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Original Article

CLINICAL AND RADIOLOGICAL OUTCOMES OF SKIN TRACTION FOR FEMORAL SHAFT FRACTURES IN CHILDREN AGED 2 TO 5 YEARS

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Fracture femur, Skin traction, Leg-length discrepancy (LLD), elastic stable intramedullary nailing (ESIN)

Abstract

Background: *Fracture shaft of femur is a common fracture in children, with treatment from conservative in form of skin traction to intramedullary nailing depending on age. Conservative treatment is mostly used upto six years of age, while for children more than 12 years surgery is usually preferred. Objective of the study was to evaluate the result of skin traction of isolated femoral shaft fracture in children.*

Methods: *Study was done in international medical college hospital,Gazipur from July 2021 to May 2025. 17 patients were enrolled for study, patients were initially given skin traction to get alignment . Patients age 2 to 5 years, with a mean age of 3.7 years range with closed isolated femoral shaft fractures were included in the Study. Patients having compound fractures and those with polytrauma were excluded from the study. Follow up was done in OPD after 1,4,8,12,24 weeks with check x-rays taken at every visit.*

Results: *17 patients were included for study , male 11 (64.7%), female 6 (35.3%) . Average age of children was 3.7 years. Mode of trauma was mostly RTA 11 (64.7%), fall from height 3 (17.6%), fall from bicycle 3 (17.6%). Average duration of traction was 17.5 (14-26) days and average stay in hospital was 15.5 days. Average union time was 8.2 weeks.*

Conclusion: *Skin traction is a easy, safe, and non-invasive treatment way for femoral shaft fractures in children in 2 to 5 years , no anesthesia is needed.*

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Introduction

Femoral shaft fractures make up only 0.7-1.7% of all fractures seen in kids and about 3.5% of long-bone breaks in the arms and legs. [1, 2] How a particular break is handled depends on a mix of things-age, height, weight, fracture pattern, soft-tissue damage, other injuries, what the family wants, and what the surgeon prefers. [3, 4] Doctors still rely mostly on non-operative care for toddlers under about four or five years, and the results are often quite good. [5, 6] Yet, newer metal implants now push many teams toward early surgery; that route can bring its own troubles, such as wound infection and hardware failure. [7, 8, 9]

Methods

Study was done in international medical college hospital,Gazipur from july 2021 to May 2025. 17 patients were enrolled for study, patients were initially given skin traction to get alignment . Patients age 2 to 5 years with closed isolated femoral shaft fractures were included in the Study. Patients having compound fractures , polytrauma were excluded from the study. the injured limb was put on skin traction using weight appropriate for age, limb position was positioned with sand bags , water bottle. X-rays were taken after 7 days of skin traction to check fracture alignment. Regular follow up at 1, 4, 8, 12, 24 weeks, with X-rays taken at each visit to monitor fracture alignment

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,clinical examination was performed to evaluate gait, LLD, malalignment .

Results

17 patients were included for study, Average age of children was 3.7 years (2-5 years). Mode of trauma was mostly RTA 11 (64.7%), fall from height 3 (17.6%), fall from bicycle 3(17.6%). Average duration of traction was 17.5 (14-26) days and average stay in hospital was 15.5 days. Average union time was 8.2 weeks (7-12 weeks).At final follow-up 2 patient (11.76%) had LLD of 1.5 cm, 2 (11.76%) had LLD of 1 cm, while 13 (76.47%) children had no LLD. None of the patients had short legged gait. three patient (17.64%) had superficial skin excoriation , two patient (11.76%) had blister , two patient (11.76%) had soft tissue infection .

Table-I

Acceptable alignment according to age

Age (years)	Shortening (in mm)	Varus/valgus angulation	Anterior/ posterior angulation
<2	15	30	30
2-5	20	15	20
6-10	15	10	15
11 to maturity	10	5	10

