

Welcome To Journal Club

Journal Club/Evidence Based Practice

APPLICATION OF TITANIUM ELASTIC NAILS FOR TREATING PEDIATRIC TIBIAL SHAFT FRACTURES



SPEAKER

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VENUE

**PROF. IBRAHIM
GALLERY**



DATE

**16/06/2026
TUESDAY**



TIME

8:00 A.M.

Organized by: Medical Education Unit, AWMCH

Teacher, Intern and 5th year Student are requested to attend
the session after managing the OPD, IPD and classes



Application of Titanium Elastic Nails for treating pediatric tibial shaft fractures

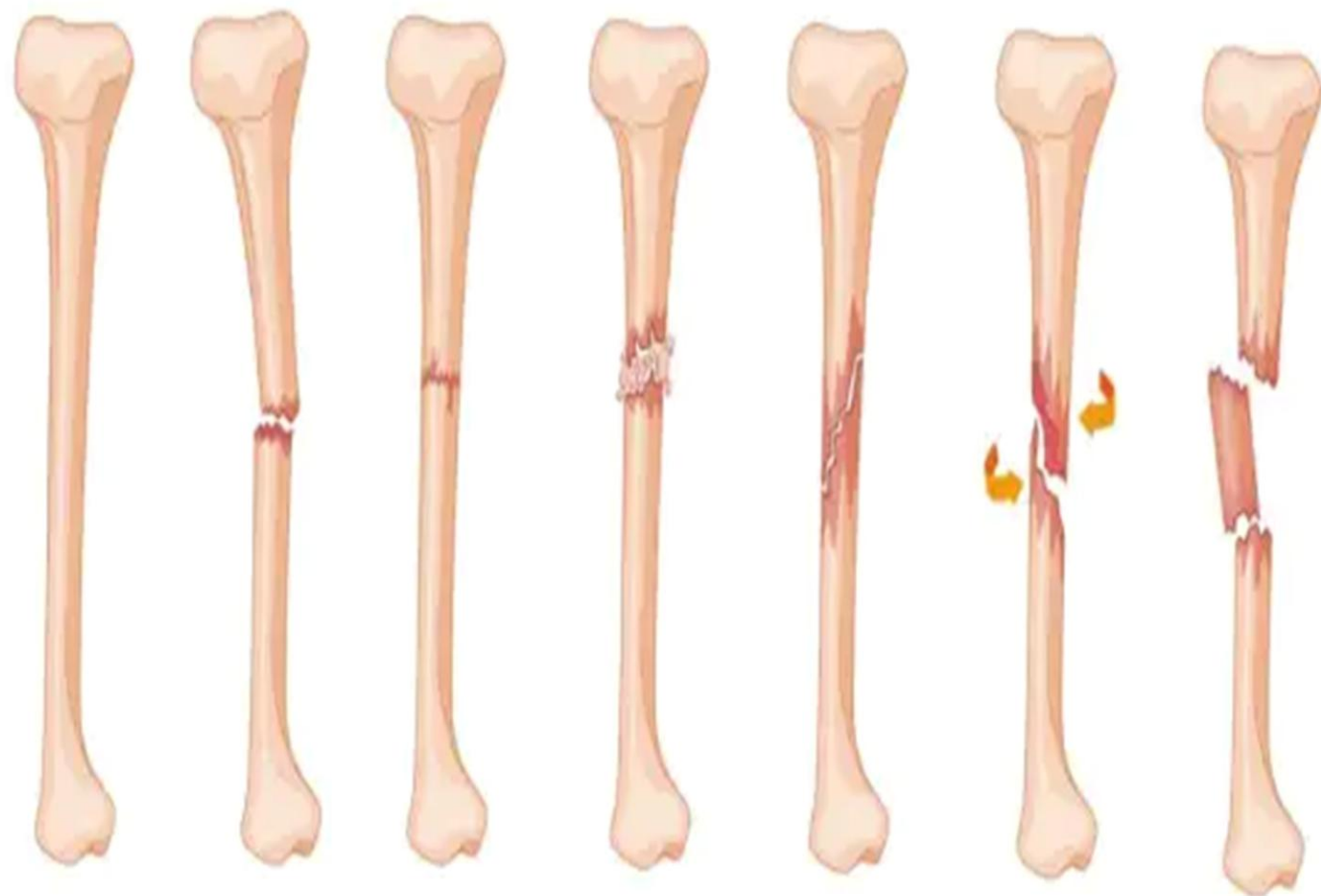
Dr. S Ripon Kumar Ghosh

Associate Professor

Dept of Orthopaedic

Ad-din Women's Medical College, Dhaka

Tibia Fracture





Application of Titanium Elastic Nails for Treating Pediatric Tibial Shaft Fractures

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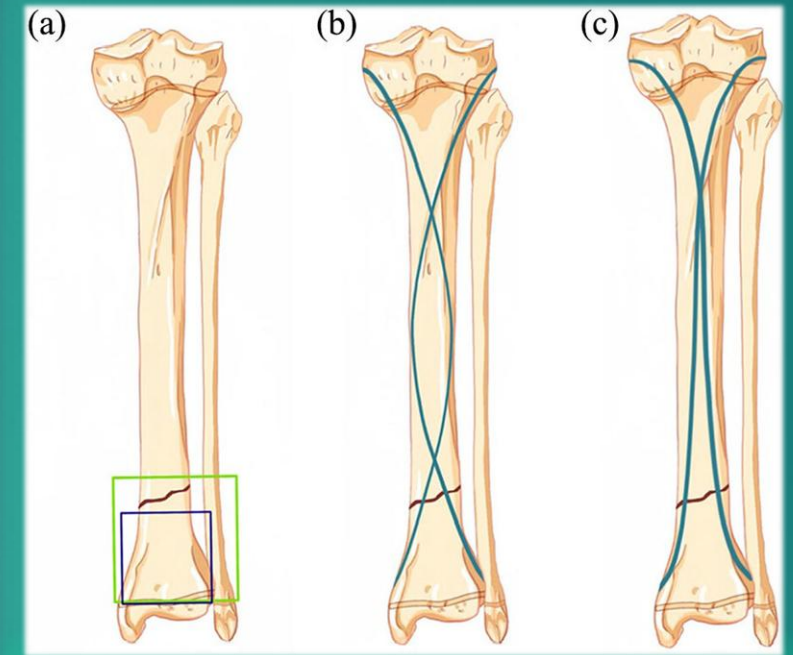
ABSTRACT

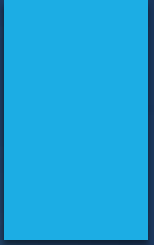
Background: Pediatric tibial shaft fractures are among the most common long bone injuries, particularly in developing countries, often requiring effective surgical management for optimal outcomes. Aim of the study to evaluate the effectiveness and clinical outcomes of Titanium Elastic Nailing in pediatric tibial shaft fractures. **Methods & Materials:** This prospective observational study was conducted over one year at the Department of Orthopedic & Spine Surgery, Ad-Din women's Medical College Hospital and Barak PRP Medical Centre & General Hospital, Dhaka, Bangladesh. A total of 15 pediatric patients aged 5–15 years with tibial shaft fractures were treated using Titanium Elastic Nails. Demographic data, fracture characteristics, operative details, and postoperative outcomes were recorded. Functional outcomes were assessed using Flynn criteria, and radiological parameters were evaluated for alignment and limb length discrepancy. Statistical analysis was performed using SPSS version 26 with descriptive statistics. **Result:** The mean age was 10.4 ± 2.9 years, with male predominance (73.33%). Road traffic accidents (40%) were the most common cause. The mean time to union was 9.8 ± 2.1 weeks, with most cases (86.67%) achieving union within 12 weeks. Complications were minimal, with 73.33% having no complications. Functional outcomes were excellent in 66.67% and good in 26.67% of patients. Radiologically, 86.67% had $<5^\circ$ angular deformity, and 93.33% had <1 cm limb length discrepancy. **Conclusion:** Titanium Elastic Nailing is an effective and reliable treatment for pediatric tibial shaft fractures, providing excellent functional and radiological outcomes with minimal complications.

