

Comparative study about the functional outcome of Closed reduction and Internal fixation with TENS and closed reduction and Hip Spica application in paediatric shaft femur fracture within age Of 5 -12 years.

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ABSTRACT

INTRODUCTION:

Fracture shaft femur represents 1.6 percent of bony injuries in paediatric age group. It is one of the common fracture requiring hospitalization and further treatment, either conservative or operative. Many times non operative methods are being preferred considering the financial status of the patient. Other modalities include casting, traction, Thomas knee splint and Pavlik harness. Operative modalities include TENS, Plating and External fixators. Nowadays TENS is one of the preferred modality for such fractures in paediatric age group.

AIMS AND OBJECTIVE:

To compare the better functional outcome between closed reduction and Internal fixation with TENS and closed reduction and hip spica application in a paediatric age group of 5-12 years with fracture shaft femur. TENS offers early recovery, early mobilization, lower chances of limb length discrepancy. Mainly the child does not need to be bed ridden for long, thus chances of other complications are less. This retrospective study compares the result of the above mentioned two treatment modalities for fracture shaft femur.

METHODS:

The study includes 38 patients who were available for follow up post surgery /conservative management in Santosh Medical College and Hospital, Ghaziabad from March-2019 to February-2020. We have a study group of 38 paediatric patients with age ranging between 5 -12 years, out of which 20 were managed with closed reduction and internal fixation with TENS, and 18 were managed with closed reduction and hip spica application. Patients with proximal or distal femoral fractures closer to the epiphyseal plate, open femoral fractures and patients with pathological fractures were excluded from the study.

RESULTS:

The group which were treated with closed reduction and internal fixation with TENS were found to be having no deformities, no malunion, no delayed union, complete functional recovery was achieved. No angulation was found in any of the patient operated and showed up for follow up. The group treated with TENS took a shorter time to start walking with support and then without support. 2 patients out of the group treated with Hip spica were found to have decubitus ulcer which was treated conservatively and 1 patient had more than 10 degrees of mal-alignment. 1 patient treated with TENS had post operative superficial suture line infection, which was well controlled with antibiotic therapy.

CONCLUSION:

Results shows that postoperative time and complications are less in patients treated with TENS and TENS have better results over Hip spica when compared on the basis of functional recovery, hospital stay, early mobilization and less time of care and complications and early return to day to day life. TENS is more preferable than Hip spica in fracture femur shaft in the age group of 5-12 years.

KEY WORDS:

Titanium elastic nail, Hip Spica Cast, Paediatric, Femoral shaft fracture, early mobilization.

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I. Introduction:

Fracture shaft femur represents 1.6 percent of bony injuries in paediatric age group. It is one of the common fracture requiring hospitalization and further treatment, either conservative or operative. Many times non operative methods are being preferred considering the financial status of the patient. Other modalities include casting, traction, Thomas knee splint and Pavlik harness^{1,2}. Operative modalities include TENS, Plating

and External fixators. Nowadays TENS is one of the preferred modality for such fractures in paediatric age group, mainly because it does not hamper with the growth plate, early recovery, less chances of limb length discrepancy and very less chances of deformity^{3,4,5}. Early mobilization and getting back to normal activity is the advantage. Hip spica is cumbersome both for the child and parents due to physical discomfort and psychological factors^{6,7}.

In this study, we have compared the functional outcome of paediatric femur shaft fracture treated with Closed reduction and Internal fixation with TENS and Closed reduction and Hip spica cast application.

AIMS AND OBJECTIVES:

To compare the better functional outcome of fracture femur shaft with Closed reduction and Internal fixation with TENS and closed reduction and hip spica application in a paediatric age group of 5 - 12 yrs. TENS offers early recovery and mobilization, less chances of deformities, very less chances of limb length discrepancy, less chances of complications related to perineal ill hygiene and early return to normal life. This retrospective study compares the result of the earlier mentioned treatment modalities for fracture shaft femur.

