
Case 87: Revision of Bilateral Tibial Fassier-Duval Rods in an Eleven Year Old Girl with Osteogenesis Imperfecta

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Abstract

This is a case of bilateral tibial bowing in an 11 year old girl with osteogenesis imperfecta type IV with telescopic Fassier-Duval rods in situ. Removal of bowed intramedullary implants is not straight forward. We describe the surgical technique in detail. Once the implants were removed, further osteotomies were performed and a more lateral entry point was used to reinsert each Fassier-Duval rod. This ensured the valgus deformity was fully corrected.

1 Brief Clinical History

An ambulatory girl with osteogenesis imperfecta type IV was treated medically for osteopenia with intravenous bisphosphonates. At the age of 4 years she underwent surgical correction of bilateral tibial and femoral deformities with multiple osteotomies and insertion of telescopic Fassier-Duval rods. The left tibial rod was exchanged at the age of 6 years due to fracture and deformity. The right femoral rod was exchanged at age of 8 years for the same reason.

Both tibial rods extended with growth leading to a decrease in telescoping between the male and female parts. Progressive valgus deformity in the tibiae led to bending of the rods that ultimately led to no further telescoping. At the age of 11 years the intermalleolar distance was 6 cm and increasing. It was therefore decided to proceed with revision

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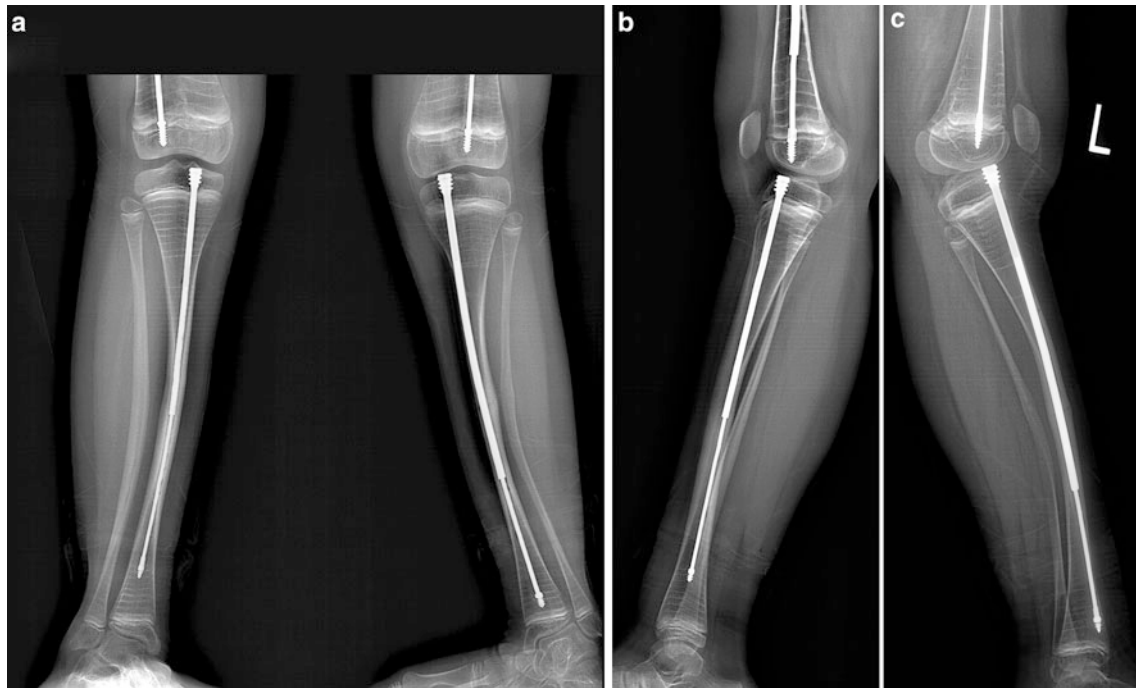


Fig. 1 Preoperative anteroposterior and lateral X-rays showing bilateral tibial bowing with Fassier-Duval rods in situ

bilateral tibial rodding. This involved removal of the previous implants, repeat tibial osteotomies (one on the right and two on the left) and reinsertion of the telescopic Fassier-Duval rods using a more laterally placed entry point.

2 Preoperative Clinical Photos and Radiographs

See Fig. 1.

3 Preoperative Problem List

1. Bilateral tibial bowing
2. Implants in situ that require removal
3. Poor bone quality

4 Treatment Strategy

1. Stop medical treatment a minimum of 48 h prior to surgery and restart a minimum of 4 months after surgery.
2. Obtain clinically straight tibiae. Careful preoperative planning of the osteotomy sites is important. Intraoperative X-ray images obtained in several planes may lead to changes in the plan.
3. Protect the growing tibiae with telescopic Fassier-Duval rods.

5 Basic Principles

The basic principles of this case are to correct the deformity and prevent future fracture. This is achieved in the following ways:

1. Perform as many osteotomies as necessary to achieve straight bones.
2. Reinsert expandable Fassier-Duval rods to protect the whole length of the growing tibiae.
3. When reinserting the Fassier-Duval rods, use a more lateral entry point to ensure the deformity is fully corrected. If the same entry point is used, some valgus deformity will persist.

6 Images During Treatment

See Fig. 2.

7 Technical Pearls

1. Plan the site of the first osteotomy preoperatively. Use a Midas Rex Microsaw (Medtronic) to start the osteotomy and cut through the Fassier-Duval rod. Once the rod is cut, perform the remaining part of the osteotomy using osteotomes.

