

## **Prefabricated Functional Bracing Versus Spica Casting For Femur Fractures in Young Children: Lowering the Cost of Care**

Patrick Wise, Nicholas John Stamatou, Matthew Frederickson, Holly Bee Leshikar, Amanda Tencza Whitaker

### **INTRODUCTION:**

Pediatric diaphyseal femur fractures are a common injury treated by pediatric orthopedic surgeons, with an estimated incidence of 19 per 100,000 children annually. Standard treatment for children between 6 months and 5 years with diaphyseal femur fractures and minimal shortening is a closed reduction and hip spica cast. Evidence now emerging suggests that prefabricated functional femur braces (PFBs) can be used to treat pediatric diaphyseal femur fractures with similar outcomes. Spica casts typically require general anesthesia, have a high rate of skin complications, and may need adjustments under additional anesthesia. The functional femur braces are adjustable, have an improved hygiene mechanism, and eliminate the need for general anesthesia due to their ease of application. This study examined the cost, efficiency, and efficacy of the PFB compared to our standard of care of spica casting for young pediatric femur fractures.

### **METHODS:**

Children between 6 months and 5 years of age who were treated with spica casting or PFBs an isolated femur fracture were retrospectively reviewed between January 2021 and October 2024. Children with follow-up until cast/brace removal were included. Hours admitted, sedation, location of treatment (operating room (OR) vs emergency department (ED)), length of stay, return to ED, complications, hospital charges, and follow-up were examined. Cost of initial hospitalization and length of stay (LOS) were compared between groups using student t-test ( $p < 0.05$ ). Costs of care were obtained from hospital account/billing records. Return to emergency department (ED) and return to operating room (OR) rates, phone calls, and mentions/images of skin/cast issues were recorded.

### **RESULTS:**

Forty-nine total patients were identified, with 38 spica casts and 11 PFBs being applied. Average age between groups was not significantly different ( $p = 0.29$ ). All spica cast applications required general anesthesia. Five of eleven PFBs (45.5%) required conscious sedation in ED, while the others required no formal sedation/anesthesia. The LOS for PFBs (16.5 +/- 9.8 hours) was lower than spica casting (26.2 +/- 15.9 hours) in a statistically significant manner ( $p = 0.03$ ). The cost of hospitalization for function bracing (\$ 49,841 +/- 16,199) was also lower than spica casting (\$74,867 +/- 14,415) in a statistically significant manner ( $p = 0.000005$ ). PFBs had no returns to the ED or the OR. Of patients who underwent spica casting, 7.9% (3 out of 38) returned to ED but no patients returned to OR. Rashes were found in 3 of the fracture brace patients and 7 of the cast patients, none requiring more than supportive care. Eight casting patients required in-office adjustments and treatment for wet/soiled casts. The total number of complications was 27% in the brace (all rashes) and 37% in the cast ( $p > 0.05$ ). There was no difference in time of immobilization, with 34 days $\pm$ 7 in the brace and 35 days $\pm$ 6.9 in the cast ( $p > 0.1$ ). There was also no difference in average phone calls (0.55 vs 0.35,  $p > 0.5$ ) or clinic visits (2.6 vs 2.8,  $p > 0.1$ ). There were no refractures. Due to the retrospective nature of our cast population, the average follow-up for the brace was 14 weeks and 25 weeks for the cast ( $p > 0.1$ )

### **DISCUSSION AND CONCLUSION:**

Prefabricated functional braces for femur fractures in young children is associated with shorter LOS, lower short-term costs of care, and a lower rate of return to the ED. Compounding on earlier research that demonstrates adequate outcomes, this study suggests that prefabricated functional femur braces are a safe, efficient and cost-effective treatment of pediatric femur fractures.