

5° CURSO INTERNACIONAL DE ORTOPEDIA PEDIÁTRICA  
 POSNA – SLAOTI – EPOS  
 12 – 14 OCTUBRO 2017  
 SÃO PAULO – BRASIL



## Guided growth for sagittal plane deformities in the knee and ankle

Dr. Javier Masquijo  
 Departamento de Ortopedia y Traumatología Infantil  
 Sanatorio Allende, Córdoba - Argentina



## Disclosures

- None

## (1) Knee

- Fixed knee flexion deformity
- Common problem in patients with spina bifida, cerebral palsy, and arthrogryposis



Arthrogryposis: A Text Atlas  
 Global Help. Staheli L.

## FKFD >10 degrees

- Ambulatory patients Anterior knee pain, decreased endurance, and progressive crouch gait
- Wheelchair users Impair standing, transfers, and activities of daily living

## Surgical options

- Posterior soft tissue release
- Supracondylar femoral extension osteotomy
- Joint distraction external fixator

Potential complications

- Fractures, neurovascular lesions, knee instability, pin site infection, and recurrent deformity with continued growth

## Surgical options

- Guided growth?



**Anterior femoral stapling**

Kramer A, Stevens PM.  
J Pediatr Orthop. 2001 Nov-Dec;21(6):804-7.

- 28 patients (47 knees)
  - CP (11), spina bifida (5), hemiplegia (3), SCIWORA (2), arthrogyposis (3), skeletal dysplasia (2), and congenital knee flexion deformity (2)
- FKFD
  - Pre 10°–25° (maximum 45°)
  - Post 0°–11°
- 1 staple extrusion

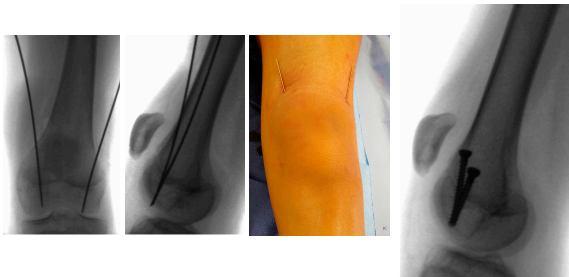
**Anterior femoral epiphysiodesis for the treatment of fixed knee flexion deformity in spina bifida patients.**

Spiro AS, Babin K, Lipovac S, et al.  
J Pediatr Orthop. 2010 Dec;30(8):858-62.

- 10 patients (20 knees)
- Preoperative FKFD 20.3 ± 9.9 degrees (10 to 40 degrees)
- All patients except 1 experienced significant improvement
- Mean correction rate 1 degree per month (range: 0.2 to 1.9 degrees)
- 2 staple extrusion

**Anterior Percutaneous Hemiepiphysiodesis of the Distal Aspect of the Femur: A New Technique**

Kay, RM, Rethlefsen SA.  
JBJS Case Connector 2015

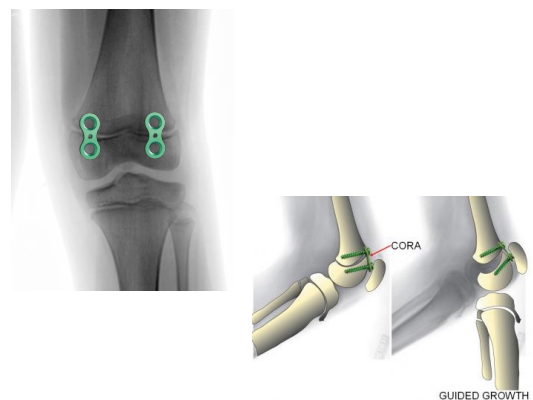
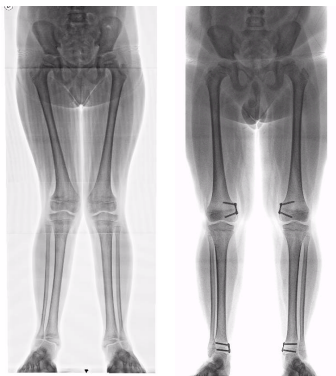


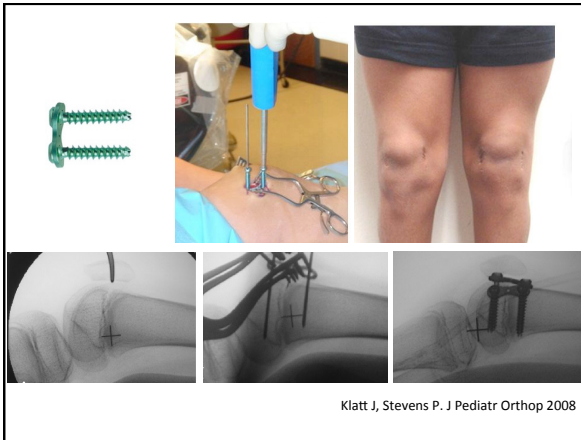
**Epiphysiodesis Screw Bending**

Normandin BM, Tennent DJ, Baldini TH, Blanchard AM, et al.  
Orthopedics, 2017



Deformation of screws  
Hardware breakage during removal





**Guided Growth for Fixed Knee Flexion Deformity**

Klatt J, Stevens PM  
J Pediatr Orthop 2008;28:626-631

- 18 patients (mean age 10 years-old)
  - CP, SB, Arthrogyrosis, trauma
- Indication FKFD >10°
  - Mean deformity 23.4° (range, 10°-50°)

**Guided Growth for Fixed Knee Flexion Deformity**

Klatt J, Stevens PM  
J Pediatr Orthop 2008;28:626-631

- All patients but one had significant improvement
  - Mean improvement 1.4° per month (range, 0.2°-4.8°)
  - Average 15° (range, 5°-40°)
  - Average residual deformity 8 degrees (range, 0-30°)

**Guided Growth for Fixed Knee Flexion Deformity**

Klatt J, Stevens PM  
J Pediatr Orthop 2008;28:626-631

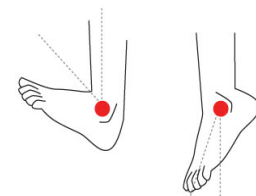
- Complications
  - Knee effusion (1), superficial infection (1), rebound (1)
  - None of the plates broke, and there was no screw migration or loosening

**TBP advantages**

- Compared to staples
  - Rare breakage or migration
  - Fewer revisions
- Compared to PETS
  - Do not cross the physis
  - Easier removal

**(2) Ankle**

- Equinus
- Calcaneus deformity



**Anterior distal tibial epiphysiodesis for the treatment of recurrent equinus deformity after surgical treatment of clubfeet.**  
 Al-Aubaidi Z, Lundgaard B, Pedersen NW.  
 J Pediatr Orthop. 2011 Sep;31(6):716-20.

- 25 children (31 feet)
- Mean shift 15 degrees
- 30% sample >9 years-old

**Guided Growth of the Distal Posterior Tibial Physis and Short Term Results: A Potential Treatment Option for Children With Calcaneus Deformity**  
 Sinha A, Selvan D, Sinha A, James LA.  
 J Pediatr Orthop. 2016 Jan;36(1):84-8.

**Distal tibia**

Limited growth

**Distal tibial physeal bridge: a complication from a tension band plate and screw construct. Report of a case**  
 Jon E. Oda<sup>a</sup> and Mihir M. Thacker<sup>b</sup>  
 Journal of Pediatric Orthopaedics B 2013, 22:259-263

Case report 259

**Take home message**

- Guided growth with TBP
- Alternative to more invasive procedures
- Mild to moderate sagittal plane deformities in the skeletally immature
- Carefull patient selection
- Meticulous technique