Keywords: Pediatric tibial fracture, Titanium elastic nail, TENS, Flynn criteria, fracture union, minimally invasive surgery.

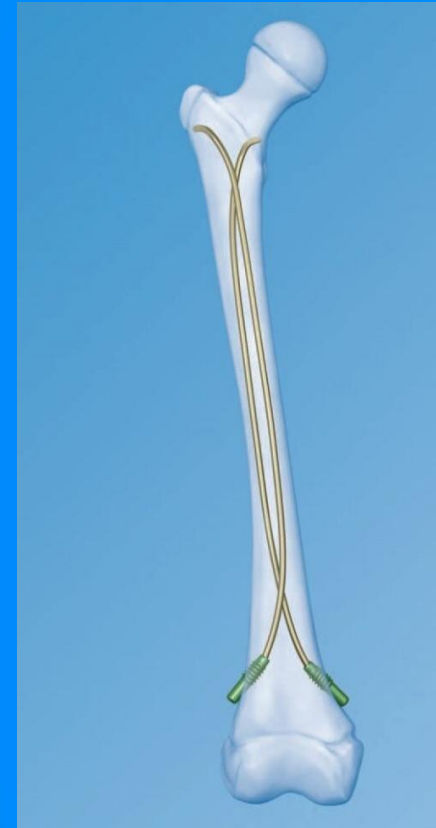
Introduction

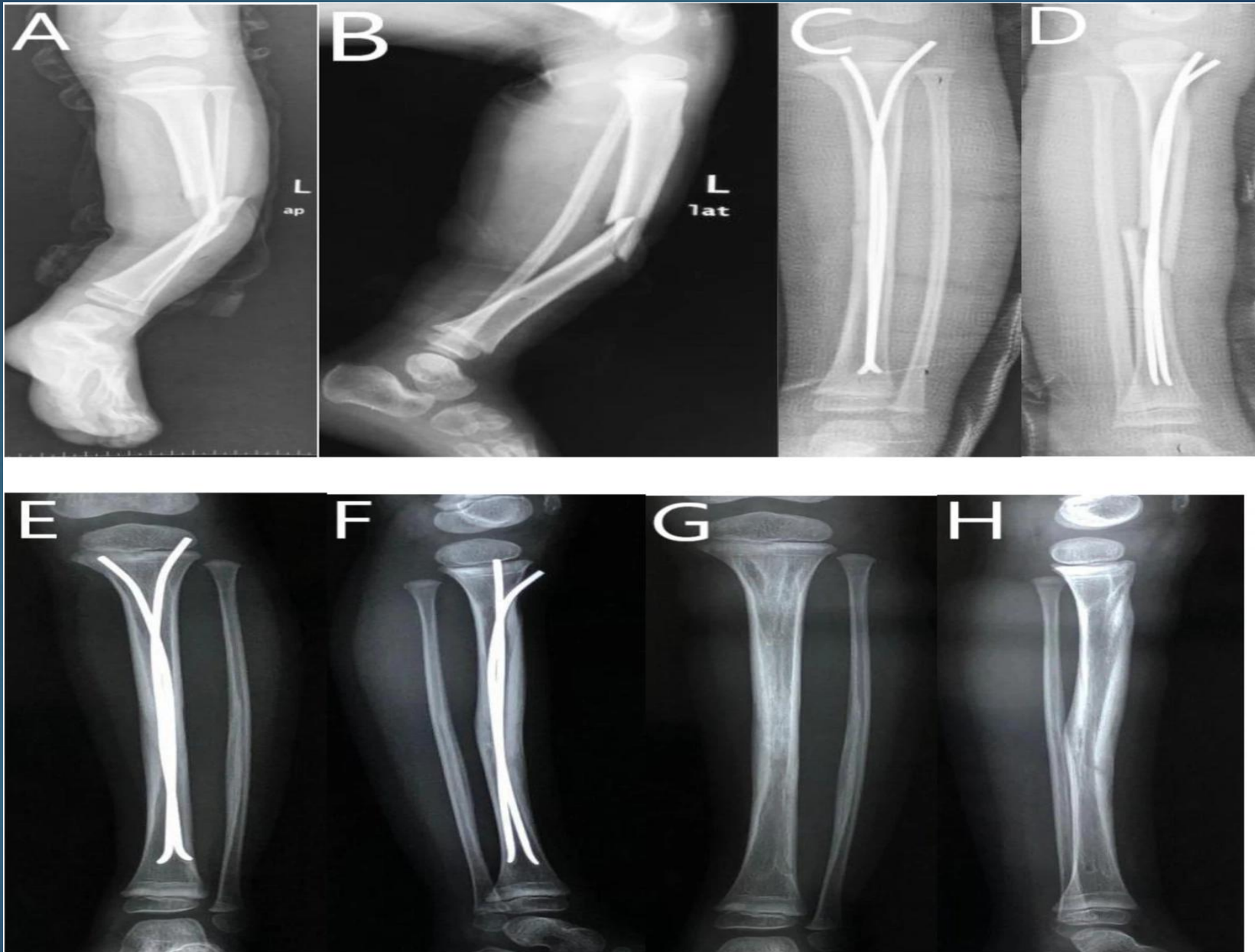
- ❖ Titanium Elastic Nailing System (TENS) has become a popular surgical method used to treat long bone fractures in children. This is a minimally invasive surgery whereby flexible titanium nails are inserted into the medullary canal to offer internal fixation that is stable and does not damage the periosteal blood supply and growth plate integrity.



