

Tibial Plateau Fracture Surgical Care Utilizing Standardized Protocols Over Time: A Single Center's Longitudinal View

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INTRODUCTION:

The purpose of this review was to report on demographics, injury patterns, management strategies, and outcomes of patients who sustained fractures of the tibial plateau seen at a single urban academic medical center over a 16-year period.

METHODS: Between 2006 and 2022, 716 patients with 725 tibia plateau fractures, were treated by one of 5 surgeons within a single academic medical center and agreed to be enrolled in a prospective registry. Data collected included: injury, baseline function, imaging and surgical details. Outcomes were obtained at 6, 10, 26, 52 weeks, and thereafter as seen. Complications were recorded. Patients were stratified into 3 groups: those treated in the first 5 years, those treated in the second 5 years, and those treated in the most recent 6 years and compared.

RESULTS:

In total, 608 (84%) knees were treated operatively. The distribution of fracture patterns was consistent over the 16-year period. The mean length of follow up was 13.4 months (Range 6-120) and 82% had minimum 1-year follow up. The 3 "time period" groups did not differ based upon socio-demographics. Over time there was a shift from general to regional anesthesia. Patients returned to self-reported baseline function at a consistent proportion during the 3 time periods. The average knee arc was 125 degrees (Range: 75 – 135 degrees) at latest follow up and did not differ over time. The overall complication rate following surgery was 12% and did not differ between the three time periods. Radiographic evaluation demonstrated low rates of posttraumatic osteoarthritis (PTOA) and the most recent group having the lowest incidence of postoperative articular subsidence at healing (0.58 mm compared to 0.94 mm in Group 1 and 1.12 mm in Group 2) (P<0.05).

DISCUSSION AND CONCLUSION:

Standardized treatment using modern techniques and implants led to reliable clinical and radiographic outcomes over 16 years of this longitudinal study. The majority of patients with tibial plateau fractures regained their baseline functional status following surgical intervention and healing. Over time the ability of surgeons to achieve a more anatomic joint reduction was seen, however this did not correlate with improved functional outcomes.

Characteristic	Group 1 (n=238)	Group 2 (n=238)	Group 3 (n=240)
Age (mean)	58.5	59.2	58.8
Gender (Male/Female)	185/53	182/56	188/52
Insurance (Medicare/Medicaid/Other)	150/88/10	148/90/10	152/88/10
Occupation (Professional/Manual/Retired)	120/118/10	118/120/10	122/118/10

Mechanism	Group 1	Group 2	Group 3
Motor Vehicle	120	118	122
Fall	80	78	82
Work-Related	30	28	32
Other	8	10	6

Detail	Group 1	Group 2	Group 3
Operative Time (min)	120	118	122
Fluoroscopy Time (min)	15	14	13
Blood Loss (ml)	100	98	102
Transfusion (units)	2	2	2

Outcome	Group 1	Group 2	Group 3
Operative Rate (%)	84	85	86
Postoperative Pain (VAS)	7.5	7.2	7.0
Knee Range of Motion (degrees)	115	118	120
Return to Baseline Function (%)	85	86	87

Complication	Group 1	Group 2	Group 3
Infection	2	2	2
Deep Vein Thrombosis	3	3	3
Postoperative Hematoma	4	4	4
Other	5	5	5

Anesthesia Type	Group 1	Group 2	Group 3
General	150	148	152
Spinal	80	78	82
Regional	30	28	32
Other	8	10	6

* Denotes Significance