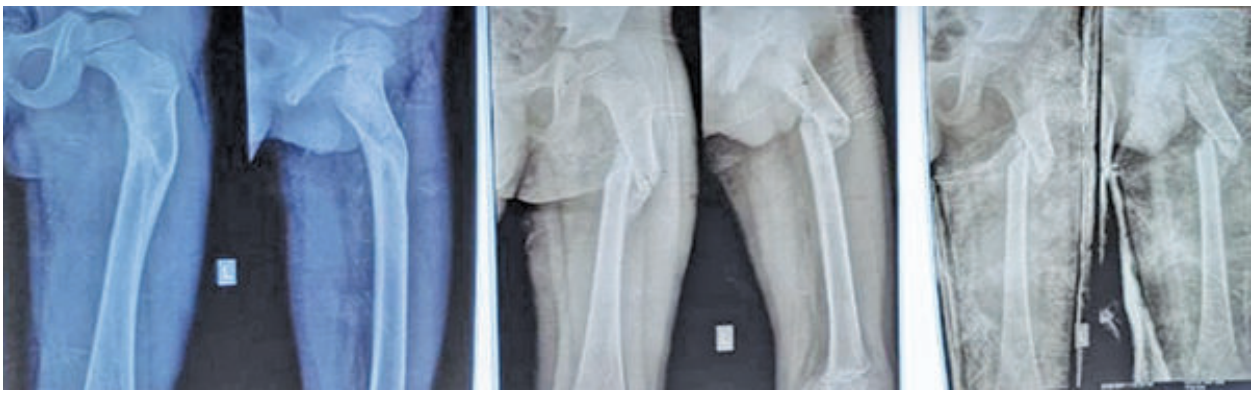

Figure 1: *The remodeling of the femoral shaft after skin traction*

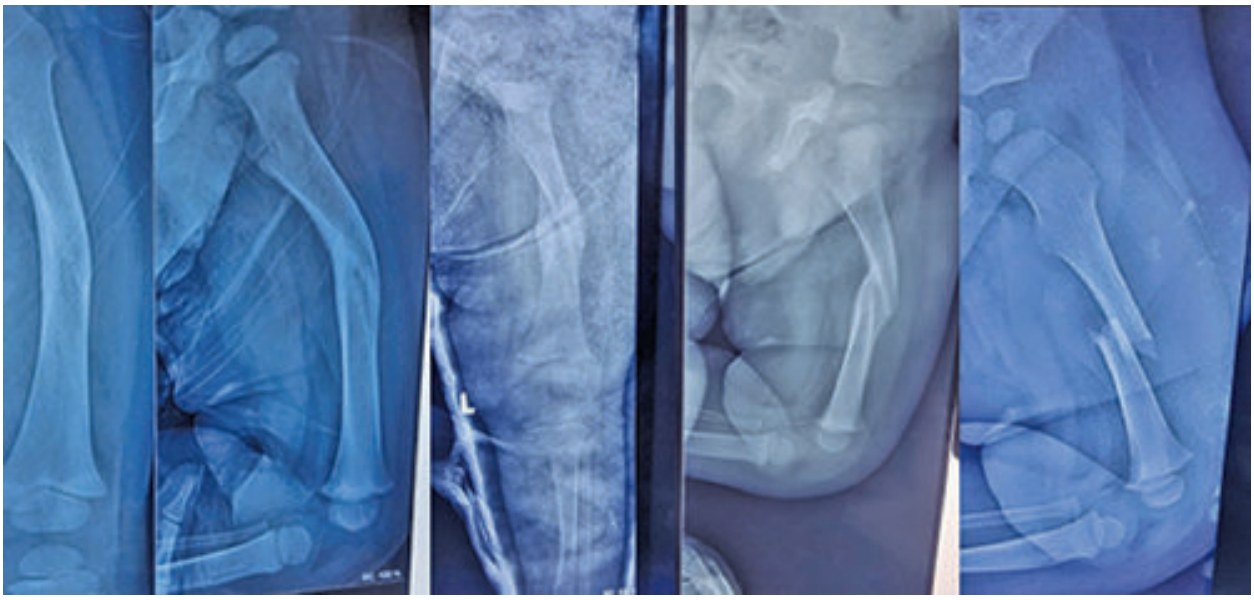

Figure 2: *The remodeling of the femoral shaft after skin traction*

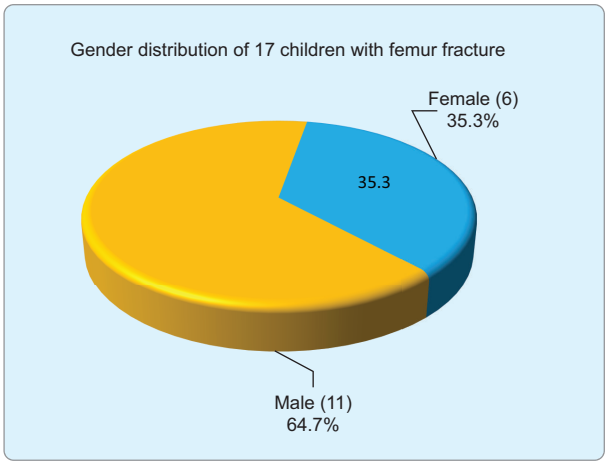

Figure 3: *Gender based distribution*

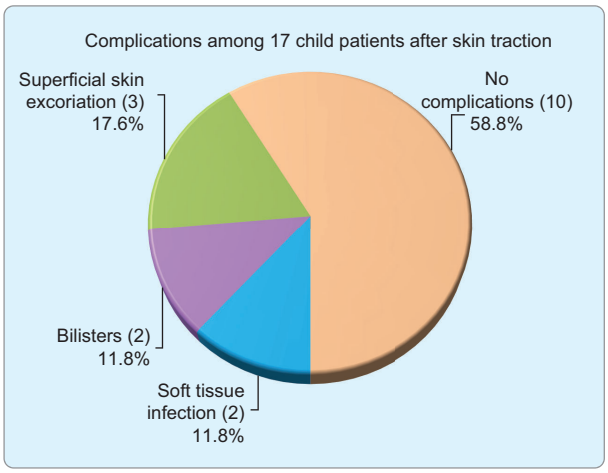

Figure 4: *Fracture complication*

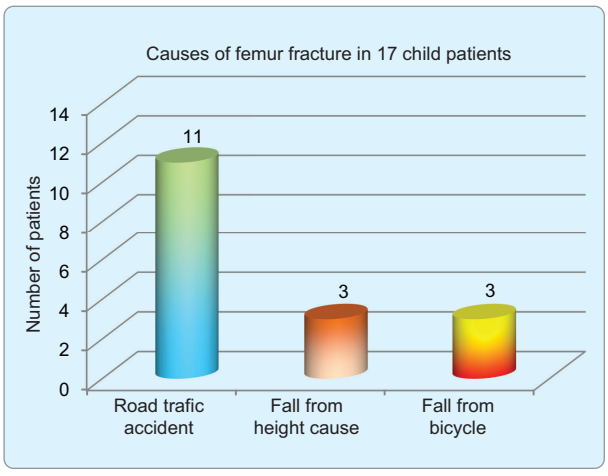

Figure 5: *Mode of trauma*

Figure 6: *Skin traction for femoral shaft fracture*

Discussion

The management of femoral shaft fractures in children is controversial. Management based on age has been suggested with conservative management for children less than 5 years, surgery for more than 10 years. Treatment for 6-10 years age group is controversial. Surgical fixation of femoral fractures associated with complications such as infection, growth plate disturbances and implant failure have been reported. However, the surgical management of femoral shaft fractures in patients below the age of four years has progressively increased . This trend has been observed in many countries, such as the United Kingdom [10], the United States[11], and Sweden[12]. In Germany, Strohm et al. have shown that 50% of all patients in the age group of below three years of age with femoral shaft fractures are nowadays treated operatively with elastic stable intramedullary nailing (ESIN). Studies have shown that children whose femoral shaft fractures were treated with ESIN achieved faster recovery than those children whose fractures were treated with traction and a cast.[13]

In addition, the trumpet-like configuration of the supracondylar area of the distal femur in younger children may cause longitudinal instability with retrograde ESIN in spiral or oblique fractures.

