

Early pain predicts long-term functional outcomes and chronic pain following operative fixation of tibial plateau fractures

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BACKGROUND

- Fractures of the tibial plateau constitute 1% of all fractures treated in the United States (Figure 1).
- Secondary to varus or valgus stress is applied to the knee, coupled with axial loading.
- There is a bimodal distribution
 - Due to higher energy mechanisms such as motor vehicle accidents, or low energy mechanisms as in falls with osteoporotic bone.
- Operative goals are:
 - reconstructing the articular surfaces
 - restoring alignment
 - repairing concomitant soft tissue injuries of the knee (Figure 2).
- Decreased knee stability and failure to restore joint alignment leads to poor long-term outcomes.
- There has been recent advancements in surgical techniques, implant technology, and post-operative management.
- However, pain following orthopaedic trauma continues to be a significant problem.

OBJECTIVE

To determine if short-term pain scores following operative fixation of tibial plateau fractures (TPF) can predict long-term pain and functional outcomes.

METHODS

- Over 11 years, all operative and non-operative TPF's treated by one of three surgeons at a single institution were prospectively followed.
- Data collection included: Demographics, Injury info, clinical, pain, radiographic and functional outcomes
- All patients that had at least 12 month follow-up and were treated operatively were included in this analysis.
- Pearson's correlation was performed between 3-month post-operative pain scores and long-term outcomes (VAS and SMFA).

Table 1. Mean SMFA and pain scores at short and long-term follow-up.

Outcome (mean)	3 Months	Late Follow-up
SMFA	36.45	21.41
Pain (VAS)	3.1	2.8

Table 2. Mean SMFA and pain scores at short and long-term follow-up.

	Correlation coefficient	P value
Moderate Correlations		
Long-term functional outcomes	.445	<0.001
Long-term emotional status	.427	<0.001
Long-term bothersome nature of injury	.446	<0.001
Long-term daily activities	.404	<0.001
Strong Correlation		
Long-term pain scores	.543	<0.001

Figure 1. Radiographs demonstrating a Schatzker VI tibial plateau fracture



Figure 2. Operatively managed Schatzker VI tibial plateau fracture.



RESULTS

- 169 patients were treated for a TPF over a 11 year period.
- 260 of these patients were treated operatively.
- Pain scores were lower at 3-month follow-up in the group receiving spinal anesthesia as compared to the group receiving general anesthesia (p=0.014).
- Anesthesia type had no influence on pain scores at long-term follow-up.
- Mean pain scores and functional outcomes are demonstrated in Table 1.
- Strong correlations existed between short-term pain scores and long-term pain scores. Moderate correlations existed between short-term pain scores and long-term functional outcomes (Table 2).

CONCLUSIONS

- The ability to anticipate long-term outcomes and chronic pain following common orthopaedic trauma, requiring operative fixation, is extremely important in surgical practice.
- Short-term pain reliably predicted long-term pain in patients who had operatively managed TPF's.
- Pain scores at short-term follow-up may aid as a tool in providing orthopaedic trauma surgeons the ability to provide early interventions aimed at optimizing patient recovery.
- Alternate strategies for pain management early in recovery may aid in improved longer term outcomes.

REFERENCES

1. Moore TM, Patzakis MJ, Harvey JP. Tibial plateau fractures: definition demographics, treatment rationale, and long-term results of closed traction management or operative reduction. J Orthop Trauma. 1987;1(2):97-119.
2. Morris BJ, Mir HR. The opioid epidemic: impact on orthopaedic surgery. JAAOS-Journal of the American Academy of Orthopaedic Surgeons. 2015 May 1;23(5):267-71.
3. Schatzker J, McBroom R, Bruce D. The Tibial Plateau Fracture: The Toronto Experience 1968-1975. Clinical orthopaedics and related research. 1979;138:94-104.
4. Stevens DG, Beharry R, McKee MD, et al. The long-term functional outcome of operatively treated tibial plateau fractures. J Orthop Trauma 2001;15(5):312-320
5. Tschernie H, Lobenhoffer P. Tibial Plateau Fractures: Management and Expected Results. Clinical orthopaedics and related research. 1993;292:87-100.
6. Urruela AM, Davidovitch R, Karia R, et al. Results following operative treatment of tibial plateau fractures. J Knee Surg. 2013;26(03), 161-166.