

Orthotic hip brace as an alternative for treatment of femoral fractures in children under the age of 3 years: a retrospective study

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Background: Femoral fractures are among the most common reasons for orthopedic related hospital admissions in children. While spica cast is recommended for most children younger than 5 years, in the last decades, Pavlik harness was proven to be a safe alternative for young children.

Objective: To assess the safety, outcomes and complications of a Hip Abduction Brace (HAB) for the treatment of femoral fractures in children under the age of 3 years.

Methods: This 7- year retrospective study was conducted in a single tertiary hospital. Children aged 6-36 months diagnosed with a femoral fracture which did not necessitate operative treatment were included. HAB has been used as the treatment of choice for non-displaced or minimally displaced fractures of the proximal femur as well as for both displaced and non-displaced femoral shaft fractures.

Table 1- Comparison of demographic characteristics in the Spica cast group vs. the hip abduction brace group

	SPICA N=73 (%)	Hip abduction brace N=29 (%)	P value
Age at admission (SD), months	25.5 (6.4)	21.5 (6.1)	0.001
Gender- Male	52 (71.2)	21 (72.4)	0.9
Comorbidities	4 (5.4)	2 (6.9)	0.77
Mechanism of injury:			
Fall	52 (71.2)	24 (82.8)	0.23
MVA	2 (2.7)	0	0.37
Other	19 (26.1)	5 (17.2)	0.34
Location of injury:			
Home	37 (50.6)	12 (41.4)	0.4
Playground	10 (13.7)	0 (0)	0.04
Kindergarten	3 (4.1)	4 (13.8)	0.08
Other/Unknown	7/16 (31.5)	2/11 (44.8)	0.2
Length of in-house stay (SD), days	1.83 (1)	0.96 (1)	<0.001

Table 2- Comparison of history and physical examination in the Spica cast group vs. the hip abduction brace group

	SPICA N=73 (%)	Hip abduction brace N=29 (%)	P value
Additional injuries	8 (11)	4 (13.8)	0.69
Presenting complaint:			
Pain	40 (54.8)	18 (62)	0.51
Refusal to bear weight	18 (24.7)	10 (34.5)	0.32
Refusal to move the limb	4 (5.5)	3 (10.4)	0.38
Physical Examination:			
Swelling	35 (47.9)	10 (34.5)	0.22
Deformation	37 (50.7)	1 (3.4)	<0.0001
Limited ROM	10 (13.7)	6 (20.7)	0.38
Neurovascular deficit	0 (0)	0 (0)	

Table 3- Comparison of fracture characteristics in the Spica cast group vs.the hip abduction brace group

	SPICA N=73 (%)	Hip abduction brace N=29 (%)	P value
Fracture location:			
Neck of femur	0 (0)	1 (3.4)	0.12
Intertrochanteric	2 (2.7)	3 (10.4)	0.1
Proximal shaft/ Subtrochanteric	7 (9.6)	4 (13.8)	0.54
Midshaft	64 (87.7)	21 (72.4)	0.06
Distal femur	0	0	
Type of fracture:			
Spiral	49 (67.1)	17 (58.6)	0.43
Buckle/greenstick	0 (0)	7 (24.1)	<0.0001
Other	24 (32.9)	5 (17.2)	0.11
Displaced	45 (61.6)	12 (41.4)	0.06
Angulation	36 (49.3)	9 (31)	0.09

Table 4- Comparison of history and physical examination in the Spica cast group vs. the hip abduction brace group

	SPICA N=73 (%)	Hip abduction brace N=29 (%)	P value
Reduction	53 (73.6)	1 (3.4)	<0.0001
Traction	29 (39.7)	4 (13.8)	0.01
Underwent surgery	70 (95.9)	0	<0.0001
Length of surgery (SD), h	66.8 (36.4)	NA	
Length of follow up (SD), days	79.1 (97.3)	67.7 (79.9)	0.58
Radiographic outcome*			
Shortening	16 (25.8)	4 (14.8)	0.26
Angulation	13 (21)	7 (25.9)	0.61
Rotation	1 (1.6)	0 (0)	0.51
Normal	32 (51.6)	16 (59.3)	0.5
Surgery complications:	1 (1.4)	NA	0.54
Treatment complications	28 (38.4)	2 (6.9)	<0.01
Malunion	3 (4.1)	1 (3.4)	0.87
Reapplication	2 (2.7)	1 (3.4)	0.85
Switch to alternative fixation technique	1 (1.4)	0 (0)	0.54
Readmission	4 (5.4)	0 (0)	0.29
Fixation failure:	19 (26)	0 (0)	<0.01
Breakage	6 (8.2)	0 (0)	
Loosening	13 (17.8)	0 (0)	
Fixation induced skin problems:	4 (5.4)	2 (6.7)	0.8
Maceration	1 (1.4)	0 (0)	
Sore wounds	2 (2.7)	1 (3.4)	
Local irritation	1 (1.4)	1 (3.4)	
Other complications	3 (4.1)	0 (0)	0.29

Conclusion: HAB can be considered a safe and comfortable alternative in selected children aged 6 to 36 months with nondisplaced/mildly displaced proximal and diaphyseal femoral fractures.