Even though end caps or locking systems may compensate for instability, there is no proof of earlier mobilization with surgery as compared with conservatively treated patients.

Financially, skin traction and home-based methods are more economical than surgical options.. Newton et al. report that the lowest charges are for spica casting. Both skin traction and home traction were associated with significant savings over in-hospital skeleton traction and intramedullary nails.[14] After ESIN, complication rates between 1.7 and 13.8% have been reported.[15,16,17] For skeletal traction, healing disorders at the Steinman pin have been reported at 9.4%, our data illustrate that skin traction is not an anatomically corrective therapy, but it allows rapid consolidation and good results through remodeling without the need for general anesthesia.

Limitations

The limitations of study are that sample size was small and follow up time phase was also short, in single centre. We couldn't assess the remodelling of angulations or correction of LLD. Care of a child in spica cast was boring for some parents, however all of the parents were satisfied with the outcome at the end of the treatment.

Conclusion

Conservative treatment in form of Skin traction in fracture shaft femur in children upto 5 years gives good results.It avoids complications of operative treatment like infection, and re-surgery for implant removal. It has minor complications like skin excoriation , blister, can be managed easily. Skin traction is easy, safe ,non invasive method of treatment for fracture shaft of femur in children upto 5 years of age and should be considered over other treatments.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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