RESEARCH PAPER

Functional Outcome of Titanium Elastic Nailing System (TENS) in Pediatric Forearm Fractures: A Short Communication

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ABSTRACT

Forearm fractures are among the most common pediatric fractures and represent approximately 30–40% of all fractures in children. While most fractures can be treated conservatively, unstable fractures and those with significant displacement often require surgical stabilization. The Titanium Elastic Nailing System (TENS) has become a widely accepted method for managing pediatric forearm fractures due to its minimally invasive nature and favorable functional outcomes. This short communication evaluates the functional outcome of TENS nailing in pediatric forearm fractures and highlights its advantages, complications, and role in modern pediatric fracture management. Most studies demonstrate excellent to good functional outcomes with rapid fracture union, minimal complications, and early return to normal activities.

Keywords: Pediatric forearm fracture; Titanium elastic nailing; TENS; intramedullary fixation; functional outcome.

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Introduction

Forearm fractures involving the radius and ulna are common injuries in the pediatric population, frequently resulting from falls during play or sports activities. These fractures account for a significant proportion of pediatric orthopedic trauma and can lead to functional impairment if not properly managed.

Traditionally, most pediatric forearm fractures are treated conservatively using closed reduction and casting due to the remarkable remodeling potential in children. However, unstable fractures, irreducible fractures, open fractures, and fractures with significant displacement often require surgical intervention.

The Titanium Elastic Nailing System (TENS) is a minimally invasive intramedullary fixation technique widely used for pediatric long bone fractures. The technique provides stable fixation while preserving periosteal blood supply and fracture hematoma, thereby promoting biological healing. In addition, TENS allows early mobilization and maintains alignment without extensive soft tissue dissection.

This short communication aims to review the functional outcomes and clinical advantages of TENS nailing in pediatric forearm fractures.

Surgical Technique

TENS nailing is usually performed under general anesthesia with fluoroscopic guidance. After closed reduction of the fracture, a small incision is made near the metaphyseal region of the radius and ulna. Pre-bent titanium elastic nails are introduced into the medullary canal and advanced across the fracture site to achieve stable fixation.

The principle of elastic stable intramedullary nailing relies on the balanced elastic forces provided by two opposing nails, which maintain fracture alignment and rotational stability. Postoperatively, a short period of immobilization is typically followed by gradual mobilization of the forearm.

Functional Outcomes

Several clinical studies have demonstrated favorable outcomes with TENS nailing in pediatric forearm fractures. Functional outcomes are usually evaluated using criteria such as the **Price criteria**, which assess pain, range of motion, and return to daily activities.

Most studies report **excellent to good outcomes in more than 90% of cases**, with restoration of normal forearm rotation and minimal residual deformity. Fracture union generally occurs within **6–8 weeks**, and children are able to resume normal activities shortly thereafter.

The minimally invasive nature of TENS also reduces soft tissue injury and postoperative pain. Compared with plate fixation, TENS requires smaller incisions, shorter operative time, and easier implant removal.

Complications

Although TENS nailing is generally safe, some complications have been reported. The most common complications include:

- Nail prominence causing skin irritation
- Superficial infection at the entry site
- Delayed union or malalignment (rare)
- Nail migration

Most complications are minor and can be managed

conservatively or by early implant removal.

Discussion

Elastic stable intramedullary nailing has gained widespread popularity for treating unstable pediatric forearm fractures. The technique offers several advantages including minimal soft tissue disruption, preservation of periosteal blood supply, and maintenance of fracture stability.

Comparative studies between TENS and plate fixation have shown similar union rates but lower complication rates and faster recovery with TENS. Additionally, the cosmetic outcome is superior due to smaller surgical scars.

However, careful patient selection is essential. TENS is most suitable for diaphyseal fractures of the radius and ulna in children aged between **5 and 15 years**. Comminuted fractures or fractures near the metaphysis may require alternative fixation methods.

Overall, current evidence supports the use of TENS as an effective and reliable method for treating pediatric forearm fractures requiring surgical stabilization.

Conclusion

Titanium Elastic Nailing System is an effective and minimally invasive technique for the management of unstable pediatric forearm fractures. The procedure provides stable fixation, promotes early fracture union, and results in excellent functional outcomes in the majority of patients. With proper surgical technique and patient selection, TENS nailing remains a preferred treatment option for pediatric forearm fractures.