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- ❖ Titanium elastic nailing is important as it is able to support fracture alignment and early mobilization which is important in shortening hospital stay and rehabilitation time.
 - ❖ The benefits of this method are low levels of soft tissue disturbance, less time spent in the operating room, earlier weight-bearing, and quicker functional restoration than the traditional approaches to immobilization.

- ❖ Although these are the advantages, some complications like nail irritation, infection, malalignment, and the necessity to perform second operations to remove the implants are reported.







RESEARCH QUESTIONS

RESEARCH QUESTIONS

How effective is titanium elastic nails in case of treating paediatric tibial nail fractures?



Methodology

- ❖ Design: Prospective observational study, 1 year.
- ❖ Place: Ad-Din Women's Medical College Hospital, Barak PRP Medical Centre, Dhaka
- ❖ Patients: Age 5-15 yrs, displaced/unstable tibial shaft fractures.
- ❖ Assessment: Flynn criteria for function, Radiology for alignment and limb length.

INCLUSION CRITERIA

- ❖ Patients age between 5-15 years.
- ❖ Closed tibial shaft fractures or open fractures (Grade 1)
- ❖ Displaced or unstable fractures requiring surgical intervention.
- ❖ Patients presenting within a reasonable time frame after injury.
- ❖ Consent obtained from guardians/parents.

