

# A Unique Case of Severe Rotational Malunion in a Conservatively Treated Paediatric Femoral Diaphyseal fracture which Needed Corrective Surgery

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**Abstract:** *The management guidelines of femoral shaft fractures in children vary according to age. Conservatively managed femoral diaphyseal fractures have a propensity to malunite. Although the angular deformities in coronal and saggital plane have a remodelling potential, rotational deformities do not. We present a case of a 6-year old boy who developed a rotational malunion of about 80 degrees after conservative management of a femoral diaphyseal fracture and had to undergo a corrective osteotomy.*

**Keywords:** Subtrochanteric osteotomy, Thomas splint, paediatric femoral diaphyseal fractures

## 1. Introduction

Femoral shaft fractures are one of the most common fractures seen in children.<sup>1</sup> Management options include non-operative treatment or operative stabilisation after open/closed reduction. Both these methods have their advantages and disadvantages, with the non-operative approach leading to higher rates of angular, axial and rotational malunion.<sup>2</sup> The remodelling potential for angular deformities in the coronal and saggital planes in children is well appreciated<sup>3</sup>, however the potential for remodelling for post-traumatic torsional deformity of femur has been reported to be poor.<sup>4</sup> We present a case of a 6 year old boy who came to us with a torsional malunion of 80 degrees after conservative management of femoral diaphyseal fracture. We performed a subtrochanteric corrective osteotomy and were able to give him a near normal function.

## 2. Case Report

A 6 year old boy presented to our out patient department with a deformity in his left lower limb and an abnormal gait. His parents gave a history of him suffering a fracture of his left femur due to a fall sustained 10 months prior to presentation. He was treated conservatively in a Thomas traction splint for 6 weeks, which was followed by protected weight bearing with a functional femoral brace for another 6 weeks. Unrestricted weight bearing had been started at 3 months.

Examination revealed a non-tender left thigh with a shortening of 1 cm in the left lower limb. There were no obvious coronal or saggital plane deformities. However there was a marked internal rotation deformity. Hip rotations on the normal right side were 40 degrees of external rotation and 40 degrees of internal rotation. While on the affected left side, the range of motion was 40 degree external rotation (Fig.1) to about 120 degrees of internal rotation (Fig. 2). We took an x-ray to show both hips and both knees in a single film with knees facing forward (Fig.3). It revealed that on the left side, antero-posterior view of the knee and a lateral view of the hip were seen in the same film! We performed a

CT scan to determine the version along both the femurs. The unaffected right femur had a version of 10 degrees (Fig.4) and the affected left side had a version of about 90 degrees (Fig.5).

To treat this child, we performed a subtrochanteric corrective derotation osteotomy (Fig 6). A hip Spica was maintained for 6 weeks after which, protected weight bearing was started. Full weight bearing was started at 8 weeks. Postoperatively the hip rotation measured clinically were equal on both sides. (Fig 7) The boy initial had an abductor lurch. But at 3 months post-operatively, after 4 weeks of abductor muscle strengthening he started walking with a normal gait.

## 3. Discussion

Management of paediatric femoral diaphyseal fractures varies with age. According to the guidelines of the American Academy of Orthopaedic Surgeons(AAOS)<sup>5</sup>, there is strong evidence that these fractures in children less than 6 months of age should be conserved in a pelvic harness or a hip spica. In the age group of 6 months – 5 years, conservative management with early/ delayed casting is recommended. In children aged between 5-11 years, flexible intramedullary nails are a treatment option. While in children older than 11 years, rigid trochanteric-entry nails, submuscular plates and flexible intramedullary nails are an option.

The non-operative treatment has the advantages of less hospital stay, early union and lower cost.<sup>6</sup> However there are higher rates of shortening and malunions. Puttaswamaiah.<sup>2</sup> has observed that in his study of conservatively managed paediatric femoral shaft fractures in 30 children the mean shortening was 1.8 cms, mean anterior angulation was 17.8 deg, mean lateral angulation was 8.9 deg while the rotational malunion ranged from -43 deg to +43 deg.

The recommended conservative management is application of a hip spica after an initial application of traction if needed. However, in our patient this had not been followed at the initial centre which had kept the lower limb on a Thomas traction splint for 6 weeks.

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After clinical estimation of the rotational deformity, the next step is exact determination of the deformity using CT scan as described by Hernandez.<sup>7</sup> This method requires 2 CT cuts, one through the femoral neck and the other through the femoral condyles.

The level of the osteotomy was decided as subtrochanteric because the bone here is roughly circular in cross section and hence a derotation of almost 80 degrees would still give a good bone to bone contact.

#### 4. Conclusion

Conservative management of paediatric fractures requires periodic monitoring to ensure that the fracture does not malunite in an unacceptable position.



