

## Aseptic nonunion of pediatric subtrochanteric fracture: A case report

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### Abstract

Nonunion of pediatric fractures related to the extracapsular proximal femur is a rare event if managed appropriately. Varus malposition renders increased stress over the fracture site leading to failure of the sound union. Management of such fractures is difficult owing to limited implant choices and presence of adjacent open physes. Open reduction and freshening of edges, removal of fibrous tissue, internal fixation with intra, or extramedullary implants, and a compliant follow-up are keys to the good functional outcome.

**Key words:** Femur fracture fixation, Injury, Pediatric subtrochanteric fracture, Trauma

The fracture within 10% of the total femoral length of the lesser trochanter is defined as subtrochanteric fracture in pediatric age group. Nonunion has rarely been associated with pediatric subtrochanteric fractures unlike its adult counterpart [1]. Few exceptional scenarios such as adolescent age, the presence of infection, segmental loss, or concomitant soft tissue problems are associated with delayed or nonunion [2,3].

### CASE REPORT

A 10-year-old male child was presented to us with complaints of difficult weight bearing in left lower extremity with feeling of instability on attempted ambulation. There was a history of injury to his left hip region 5 months back after fall from a moving vehicle. There was a history of conservative treatment since the time of injury with rest and plaster splint application. The old radiograph 1 month after the aforementioned treatment was brought by attendants, which showed a fracture of the subtrochanteric region of left proximal femur with attempt of the union in varus malposition (Fig. 1). After 3 months, the child was asked to bear weight to increase chances of union following which the child experienced pain and discomfort after a week. He could not bear weight properly in the affected limb since then.

The fresh radiographs showed a frank nonunion of the fracture site with displacement and rounded edges (Fig. 2). The patient was advised treatment by surgical intervention with various options with respective pros and cons. The patient chose open reduction and internal fixation with an intramedullary flexible nailing and supportive therapy. After due informed consent, the patient was planned for surgery

under spinal anesthesia. The fracture site was approached with the direct lateral approach. The fracture ends were held by bone holding forceps followed by an intra and extramedullary curettage resulting in freshening of edges and removal of fibrous tissues until bleeding native tissue was visible. Two appropriately sized titanium elastic nails were introduced in a retrograde manner from distal femoral region to cross and engage proximal femur across fracture site providing sufficient stability. The biplanar position of nails was checked under image intensifier in orthogonal planes followed by closure of a wound in layers. A 2 weeks Thomas' splint was placed for the rest to the extremity until pain and swelling are subsided, and gentle knee and physiotherapy started. Quadriceps strengthening exercises were encouraged all through the post-operative period. The post-operative radiograph showed satisfactory fracture reduction and position of intramedullary implants (Fig. 3).

There was radiological evidence of union in serial radiographs in the follow-up while clinically there was decreased pain and discomfort. The fracture was united well after a year of follow-up and patient performing pain free activities of daily living (Fig. 4). There was no wound or surgery related complications seen.

### DISCUSSION

The subtrochanteric fractures have been satisfactorily managed by conservative means in the past [4]. Literature has relatively less substantial studies regarding these subset of pediatric femoral fractures [4,5]. Other successful modality is flexible intramedullary nails with excellent outcome in some studies. Besides it, submuscular plating that is used widely for shaft



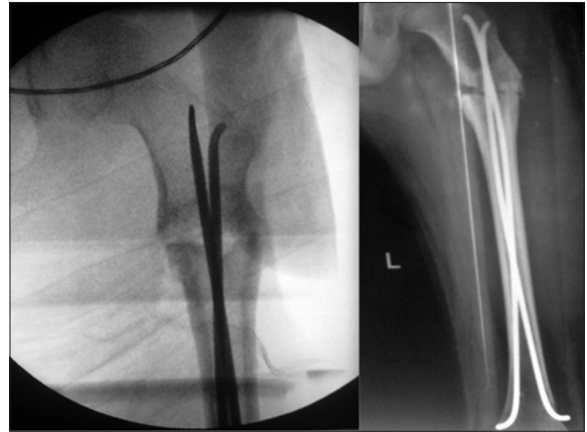
**Figure 1: Varus malposition of conservatively managed subtrochanteric fracture on serial radiographs**



**Figure 2: Radiograph showing frank nonunion**

femur fractures has also been found another excellent technique to treat subtrochanteric fractures [5,6].