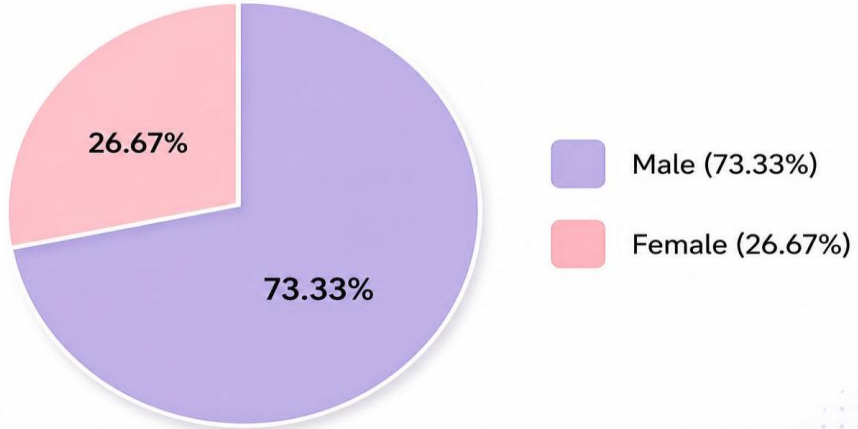
Exclusion criteria

- ❖ Patients with open fractures Grade 2 and 3.
- ❖ Pathological fractures.
- ❖ Associated neurovascular injury.
- ❖ Polytrauma patients requiring alternative priority management.
- ❖ Previous fracture or deformity in the same limb.
- ❖ Patients unfit for anesthesia or surgery.

Result

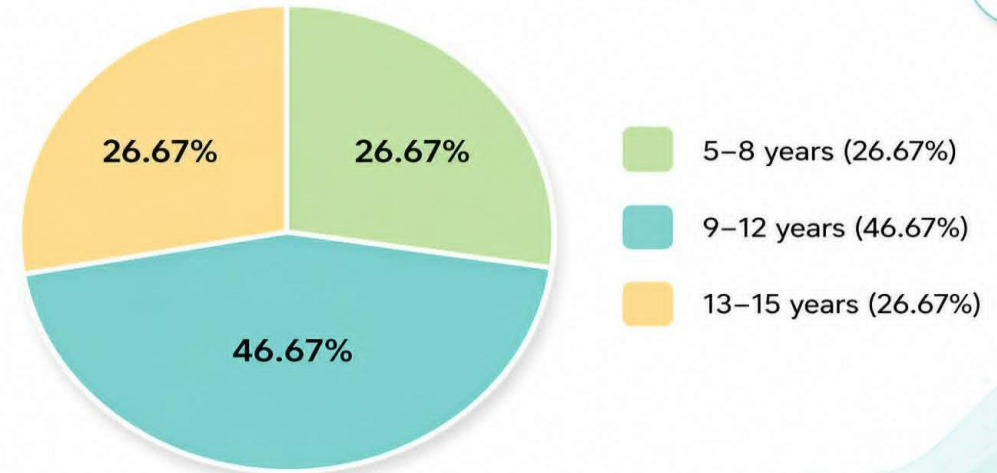
Characteristics	Frequency	Percentages
Age		
5-8	4	26.67
9-12	7	46.67
13-15	4	26.67
Mean SD	10.4 2.9	
Gender		
Male	11	73.33
Female	4	26.67
Side of fracture		
Right	9	60.00
Left	6	40.00

1 GENDER DISTRIBUTION ($n = 15$)



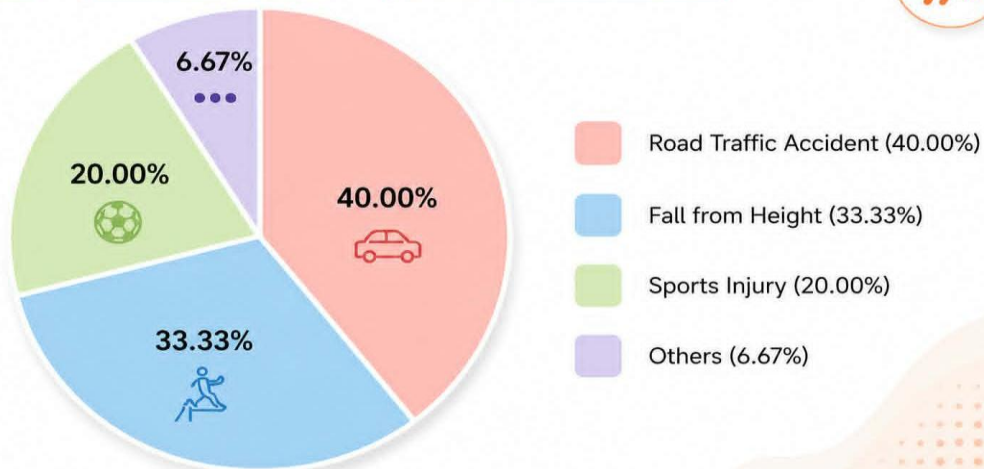
Source: Table I – Baseline Demographic Characteristics

