

# Comment on Siddiqui et al: 'Femoral shaft fractures in children with non-ambulatory neuromuscular disorders can be effectively treated using flexible intramedullary nail'

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Sirs,

We read with great interest the article by Siddiqui et al<sup>1</sup> in your esteemed journal.

We want to congratulate the authors for conducting this study but there are some concerns with regard to this paper that needs to be clarified.

From the data given in the study it is clearly understood that a major part of the neuromuscular (NM) disorders group children (10/12) had length unstable fractures. Flexible intramedullary nails (FINs) are not an ideal implant for length unstable fractures like spiral and long oblique type. We understand that these are low energy spiral fractures which occur as the bones are universally weak due to reasons such as the lack of adequate nutrition, non-ambulatory status contributing to osteopenia etc. The authors say angular malunion has no functional impact. But an angular malunion will be subjected to constant uneven forces due to differential spasticity and contractures adding up to altered lever arm and in theory this will result in more fractures which will be difficult to treat repeatedly in these children with associated comorbidities. This will be aggravated in children with dystonia, seizures etc.

The configuration of the FIN, illustrated in Figure 1 of the original article has maximum spindle formation at the midshaft of the femur and not at the fracture site, making the fixation unstable. The nail should be pre-bent accordingly so that maximum spindle formation occurs at the fracture site, and good three-point fixation principle will give a stable configuration.<sup>2</sup>

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The authors themselves say length instability leads to implant migration, with in one case the nail even piercing the skin which may lead to further major complications like intramedullary infection/osteomyelitis which should be avoided by all means in these children.

The authors say they had used one FIN in cases with a narrow medullary canal (3/12; 25%); but how is this sufficient to internally fix a fracture in child with stiff/contracted muscles and joints? The medullary canal fill is also less in the NM group which is expected, and again leads to instability.

A mean sagittal plane deformity of 21° in the sagittal plane is significant as the quadriceps and hamstrings on either side might aggravate the uneven forces borne by this deformed femur, making it prone for repeated injury. Also, a fixed knee joint contracture alters the lever arm, adding rigidity and also increases the forces across the deformed/malunited site.

The authors did not clearly mention about the removal of the nail after union. In the discussion of the article they say that the FINs can provide protection against future fracture, so we assume the nails were not removed. Elastic nails are not strong enough to protect against fracture and prevent displacement of bony fragments. The advantage of a rigid nail like a rush rod or even telescopic rod (if canal diameter permits in certain cases) is that it stays inside, facilitating early mobilization which reduces the immobilization-related osteopenia in these kids and also will be of help in preventing future fractures as it is not necessary to remove these rigid nails.

We conclude that fundamentally the principle of dual FIN is not applicable in spastic children because due to the spasticity it makes the forces transmitted across the fracture fragments uneven. The principle behind the Enders nail of stacking the canal with multiple nails will be more preferable because it has more canal occupancy, the nails are more rigid and more nails can be used as the canal can accommodate them, thereby increasing stability. The soft-tissue irritation by the Enders nail is less because the end of the nail is smooth and it is flush with the bone.<sup>3</sup>

Yours faithfully,  
The Authors

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## COMPLIANCE WITH ETHICAL STANDARDS

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### ICMJE CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

### REFERENCES

1. **Siddiqui AA, Illingworth KD, Abousamra OA, Meisel EM, Kay RM.** Femoral shaft fractures in children with non-ambulatory neuromuscular

disorders can be effectively treated using flexible intramedullary nails. *J Child Orthop* 2020;14:132-138.

2. **Ligier JN, Metaizeau JP, Prévot J, Lascombes P.** Elastic stable intramedullary nailing of femoral shaft fractures in children. *J Bone Joint Surg [Br]* 1988;70-B:74-77.

3. **Saha P, Ghosh A, Khan HA, Ray S, Behera S.** Analysis of results of titanium elastic nails (TENS) and Ender nails: a comparative study. *Int J Sci Stud* 2015;3:81-85.

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