ORIGINAL ARTICLE

# Comparison of Titanium Elastic Nailing vs Hip Spica Cast in Treatment of Femoral Shaft Fractures in Children

Syed Habib Ullah Shah, Eid Muhammad, Mazhar Iqbal

## ABSTRACT

**Objective**: **Objectives:-** To compare mean duration of bone union in traction followed by spica cast versus titanium elastic nailing (TEN) for fracture shaft of femur in children of age 6-12 years.

**Patients and Methods**: This Randomized Control Trials was carried out in the Department of Orthopaedic Surgery, Nishter Hospital Multan from November 2013 to May 2014.A total of 60 patients were included in the study.

**Results**: Out of 60 patients 31 (51.7%) were male and 29 (48.3%) were Female. As regard to the age of patients, male (31) were have mean age of 8.84 and Standard deviation was 2.035, similarly female (29) were have mean age of 8.97 and Standard deviation was 2.009. As regard to the outcomes group 1 with spica Casting were have mean duration 8.77 weeks and Standard deviation was 1.88. Similarly in-group 2 Titanium Elastic Nailing were have Mean of 11.99 weeks and Standard deviation was 20.303. After applying T-test P value calculated as P=.012 which is a valid value.

**Conclusion**: According to this study TEN has better outcomes as compared to the traction followed by spica cast.

**Key words:** Femur, Hip Spica, Titanium Elastic Nailing, and Femoral Shaft

## INTRODUCTION

Femoral shaft fractures are among the most common major paediatric injuries treated by orthopaedic surgeons[1]. Incidence is 1.6% of all children fractures[2], prevalence in boys is 2.6:1 of girls[3]. Femur is the longest and main weight bearing bone of the body. Complications of this fracture can be catastrophic for the child as well as for the family. Common causes of this fracture are child abuse, road traffic accidents, fall from height and fall of heavy objects on the affected limb[4].

Although fracture shaft of femur in children can be treated in a number of ways[5], but choice of specific method is, in general, based upon the fracture pattern, age of the child, and weight of the child and experience of the surgeon. Age is one of the most important factor[6]. Treatment modalities changes with age. Children of age less than 6 years are best managed by spica casting while intramedullary nailing treats those who are above 12 years. Treatment of children between ages 6-12 years is a matter of much debate[7].

*Ghazi Khan Medical College DG Khan*
*Department of Orthopaedics*
*Correspondence: Syed Habib Ullah Shah*
*Email: drsyedhabib67@gmail.com*

The most common treatment modalities, which are in current practice for treating femoral shaft fractures in children between ages 6-12 years, are traction followed by spica cast and titanium nailing[8]. Traditionally this age group had been managed by traction followed by spica cast[9]. However this treatment method is fraught with many complications[10]. Delayed union is one of those complications which in turn cause longer hospital stay, absence from school and daily activities of life and puts socio economic burden on the family[11,13].

## METHODS

This **r**andomized control trials was carried out in the Department of Orthopaedic surgery, Nishter Hospital Multan from November 2013 to May 2014. A total of 60 patients were included in the study.

## RESULTS

Out of 60 patients 31 (51.7%) were male and 29 (48.3%) were female (Table 1). As regard to the age of patients, male (31) was have mean age of 8.84±2.035 years, similarly female (29) were having mean age of 8.97±2.09 years (Table 2). As regard to the outcomes group 1 with spica casting have mean duration 8.77±1.88 weeks (Table 3). Similarly in-group 2

Titanium Elastic Nailing were have Mean of 11.99 weeks and Standard deviation was 20.303 (Table 3). After applying T-test P value calculated as P=.012 which is a valid value.

**Table 1:** Distribution of patients by gender (n=60)

| Gender | No. | % |
|---|---|---|
| Male | 31 | 51.7 |
| Female | 29 | 48.3 |

**Table 2:** Mean±SD of age by gender

| Gender | Age (years) |
|---|---|
| Male | 8.84±2.03 |
| Female | 8.97±2.09 |

**Table 3:** Cross table of outcomes

| Outcome | Duration (weeks) |
|---|---|
| Casting spica | 8.77±1.88 |
| Titanium elastic nailing | 11.99±2.30 |

P=0.403

## DISCUSSION

Although spica casting with skeletal traction is traditionally used for femoral-shaft fractures in children, recent studies have shown its possible effects on social, economic, educational, and emotional costs. In contrast, elastic intra-medullary nailing of femoral-shaft fractures has gained extensive popularity because of its better clinical and psycho-socioeconomic outcomes with lower risk of complications[14]. In our study, we showed the benefits of the TEN surgical method versus traction and spica casting with respect to hospital stay, duration of bone union, time to start walking with support or independently, returning to school, and parent satisfaction. Our findings were in agreement with the results of many studies that showed the efficacy and benefits of elastic nails for treating femoral-shaft fractures. Ligier et al[15] used elastic intramedullary nail (antero-grade or retrograde) with Kirschner wires or pins. They reported more desirable outcomes in femoral-shaft fractures treated with TEN. In Reeve et al [16] study, 41 patients with femoral fractures were treated with traction and casting, and 49 cases underwent intramedullary nailing surgery. They showed complications were higher in the traction and casting group in comparison with the group undergoing surgery.