2 AGE DISTRIBUTION ($n = 15$)



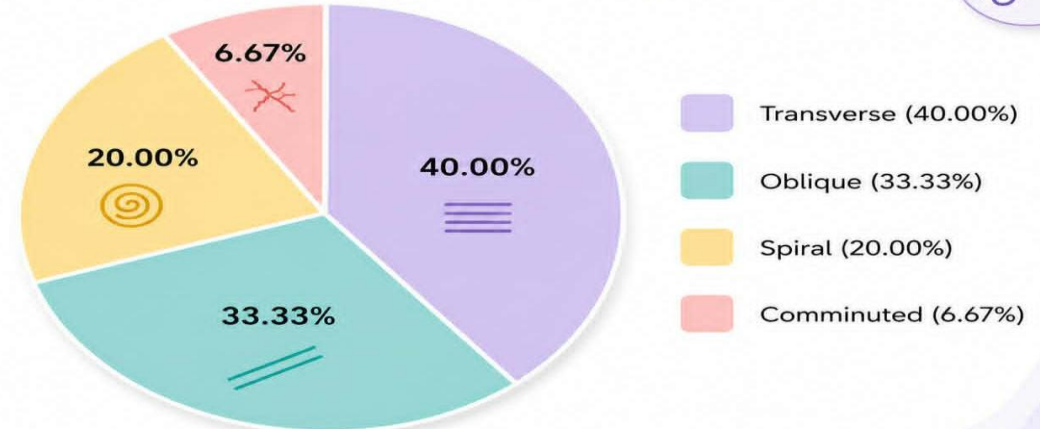
Source: Table I – Baseline Demographic Characteristics

3 MECHANISM OF INJURY ($n = 15$)



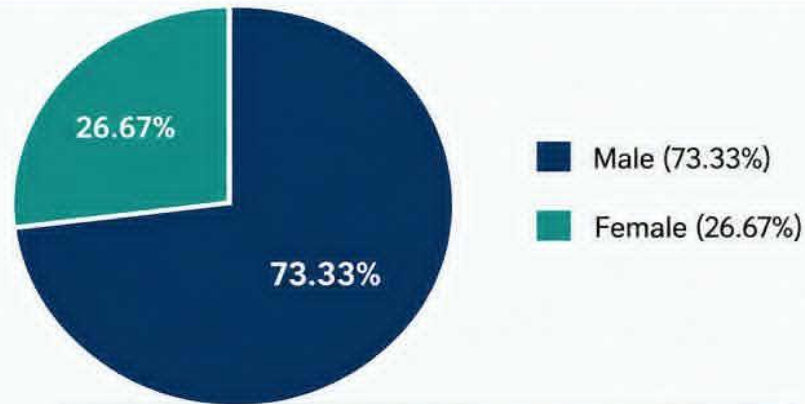
Source: Table II – Mechanism and Pattern of Injury

4 FRACTURE PATTERN ($n = 15$)



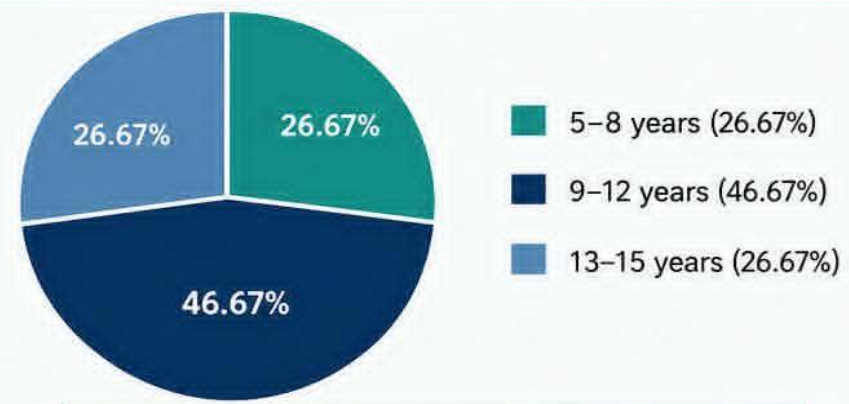
Source: Table II – Mechanism and Pattern of Injury

