Clinical Results and Treatment Strategies for Fibular Hemimelia

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Fibular hemimelia

- Total or partial deficiency of Fibula
- The most frequent congenital deficiency of the long bones
  (1/50,000 newborn)
- Anteromedial bowing
Fibular hemimelia

Not only a disorder of the fibula

- Hip
  - Acetabular dysplasia
  - Proximal femoral varus
- Femur
  - PFFD
- Knee
  - Genu valgum
  - Anterior-Posterior instability with absent cruciate
  - Patellar hypoplasia
  - High-riding patella
  - Lateral patellar subluxation
  - Hypoplastic lateral femoral condyl
- Tibial bowing
- Ankle
  - Valgus deformity
  - Ball and socket ankle
- Foot
  - Tarsal coalition
  - Absence of lateral ray(s)
  - Metatarsus adductus
- Other abnormalities
  - **Limb length discrepancy (LLD)**
Achterman-Kalamchi

Type 1A

Type 1B

Type 2
Objective of the treatment

- salvage the limb,
  - Plantigrade weight bearing
  - Stable ankle joint
  - Sensation

- with an acceptable limb length discrepancy
Surgical procedures for fibular hemimelia

- Achilles lengthening
- Supracondylar femoral varus osteotomy
- Fibular remnant resection
- Proximal femoral valgus osteotomy
- Contracture correction using
  - external fixators
  - flexor tendon releases
  - posterior capsule release
- Centralizing of ankle
- Ankle arthrodesis
- Deformity correction
Treatment alternatives for LLD

✔ Shoe-lift
✔ Contralateral epiphysiodesis
✔ Contralateral shortening
✔ Amputation and prosthetic fitting (type 2 ??)
  • Boyd
  • Syme

✔ Bone lengthening

Treatment depends on patient
Methods: Treatment

Type 1a
Fibular hypoplasia
Bone lengthening
Deformity correction if present
Methods: Treatment

Type 1b

First session: Fibular Anlage resection ± Deformity correction
Ankle centralization

Second session: Bone lengthening ± Deformity correction
Methods: Treatment

Type 2

Fibular hemimelia

Fibular anlage resection ±

Achillotomy/Achilloblasty

Deformity correction

Bone lengthening

Ankle centralization
Patients and Method

- 1994-2012
- 69 segments of 65 patients
- 27 Girls, 38 Boys
- Mean age: 12 (6 months-16) years old
- PFFD: 14 patients
- Femoral shortening: 18
- Lacked one or more lateral ray: 34

- Achterman-Kalamchi
  - Type Ia: 27
  - Type Ib: 22
  - Type II: 20
Operations

- Anlage excision: 65 patients
- Achillotomy: 53 patients
- Ankle centralization: 47 patients
- Peroneal tendon release: 28 patients
- Osteotomy for correction
  - Ankle: 65 patients
  - Tibia: 37
  - Femur: 15
- Lengthening: 65 patients
Results

- Mean follow up: 8 (1-12) years
- Mean number of surgery: 4.3 (2-11)
- Mean length of hospital admission: 29 (14-83) days
- Corrections
  - Ankle: 65 patients
  - Proximal diaphysis tibia: 37
  - Distal femur: 15
- Foot deformity correction: 17 patients
- Knee protection: 14 patients
Results

- Mean lengthening
  - Tibia: 11 (7-15) cm
  - Femur: 7 (3-11) cm
- No LLD: 47 patients
  - Less than 2 cm: 11 patients
  - More than 2 cm: 7 patients
- Mean ext. Fixator: 12.8 (6.2-19.8) months
- Mean HI: 52.9 (37-58) days/cm

- Activity level
  - No restriction: 7
  - Mild: 11
  - Limitation of activity: 38
  - Severe limitation: 9

- Level of pain
  - No: 30
  - Any: 21
  - Mild: 8
  - Moderate: 3
  - Severe: 3

- Satisfaction: 74%
  - Yes: 48
  - No: 17
Complications

- Subluxation 4
- Dislocation 2
- Flexion contr 18
- Decrease of ROM 16
- Recurrence of def. 7
- Pin tract infection 54
- Delayed cons. 13
- Regenerate fx 6
- Aestetic concern 7
- Transient paresthesiae 8
- Depression 11
- Equinus 14

**Total** 160

**Rate** 2.46/per patient

- **Osteomyelitis** 2
- **Stiff joint** 3
- **Amputation** 4
  (3 severe pain, 1 bed cosmesis)
Case examples
NA, 3 years, F
Bil. Type II
NC, 3 y, F, Bil. Type II
Complications

Anterior knee dislocation

Posterior knee dislocation
Hip dislocation

- 12, M
- Fibular hemimelia + PFFD
- 14 cm LLD
- Bifocal corticotomy
Hip dislocation

Postoperative 2 months
IY, 14 y, m. FH+PFFD
Conclusion

- Mean ext fixator: 12.8 months
- Mean HI: 52.9 days/cm
- Complication rate: 2.46 / per patient
- Satisfaction: 66%

Reconstruction
Conclusion

- Patients have a nonfunctional foot
- Patients have a predicted LLD > 25 cm at maturity
- Patients have a lack of more than 2-3 rays

Amputation
Our treatment strategie for Fibular hemimelia

- 0-6 month: bracing and passive exercises
- 6 month-1 year: Achillotomy or achillopasty, alnage resection with peroneal tendon release
- 1-4 year: ankle centralization with Ilizarov+osteotomy
- 4 year: deformity correction and first lengthening
- 6-8 years: second lengthening
- 12-14 year: Final lengthening +/- deformity correction