Methods and Materials:

The study includes 38 patients who were available for the follow up post surgery and conservative management in Santosh Medical College and Hospital, Ghaziabad, from March 2019 to February 2020. The Study group includes 38 paediatric patients (age group 5 -12 years, male- 29, female- 9), 20 patients (15 male, 5 female) were managed with closed reduction and Internal fixation with TENS, and 18 patients (14 male, 4 female) were managed with closed reduction and hip spica application.

Inclusion criteria:

Children between age group 5 -12yrs, simple shaft femur fractures, traumatic injury.

Exclusion criteria: Patients with proximal or distal femoral fractures closer to the epiphyseal plate, patients with open femoral fractures and patients with pathological fractures were excluded from the study.

The treatment methods and demographic data of these two groups is demonstrated in Table 1.

Types of fractures and its distribution is demonstrated in Table 2.

Table 1: Treatment methods and demographic data of 38 patients managed.

	Closed reduction and internal fixation with TENS (n=22,57.89%)		Closed reduction and hip spica application (n=18,42.11%)	
	Number	Percentage	Number	Percentage
Male	15	39.47	14	36.84
Female	5	13.15	4	10.52

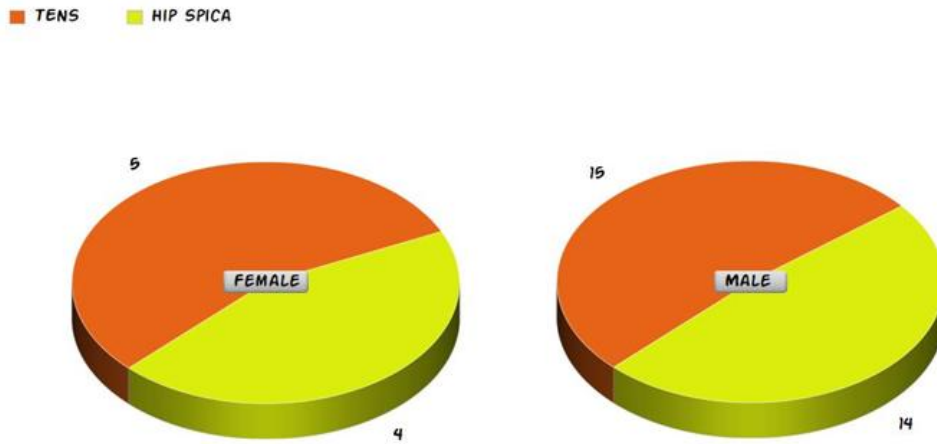
Table 2: Types of fracture in the study patients.

Type of fracture	Number	Percentage
Transverse	18	47.36
Oblique	16	42.10
Spiral	04	10.52
Comminuted	00	0.00

The two groups were compared to the time between injury and treatment (CRIF with TENS and CR with HIP SPICA), hospitalization time, pre operative data, standing and walking time and the complications involved⁸.

The complications in group 1(CRIF with TENS) was: infection in one patient.

And in group 2 (CR and HIP SPICA):2 developed decubitus ulcer and 1 had more than 10 degrees of mal-alignment.



The scoring criteria for titanium elastic nailing is mentioned below in Table 3.

Table 3: Flynn Scoring criteria for titanium elastic nail.

	Excellent result	Satisfactory result	Poor result
Leg length discrepancy	< 1cm	< 2 cm	>2 cm
Mal-alignment	< 5 degree	< 10 degree	> 10 degree
Pain	None	None	Present
Complication	None	Minor resolved complications	Major complications or morbidity



Fig 1- Pre-op and post-op x-rays of fracture shaft femur managed with closed reduction and internal fixation with TENS.