When treating these fractures conservatively, careful follow-up with radiographs in early weeks of therapy are essential to check displacement or malalignment [7]. The malalignment and shortening results in leg length discrepancy and altered hip biomechanics that has potential long-term complications affecting overall mobility and functional outcome. The presented case highlights the importance of achieving and maintaining appropriate alignment during conservative treatment failure of which may lead to higher stresses over the fracture site and resultant nonunion. The physiological cyclic loading over a malreduced fracture leads to failure of union and disability to the patient. The treatment options like elastic nailing also are not free of complication but still a viable option in the management of subtrochanteric fractures [8]. We chose nails over plates as these are good devices with proven stability and safety. These are easier to remove after the union and require lesser incision for the procedure. The locking plates in comparison are sturdier implant but may pose difficulty in removal in cases of cold welded screws [9]. The plates also



**Figure 3: Operative management by open reduction and flexible nailing**



**Figure 4: Follow-up radiograph showing united fracture**

have reportedly higher incidences of refracture after removal of hardware [10]. Compared to a locked plate, flexible nails were a cheaper alternative at our center. The current report of an un-united subtrochanteric fracture managed by open reduction and elastic nailing has been a rare report.

**CONCLUSION**

Varus malreduction during conservative treatment leads to delayed or nonunion due to inherent biomechanical disadvantage. Successful management of these injuries with the removal of fibrous tissue, freshening of edges, and fixation with elastic nailing system is a viable option.

**REFERENCES**

1. Flynn JM, Skaggs DL. Femoral shaft fractures. In: Rockwood and Wilkins Fractures in Children. 7<sup>th</sup> ed. Philadelphia, USA: Lippincott Williams and Wilkins, Wolter Kluwer; 2010. p. 797-841.
2. Sales de Gauzy J, Fitoussi F, Jouve JL, Karger C, Badina A, Masquelet AC; French Society of Orthopaedic Surgery and Traumatology (SoFCOT). Traumatic diaphyseal bone defects in children. Orthop Traumatol Surg Res. 2012;98(2):220-6.

3. Sink EL, Gralla J, Repine M. Complications of pediatric femur fractures treated with titanium elastic nails: A comparison of fracture types. *J Pediatr Orthop*. 2005;25(5):577-80.
4. DeLee JC, Clanton TO, Rockwood CA Jr. Closed treatment of subtrochanteric fractures of the femur in a modified cast-brace. *J Bone Joint Surg Am*. 1981;63(5):773-9.
5. Ireland DC, Fisher RL. Subtrochanteric fractures of the femur in children. *Clin Orthop Relat Res*. 1975;(110):157-66.
6. Pombo MW, Shilt JS. The definition and treatment of pediatric subtrochanteric femur fractures with titanium elastic nails. *J Pediatr Orthop*. 2006;26(3):364-70.
7. Jeng C, Sponseller PD, Yates A, Paletta G. Subtrochanteric femoral fractures in children. Alignment after 90 degrees-90 degrees traction and cast application. *Clin Orthop Relat Res*. 1997;(341):170-4.
8. Parikh SN, Nathan ST, Priola MJ, Eismann EA. Elastic nailing for pediatric subtrochanteric and supracondylar femur fractures. *Clin Orthop Relat Res*. 2014;472(9):2735-44.
9. Pate O, Hedequist D, Leong N, Hresko T. Implant removal after submuscular plating for pediatric femur fractures. *J Pediatr Orthop*. 2009;29(7):709-12.
10. Becker T, Weigl D, Mercado E, Katz K, Bar-On E. Fractures and refractures after femoral locking compression plate fixation in children and adolescents. *J Pediatr Orthop*. 2012;32(7):e40-6.

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