In our study, the duration of hospital stay was significantly longer in the traction and spica cast group than in the TEN groups. This is in conformity with other studies[17], which reported shorter hospital stays with TEN, but is in contrast to a study[11]. Our findings showed shorter time to start walking with support or independently and sooner return to school in the TEN group compared with the spica casting group. It is probably because of better contact of the fracture surfaces and anatomical reduction in patients who underwent TEN surgery. Such earlier recovery milestones have also been shown[18,19]. In our study, a higher rate of malunion was observed in the traction and spica group compared with the TEN groups. This finding conforms to the results of a similar study conducted by Kirby et al[20] which compared traction and cast with intramedullary nailing and reported malunion only in the traction and casting group.

## CONCLUSION

According to this study TEN has better outcomes as compared to the traction followed by spica cast.

## REFERENCES

1. lynn JM, Skaggs D, Sponseller PD, Ganley TJ, Kay RM, Leitch K. The operative management of paediatric fractures of lower extremity. J Bone Joint Surg Am 2002; 84: 2288-99.
2. Hinton RY, Lincolin A, Crockett MM, Sponseller P, Smith G. Fracture of femoral shaft in children. J Bone Joint Surg Am 1999; 81(4): 500-9.
3. Hedlund R, Lindgren U. The incidence of femoral shaft fractures in children. J Paediatric Orthop.1986; 6: 47-50.
4. Blackmore LC, Loder RT, Hensinger RN. Role of intentional abuse of children 1-5 years old with isolated femoral shaft fractures. J Paedial Orthop 1996; 16: 585-8.
5. Fakoor M, Mousavei S, Javherizadeh H, Pol PC. Different types of femoral shaft fractures. 2011; 83(9): 477-87.
6. Melisie F, Krung E, Duijiff JW, krijnen P, Schipper IB. Ned Tijdschr Geneeskd. Age specific treatment of femoral shaft fractures in children. Am J Orthop 2009; 38(3): 49-55.
7. Khazzam M, Tassone C, Liu XC, Lyon R, Freejo B, Shwab J, et al. Use of flexible intramedullary nail fixation in treating femur fractures in children. Am J Orthop 2009; 38(3): 49-55.

8. Barry M, Paterson JM. Flexible intramedullary nails for fractures in children. J Bone Joint Surg 2004; 86(7): 947-53.
9. Ferguson J, Nicol RO. Early spical treatment of paediatric femoral shaft fractures. J Paediatr Ortop 2000; 20: 189-92.
10. Shamshak HR, Mousavi H, Salehi G, Eshagi MA. Titanium elastic nailing versus hip spica cast in treatment of femoral shaft fracture in children. J Orthop Traumatol 2011; 12(1): 45-8.
11. Saseendar S, Manon J, Patro DK. Treatment of femoral fracture in children. J Child Orthop 2010; 4(3): 245-51.
12. Mehdinasab SA, Najad SAM, Sarafan N. Short term outcome of treatment of femoral shaft fractures in children by two methods. Pak J Med Sci 2008; 24: 147-51.
13. Buechsenschuetz KE, Mehlman CT, Shaw KJ, Crawford AH, Immerman EB. Femoral shaft fractures in children: traction and casting versus elastic stable intramedullary nailing. J Trauma 2002; 53: 914–21.
14. Wright JG. The treatment of femoral shaft fractures in children: a systematic overview and critical appraisal of the literature. Can J Surg 2000; 43: 180–9.
15. Ligier JN, Metaizeau JP, Prevot J. Closed flexible medullary nailing in paediatric traumatology. Chir Pediatr 1983; 24: 383–5.
16. Reeves RB, Ballard RI, Hughes JL. Internal fixation versus traction and casting of adolescent femoral shaft fractures. J Paediatr Orthop 1990; 10: 592–5.
17. Flynn JM, Luedtke LM, Ganley TJ, Dawson J, Davidson RS, Dormans JP et al. Comparison of titanium elastic nails with traction and a spica cast to treat femoral fractures in children. J Bone Joint Surg Am 2004; 86: 770–7.
18. Greisberg J, Bliss MJ, Eberson CP, Solga P, d'Amato C. Social and economic benefits of flexible intramedullary nails in the treatment of paediatric femoral shaft fractures. Orthopaedics 2002; 25: 1067–70.
19. Kirby RM, Winquist RA, Hansen ST. Femoral shaft fractures in adolescents. J Paediatr Orthop 1981; 1: 193–7.
20. Aronson J, Tursky EA. External fixation of femur fractures in children. J Paediatr Orthop 1992; 12: 157.