

Pediatric Subtrochanteric Fractures: A Comparison of Outcomes by Implant Type

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INTRODUCTION: Subtrochanteric fractures comprise 4-10% of pediatric femur fractures and can be fixed with different implants. This study evaluates clinical and radiographic outcomes in operative pediatric subtrochanteric fractures.

METHODS: A retrospective review of patients aged ≤ 17 with traumatic subtrochanteric fractures receiving intramedullary nailing (IMN), titanium elastic nailing (TEN), or plate between 2015-2023 at a level-1 center was conducted, excluding pathologic fractures. Clinical and radiographic outcomes were collected in patients with at least 6-weeks follow-up.

RESULTS: Among 35 fractures (34 patients, mean age 9.7, age range 3-16, 76.5% male), 11 received IMN, 12 TEN, and 12 plate. There was no difference in sex, ASA, AO/OTA fracture type, mechanism of injury, open fracture, or polytrauma between groups. Mean follow-up was 302 days. No significant differences were found in rates of complications among implants, but age and weight influenced implant selection (Table 1). 91.7% of TEN and 50.0% plate patients underwent planned hardware removal. No IMNs were removed. Radiographic measurements were comparable, except for mRUST at 6 weeks and 3 months.

DISCUSSION AND CONCLUSION: TENs demonstrated shorter surgical duration and estimated blood loss in pediatric subtrochanteric femur fractures fixation, but the majority required planned hardware removal. Plate fixation demonstrated decreased 6-week and 3-month healing on radiographs. Age and weight affected implant type but all had low complication rates.

Table 1: Demographics, radiological & clinical outcomes of plate, IMN, and TEN patients

	Plate	IMN	TEN	p
Age	9.3	13.3	6.8	<0.001
Weight (kg)	43.7	68.4	26.2	<0.001
BMI	21.3	25.4	17.5	0.008
Duration of surgery (hours)	3.88	4.19	1.99	<0.001
Estimated blood loss (ml)	230	264	18	0.002
FNSA* (°)	136.3	133.4	137.0	0.194
Cortical displacement on lateral* (mm)	3.0	7.2	2.1	0.066
Cortical displacement on AP* (mm)	2.5	6.0	3.0	0.252
Angulation at fracture site on lateral* (°)	1.6	1.0	2.2	0.675
Angulation at fracture site on AP* (°)	0.6	0.5	0.8	0.921
mRUST at 6 weeks	7.0	8.5	10.6	0.043
mRUST at 3 months	9.7	10.6	14.0	0.030
Unplanned revision surgery (n, %)	2, 16.7%	1, 9.1%	2, 16.7%	1.000
Planned removal of hardware (n, %)	6, 50.0%	0, 0%	11, 91.7%	<0.001
Deep infection (n, %)	0, 0%	1, 9.1%	0, 0%	0.267
Wound complication (n, %)	0, 0%	1, 9.1%	1, 10%	0.722
Nonunion (n, %)	0, 0%	0, 0%	1, 10%	1.000

*Measured on immediate postop radiographs