1. GENDER DISTRIBUTION (n = 15)



Source: Table I – Baseline Demographic Characteristics

2. AGE DISTRIBUTION (n = 15)



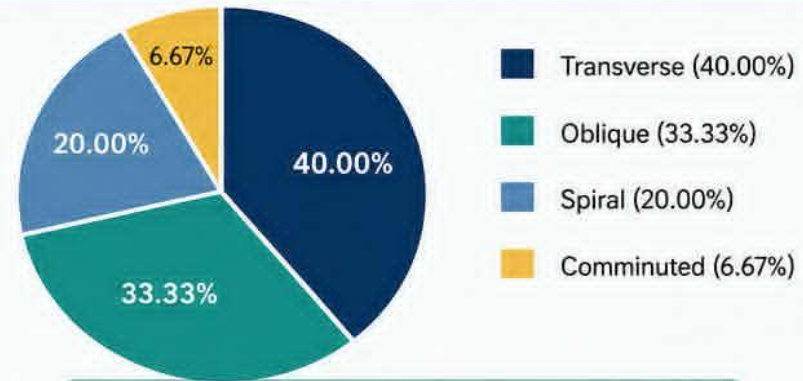
Source: Table I – Baseline Demographic Characteristics

3. MECHANISM OF INJURY (n = 15)



Source: Table II – Mechanism and Pattern of Injury

4. FRACTURE PATTERN (n = 15)



Source: Table II – Mechanism and Pattern of Injury



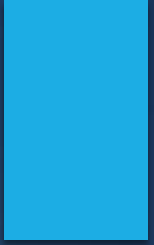
Study: Application of Titanium Elastic Nails for Treating Pediatric Tibial Shaft Fractures
Ghosh et al., *The Planet*, 2025; 9(2): 249–253.



Note: Data presented are from a prospective observational study of 15 patients.

