From Level Surface And 45% Were Due To Rta.

In This Study 59.8% Were Lateral Tibial Condylar Fracture, Isolated Medial Tibial Condylar Fracture Occurred In 17% Where As Involvement Of Bicondylar Lesions Were 23%.This Is Comparable To Studies Done By Hohl M In 1991 Reported 50-70% Injuries Affecting Lateral Condyle ,Isolated Medial Condyle Lesions In 10-23% And Bi-Condylar Lesions Found In 10-30%.Rasmussen Reported 70% Of The Injuries Affecting Lateral Condyle ,12% Affecting Medial Condyle And Bicondylar Lesions In 18%.Lansinger O Reported 70% Affecting The Lateral Condyle,11%\$ Medial Condyle And 19% Bicondylar Lesions.9 Patients Treated By Conservative Treatment Methods Showed Good To Excellent Results,2 Fair And 1 Poor Results Out Of 12 Patients. These Results Were Comparable To The Study Done By Duparc And Ficut Where They Got Good To Excellent Results In 62% Of The Patients. In 1981 De Coster Et Al Reported 61% Of Good To Excellent Results Following Conservative Management. Their Method Of Management Was Mainly By Functional Cast Bracing. Some Investigators Have Revealed A Higher Rate Of Good To Excellent Results. Apley In 1979



Reported 80% Good Results By Traction Mobilization Methods. De Mourgues And Chaix In 1969 Reported 75% Good And Excellent Results After Cast Brace Treatment Of Compression And Bicondylar Fractures. Drennan Db Reported 85% Of The Patient Results Were Rated Good To Excellent. Loss Of Reduction Was The Early Complication Noted In 4 Patients Among 12 Conservatively Managed Patients. Knee Joint Stiffness Was Seen In 6 Conservatively Managed Patients. Post Traumatic Osteoarthritic Changes Were Seen In 3 Conservatively Managed Patients. These Changes Were More Commonly Seen Among High Velocity Trauma In Type Iv, V And Vi Fractures. Jensen And Group Reported 12% Incidence Secondary Osteoarthritis With Conservative Treatment. Average Time Of Union Of Those Fractures Management Conservatively Was 3.8 Months.

The Results Of Functional Evaluation Of The Knee Treated By Surgical Means Showed 47.8% Showed Excellent Results, 26% Good Results And 17% Fair Results And 8% Poor Results. Chaix Et Al Reported 86% Good To Excellent Results By Surgical Means Of Treatment. Tscherne Reported 190(77%) Of The 244 Cases Of Tibial Plateau Fractures Showed Good Results. Keogh Reported Out Of 13 Patients Treated Displaced Tibial Fractures With Percutaneous Screw Fixation 11 Had Satisfactory Results, One Had Fair And One Had Poor Results. Koval Reported 33% Excellent, 56% Good And 11% Fair Results With 20 Displaced Fractures Treated By Indirect Reduction And Percutaneous Screw Fixation. Functional Evaluation Of Knee Joint Based On Hohl And Luck Method Revealed 25% Excellent Results, 50% Good Results By Conservative Treatment And 47.8% Excellent Results, 26% Good Results By Surgical Treatment. Savoie Reported In A Retrospective Review Of 80 Patients, 23 Treated Non-Operatively And 52 Operatively, Satisfactory Results Were Obtained In 87% Of The Operatively Treated And 66% Of Those Treated Non-Operatively. Blokker Reported 60% Of The Fracture Treated By Surgical Means, 22 Was Treated By Closed Methods Reported Overall 75% Had Satisfactory Results. After Classification Of Fractures Into Low Velocity Injuries And High Velocity Injuries, 33.3% Of Low Velocity Injuries Are Treated By Conservative Method And 66.6% Treated With Surgical Methods And 35.7% By Conservative Methods. The Results Showed That Surgical Treatment Produce Better Treatment In Low Velocity Injuries As Compared To Conservative Methods. However Conservative Management Of Type 1 Un Displaced Fracture Did Not Yield Good Result. In High Velocity Injuries, Good Articular Surface Reduction Showed Good Results. Among The Early Complication Infection Was A Common Problem With Surgical Methods. Loss Of Reduction Was Seen In 4 Patients Managed By Conservative Method. Study Also Revealed That The Duration Of Hospital Stay Was Much Shorter After Conservative Management As Compared To Surgical Method.

### **Conclusion:**

The Correct Method Of Management Of Tibial Condylar Fractures Depends On Good Clinical Judgement. Males Are Affected More Than Females. Fractures Occurred More Commonly Between 31—40 Years. Commonest Mode Of Injury Was The Road Traffic Accident (High Energy Trauma). Lateral Plateau Fractures Were More Common Compared To Medial Plateau. The Main Aim Of The Surgical Treatment Includes Precise Reconstruction Of The Articular Surface With Elevation Of The Depressed Bone Fragment, Bone Grafting, Stable Fragment Fixation Allowing Early Range Of Movement And Repair Of All Concomitant Ligamentous And Other Soft Tissue Injuries. Displaced Intra-Articular Fractures Those Belonging To Schatzker's Type 1, 2 And 3 Should Be Treated By Surgical Methods. Conservative Treatment Yielded Good Results In Type 1 Un Displaced Fractures. Schatzker's Type 3 Can Be Managed Conservatively If The Depression Is Less Than 2 Mm. Orif With Buttress Plate And Bone Grafting Gives Good To Fair Results In Schatzker's Type Iv And Type V Fractures. Incidence Of Minimal To Moderate Posttraumatic Osteoarthritis And Knee Stiffness Was Higher In The Conservatively Managed Patients And In Patients With High Velocity Injuries As Compared





To The Surgical Group And Low Velocity Injuries Indicating The Importance Of Accurate Articular Surface Reconstruction By Surgical Methods.

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