

# Does Time to Treatment of Pediatric Femoral Shaft Fractures Impact Clinical Outcomes?

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**Purpose:** One quality measure used by USNWR and other entities is time to treatment for isolated pediatric femoral shaft fracture. Hospitals that are able to provide at least 80% of pediatric patients with an operating room start time within 18 hours of admission to the emergency department, receive more points towards a better pediatric orthopedic ranking. Therefore, it is important to determine whether the 18-hour cut-off time to treatment of pediatric femur shaft fractures actually affects clinical outcomes. We hypothesize that there are no differences in outcomes and complication rates for patients who receive treatment within 18 hours compared to those who receive treatment after 18 hours.

**Methods:** A retrospective review was conducted to compare clinical outcomes of 174 pediatric patients (age < 16) with isolated femur shaft fractures (Injury Severity Score = 9) from 1997 to 2017 at a single level I pediatric trauma center. The two groups compared were those receiving treatment within 18 hours of ED admission (N = 87) or greater than 18 hours (N = 87).

**Results:** Patient, injury, and surgical characteristics were similar between the early and delayed treatment groups, including mean age (7.5 vs. 8.1 years) with almost

identical numbers of children in age categories: 0-4, 4-9, 10-13, and 14-15 years. Patients who received treatment within 18 hours were more frequently immobilized post-operatively (70.1% vs. 52.9%,  $p = 0.0362$ ) and had a shorter median length of stay in the hospital (2 vs. 3 days,  $p = 0.0047$ ). There were no statistical differences in any outcomes including surgical site infection, time to weight-bearing (48 days vs. 53 days), time to complete radiologic fracture healing (259 vs. 232 days), range of motion, angular deformity, leg length discrepancy, loss of reduction, or persistent pain/tenderness.

**Conclusions:** Treatment of pediatric femur shaft fractures within 18 hours does not impact clinical outcomes, but may result in one additional day of hospitalization.

**Significance:** It is important that national quality measures are supported by evidence-based data so that as hospitals seek to meet quality standards, patient outcomes will also improve. Treatment of a femoral shaft fracture within 18 hours resulted in one day shorter length of stay but no long-term detectable differences in patient outcomes.

	OR < 18 Hours N = 87	OR > 18 Hours N = 87	All N = 174	P-value
<b>Demographics</b>				
Age Mean (sd)	7.53 (4.70)	8.12 (4.70)	7.87 (4.70)	0.4096
Age (cat)				0.7326
<4	28 (32.2)	22 (25.3)	50	
4-9	27 (31.0)	29 (33.3)	56	
10-13	24 (27.6)	25 (28.7)	49	
14+	8 (9.2)	11 (12.6)	19	
<b>Surgery</b>				
ED Time Mean(sd) (min)	157.51 (61.36)	182.59 (85.40) Na = 1	169.98 (75.13) Na = 1	0.0277
Time to OR Median(IQR) (hr)	7.46 (4.29)	36.33 (13.29)	17.54 (28.84)	--
Time to incision Median(IQR) (hr)	9.75(5.145) Na = 24	38.54 (12.71) Na = 6	27.84 (29.59) Na = 30	--
Procedure length Mean(sd) (hr)	4.012857 (2.137238) Na = 24	4.21 (1.979124) Na = 6	4.12 (2.04) Na = 30	0.5678
OR time Median(IQR) (hr)	6.5 (5.125)	7.79 (5.71)	7.44 (5.34)	0.1568
Blood loss Median(IQR) (cc)	150 (112.5) Na = 59	150 (137.5) Na = 49	150.00 (137.50) Na = 108	0.5480
<b>Post-Op</b>				
Immobilization	61 (70.1)	46 (52.9)	107 (61.5)	0.0362
Length of stay – median(IQR) (days)	2(2)	3(2)	2(3)	0.0047
Follow-up – median(IQR) (days)	311.0 (188.5-393.0)	305.0 (218.0-424.5)	311.0 (191.0-414.0)	0.5345
<b>Outcomes</b>				
Complete fracture time to heal Mean(sd) (days)	258.9 (157.3) Na = 21	232 .0 (134.7) Na = 26	245.4 (146.6) NA = 47	0.4970
Time to full <u>weightbearing</u> Mean(sd) (days)	48.1 (20.2) Na = 1	52.5 (34.3)	50.3 (28.1) Na = 1	0.3696
Surgical site infection	6 (6.9)	1 (1.1)	7 (4.0)	0.1174
Hardware removal	40/53	52/58	92/103	0.0984