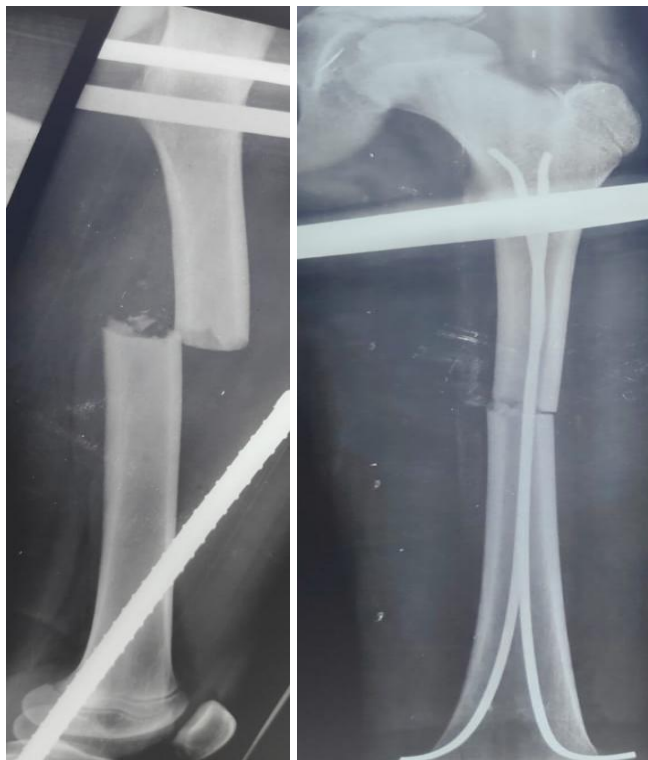


Fig 2- Pre-op and Post-op x-rays of fracture shaft femur managed with CRIF with TENS.



Fig 3- Hip Spica application in a 6 year old child with fracture shaft (left) femur.

II. Result:

The group which were treated with closed reduction and internal fixation with TENS (20 patients, 15 male and 5 female) were found to be having no deformities, no malunion, no delayed union, complete functional recovery was achieved. No angulation was found in any of the patient operated and showed up for follow up. The group treated with TENS took a shorter time to start walking with support and then without support. The group treated with Hip spica (18 patients, 14 male and 4 female), 2 patients out of the group treated with Hip spica were found to have decubitus ulcer which was treated conservatively and 1 patient had more than 10 degrees of mal-alignment .1 patient treated with TENS had post operative superficial suture line infection, which was well controlled with antibiotic therapy.

III. Discussion:

In a retrograde study, 38 paediatric patients were chosen with age ranging from 5-12 years, having shaft femur fracture. Patients with proximal or distal femoral fractures closer to the epiphyseal plate, open femoral fractures and patients with pathological fractures were excluded from the study.

Out of 38 patients, 20 patients were treated with closed reduction and internal fixation with TENS, and rest 18 patient were treated with closed reduction under image intensifier and Hip spica cast application. Both

the groups were followed for a period of 6 months y .At 4 weeks, 8 week, 12 weeks and 6 months . The group treated with tens ,after 4 weeks mobilization with support was started along with Physiotherapy .By the end of 12 weeks all patients treated with TENS had full range of motion, no painful movement and could squat without support and pain⁹. The patients treated with Hip spica out of them 5 had to undergo cast repair and 6 has perineal infection due to ill hygiene and was treated with topical medications .

The group treated with TENS had an excellent recovery, only one patient developed incision site infection, which was well controlled with antibiotic therapy.

In the cases treated with closed reduction and Hip spica application 2 patients developed decubitus ulcer, 1 had more than 10 degrees of mal-alignment, although remodelling is very good in paediatric age group. In paediatric patients, psychological factor also needs to be taken into account.

Patients treated with TENS hospital stay was less, early mobilization with support was started and soon those children took up their daily life activity¹⁰. moreover the patient treated with closed reduction and Hip spica application ,had poor perineal hygiene, poor patient compliance, morbidities were also found to more and related psychological issues the patients also required cast repair.

IV. Conclusion:

Results shows that postoperative time and complications are less in patients treated with TENS and TENS have better results over Hip spica when compared on the basis of functional recovery, hospital stay, early mobilization and less time of care and complications and early return to day to day life. The patients treated with Hip spica ,had to undergo cast repair multiple times. TENS is more preferable than Hip spica in fracture femur shaft in the age group of 5-12 years.

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