

Guided growth with Hinge Plates for lack of extension and fixed flexion of the knee

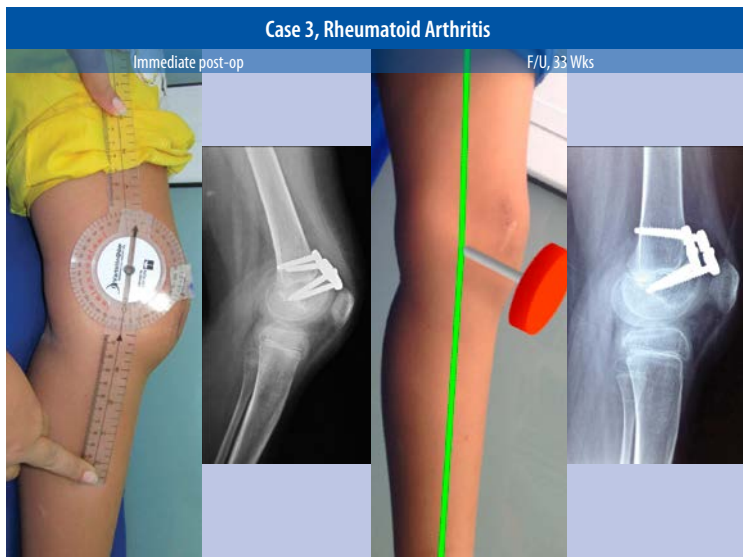
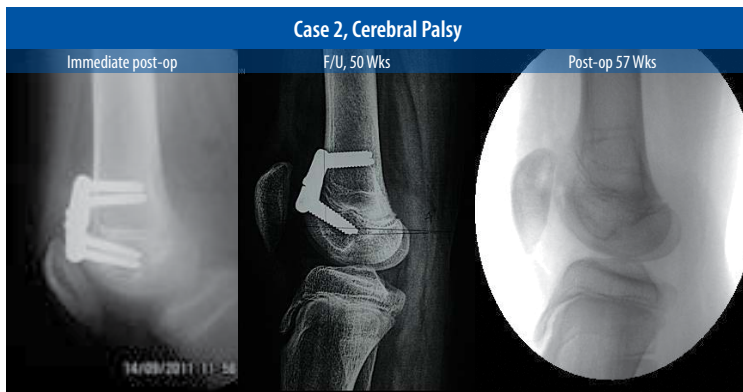
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INTRODUCTION

Lack of extension of the knee (LEK) and Fixed flexion of the knee (FFK) may occur in patients with osteogenesis imperfecta, arthrogryposis, rheumatoid arthritis, cerebral palsy and other conditions. They develop a crouch gait, a non-efficient energy saving condition that causes a compensatory flexion deformity of the hip and lumbar lordosis. Recommended treatments for LEK and FFK have included bracing, physical therapy and in severe cases: popliteal posterior release, distal femoral osteotomy or progressive distraction with external fixation; but these treatments often fail because of the complications and rebounds. Kramer and Stevens reported correction of these deformities using staples for hemiepiphysiodesis of the distal anterior femur. Klatt and Stevens reported in a further experience "some limitations of stapling including relatively slow correction and occasional hardware migration", in the same report they present their results using a pair of anterior 8-plates for hemiepiphysiodeses with less complications.

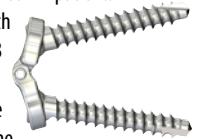


METHOD

Two 3-cm incisions are made, one on either side of the patella, centered at the level of the physis. Because of the anterior and central position of the patella, 2 plates are required for sagittal correction. The Hinge Plates are placed just outside the articular portion of the joint surface, medially and laterally.

RESULTS

We present our experience with guided growth and an alternative way to do anterior hemiepiphysiodeses using Hinge Plates in patients with LEK and FFK. We studied 11 patients (13 knees) with: 3 patients with arthrogryposis (5 knees), 1 patient with osteogenesis imperfecta (1 knee), 3 patients with rheumatoid arthritis (3 knees), 2 patients with postaxial hypoplasia and short femur (2 knees), and 2 patients with cerebral palsy (CP) and hemiplegic pattern. The average age was 6 years (3-13) and the average lack of extension was 40° (20°-60°). The average follow up was 2 years and 2 months (42 months to 12 months). Clinical assessment included measurement of knee range motion, gait evaluation, and screening for concomitant deformities. We found three patterns: Type 1: FFK with limitation of both flexion and extension; Type 2: LEK but normal flexion; and Type 3, pro-curvatum deformity of the distal femur with LEK. The 5 knees with arthrogryposis match type 1; type 2 was found in three patients with rheumatoid arthritis, two patients with CP and one patient with osteogenesis imperfecta (6 knees), type 3 was found in two patients (2 knees) with postaxial hypoplasia.



DISCUSSION

One patient had previous treatment with staples that failed due to forward migration and 5 patients had been previously treated with custom plates (without hinges), in these cases we observed that the correction stops when the screws impinge the plate and then lock. These 6 patients were treated by replacing staples or the plates with Hinge Plates. Nine knees (69.2%) had a full correction at 14 months; the other four knees are in progress. We did not find loosening of the screws or migration.



CONCLUSIONS

We observed in some cases that after the screw has reached maximal rotation, the plate will begin to hinge around its pivot point. We observed that guided growth is effective with Hinge Plates for correction of LEK and FFK.

References:

1. Klatt J, Stevens P. Guided growth for fixed knee flexion deformity. J Pediatr Orthop. Sep 2009. V28. N6:626-631
2. Schroederlucke S, Bertrand S. Failure of Orthofix eight-Plate for the Treatment of Blount Disease J Pediatr Orthop 2009. V 29, Number 1:57-60.
3. Stitzgen A, Garrels A, Kobayashi H. Biomechanical Comparison Between 2 Guided-growth Constructs J Pediatr Orthop 2012. Volume 32, Number 2:206-209.
4. Spiro A, Babin K, Lipovac S. Anterior Femoral Epiphysiodesis for the Treatment of Fixed Knee Flexion Deformity in Spina Bifida Patients. J Pediatr Orthop.2010. Volume 30, Number 8:858-862.



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