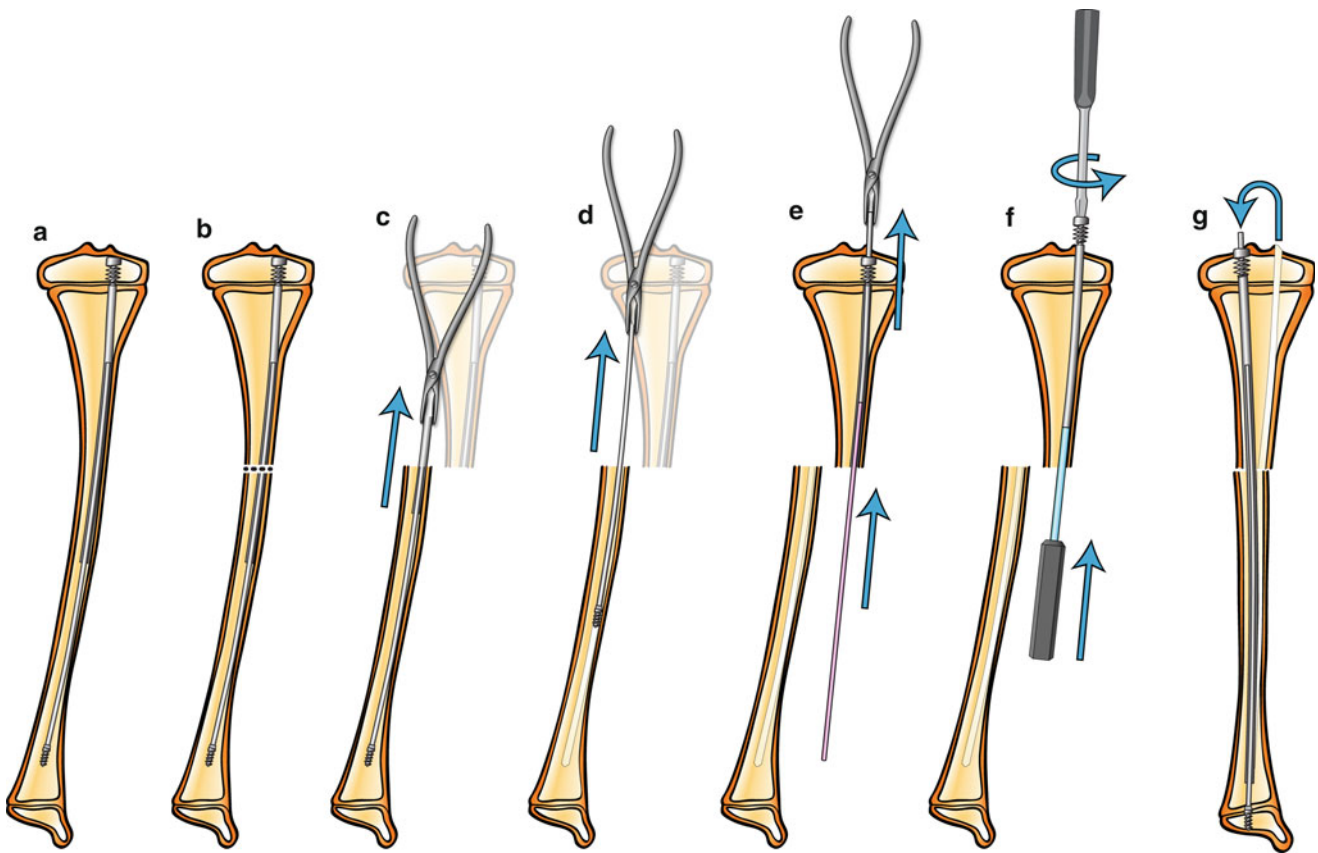


Fig. 2 Surgical stages to remove a Fassier-Duval rod. (a) Deformed tibia with Fassier-Duval rod in situ. (b) Perform the tibial osteotomy. (c) Remove the distal female rod using pliers. (d) Remove the distal male rod using pliers or a T-handle. (e) Insert a wire (the same size as the male rod) into the distal end of the remaining female rod. Push the male rod into the knee under X-ray guidance. Make an appropriate

incision in the knee and remove the male rod using pliers. (f) Engage the screwdriver in the female head. While unscrewing, apply pressure at the distal end of the female part using a rod of the same diameter. This will aid the removal. (g) When inserting the new Fassier-Duval rod, use a more lateral entry starting point

2. Bone that has been cut with the Midas Rex Microsaw will be damaged. Remove it using a rangeur.
3. Further tibial osteotomies can be performed percutaneously using multiple drill holes and an osteotome.

8 Outcome Clinical Photos and Radiographs

See Fig. 3.

9 Avoiding and Managing Problems

1. Do not use the largest diameter rod that fits the canal as this can lead to bone resorption.

2. Ensure the threads of the male component are in the epiphysis on the lateral intraoperative X-ray view. The anteroposterior view can be misleading.
3. Ensure the male part is not too long within the knee. This could cause articular cartilage damage.
4. Protect the osteotomies in above-knee plaster immobilization postoperatively and avoid weight bearing for 3 weeks. At this time, ankle-foot orthoses should be fitted to allow weight bearing.

10 See Also in Vol. 3

Case 85: Deformity of the Humerus in a Four Year Old Boy with Osteogenesis Imperfecta

Case 97: Forearm Deformity in a Fourteen-Year-Old Boy with Osteogenesis Imperfecta



Fig. 3 Immediate postoperative anteroposterior and lateral radiographs of both tibiae showing correction of deformity

References and Suggested Reading

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