Fig.1



Fig.3



Fig.2

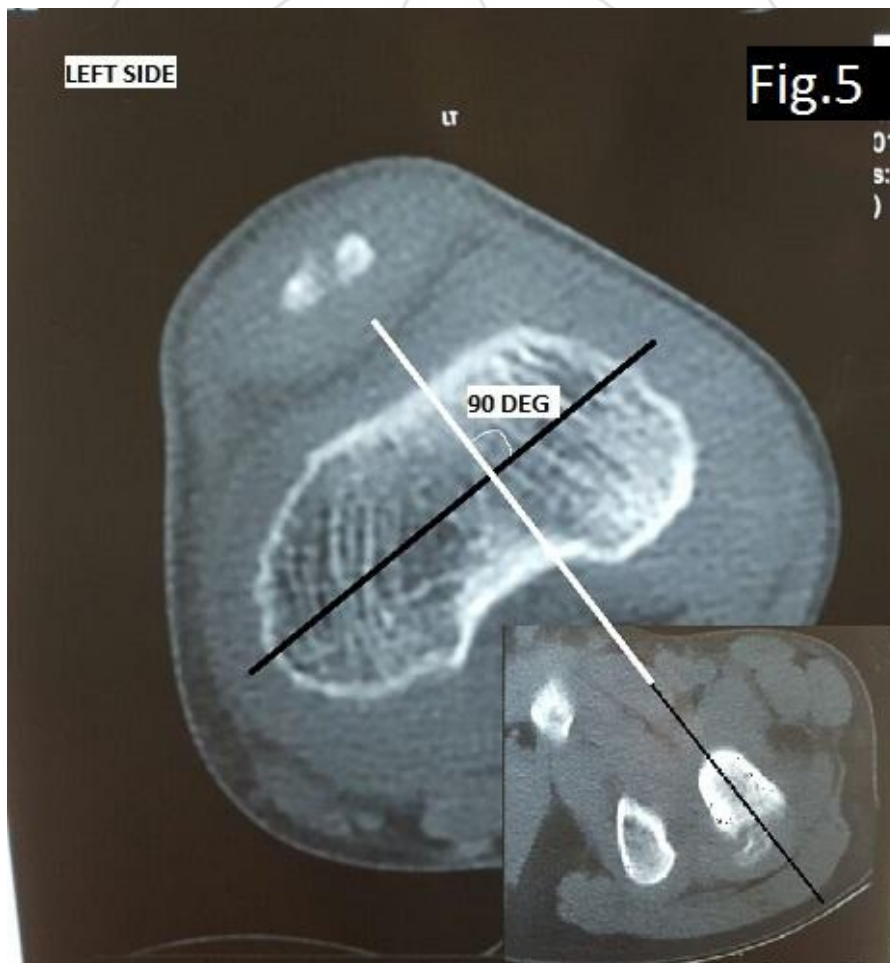
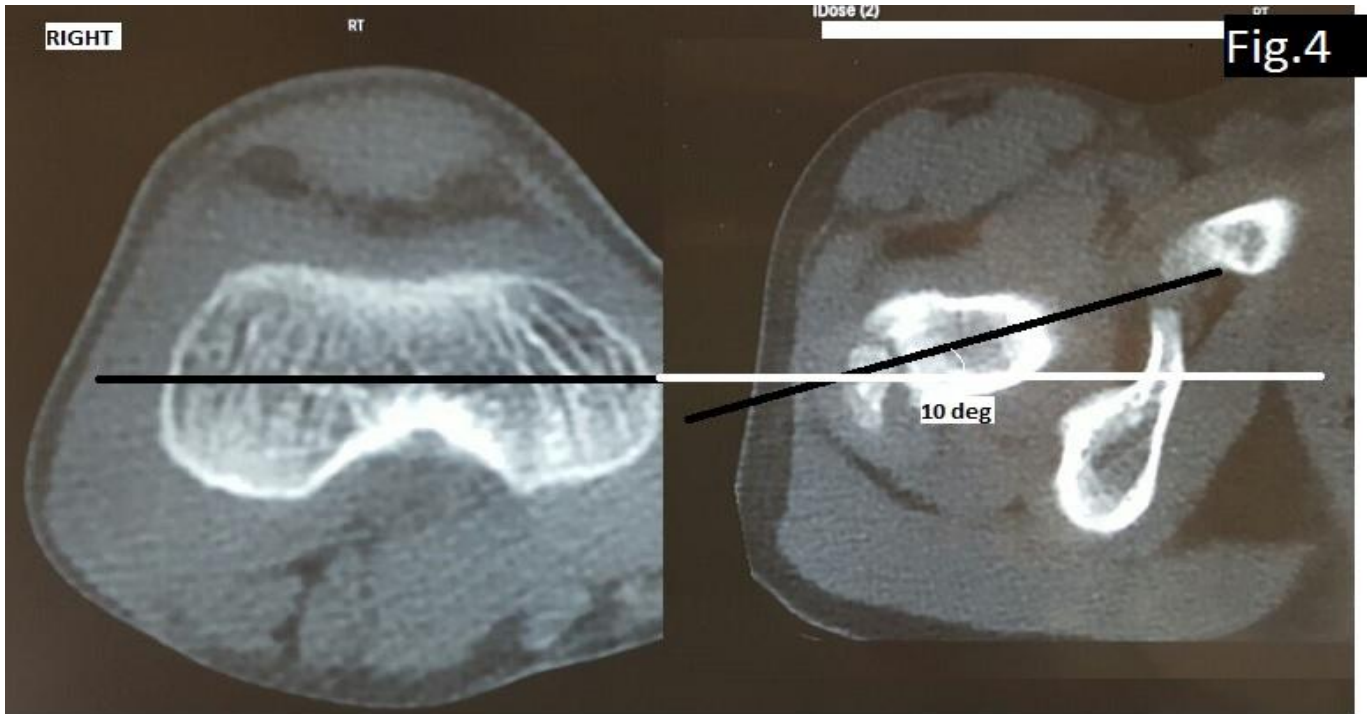




Fig.6



Fig.7



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