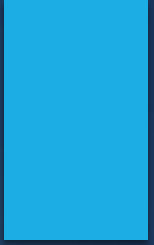
RECOMMENDATION

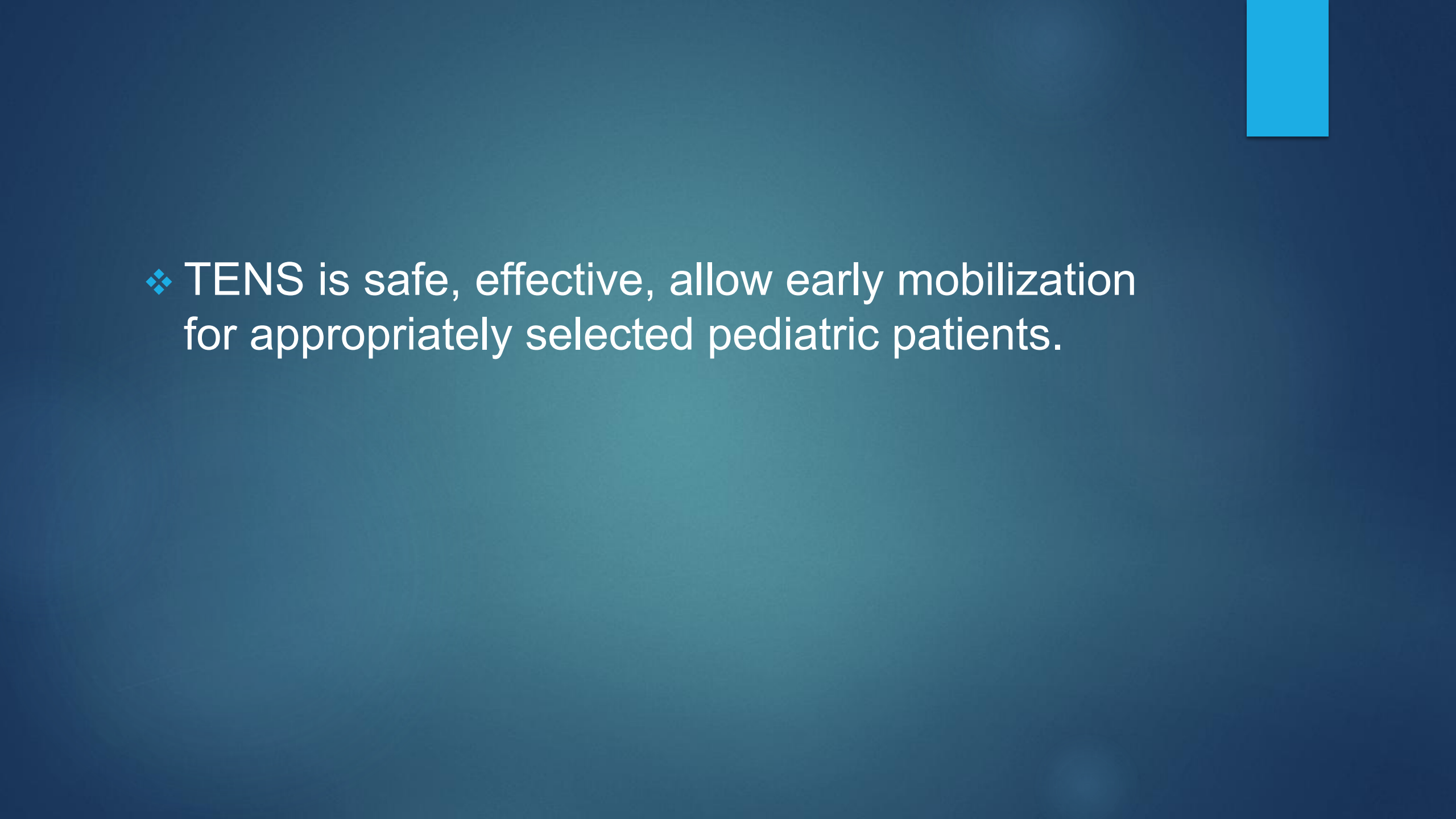
- ❖ TENS is preferred for selected pediatric patients.
- ❖ Used for displaced/unstable fractures: Study included patients 5-15 years with displaced or unstable fractures requiring surgical intervention. TENS gave reliable stabilization + early mobilization.
- ❖ Aim for closed reduction: Closed reduction was successful in 86.67% of cases. Biological advantage of closed techniques for preserving periosteal blood supply is emphasized.

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- ❖ For pediatric tibial shaft fractures (5-15 years) , especially displaced/unstable ones, TENS offers excellent union rates + function with minimal complications. But the evidence is still preliminary due to small sample size.
 - ❖ Note: This is surgical guidance from one study. Treatment decisions depend on fracture type, age, surgeons experience. Consulting an orthopedic surgeon for individual cases is mandatory.

CONCLUSION

- ❖ Titanium Elastic Nailing provides reliable stabilization, facilitates early mobilization, and ensures favorable clinical and functional recovery, making it a preferred treatment option for appropriately selected pediatric patients.
- ❖ Effective and reliable treatment for pediatric tibial shaft fractures, providing excellent functional and radiological outcomes with minimal complications.

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- ❖ Despite the popularity of Titanium Elastic Nailing System (TENS), differences in outcomes and insufficient evidence on the topic are still a problem in Bangladesh and needs to be considered for effectiveness.

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- ❖ TENS is safe, effective, allow early mobilization for appropriately selected pediatric patients.

THANK YOU :)

