Review of treatments for brachymetatarsia and lengthening at our center (2007-2025): evolution of therapy and clinical indications

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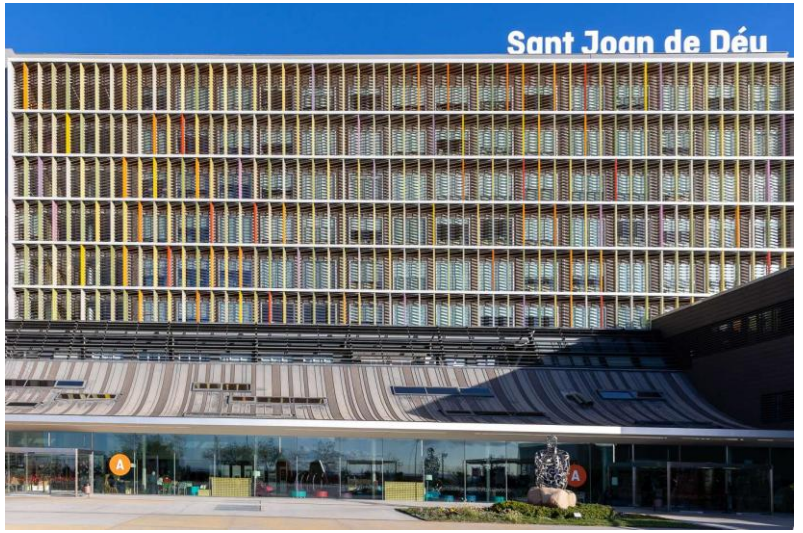
May 2025

• 👶 **Leading pediatric and maternity hospital**
Specialized in child and maternal healthcare.

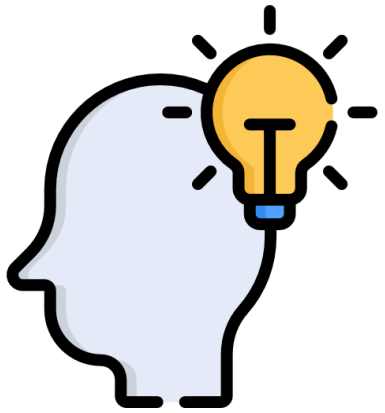


• 🧠 **Excellence in complex and rare diseases**
Expertise in oncology, neurology, and cardiology.

• 🤝 **Family-centered and humanized care**
Emotional support, child-friendly spaces, and holistic approach.

• 💡 **Innovation with global impact**
Cutting-edge technology and international collaboration.

- Review of brachymetatarsia treatment.
- Evolution of techniques used.
- Treatment indications.



BACKGROUND-AIM

- **Incidence**: 0.02-0.05% of the population.
- Predominantly in **females** (25:1)
- **Bilateral** in 72% of cases
- The **4th** metatarsal is the most frequently affected

ETIOLOGY

Congenital

- **Premature physeal closure**
- Embryonic development disorder
- Endochondral ossification defects

Adquired

- Traumatic: Fractures with physeal injury
- Infectious: Osteomyelitis
- Iatrogenic: Previous surgery
- Tumoral: Enchondromatosis

Syndromic associations

- Down syndrome
- Turner syndrome
- Pseudohypoparathyroidism
- Albright's disease

LAMM CLASSIFICATION

Number: Affected MTT number

Letter:
- A → shortened length
- B → shortened length + diaphyseal axis involvement
- C → shortened length + MTT-phalanx joint involvement

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Contents lists available at ScienceDirect

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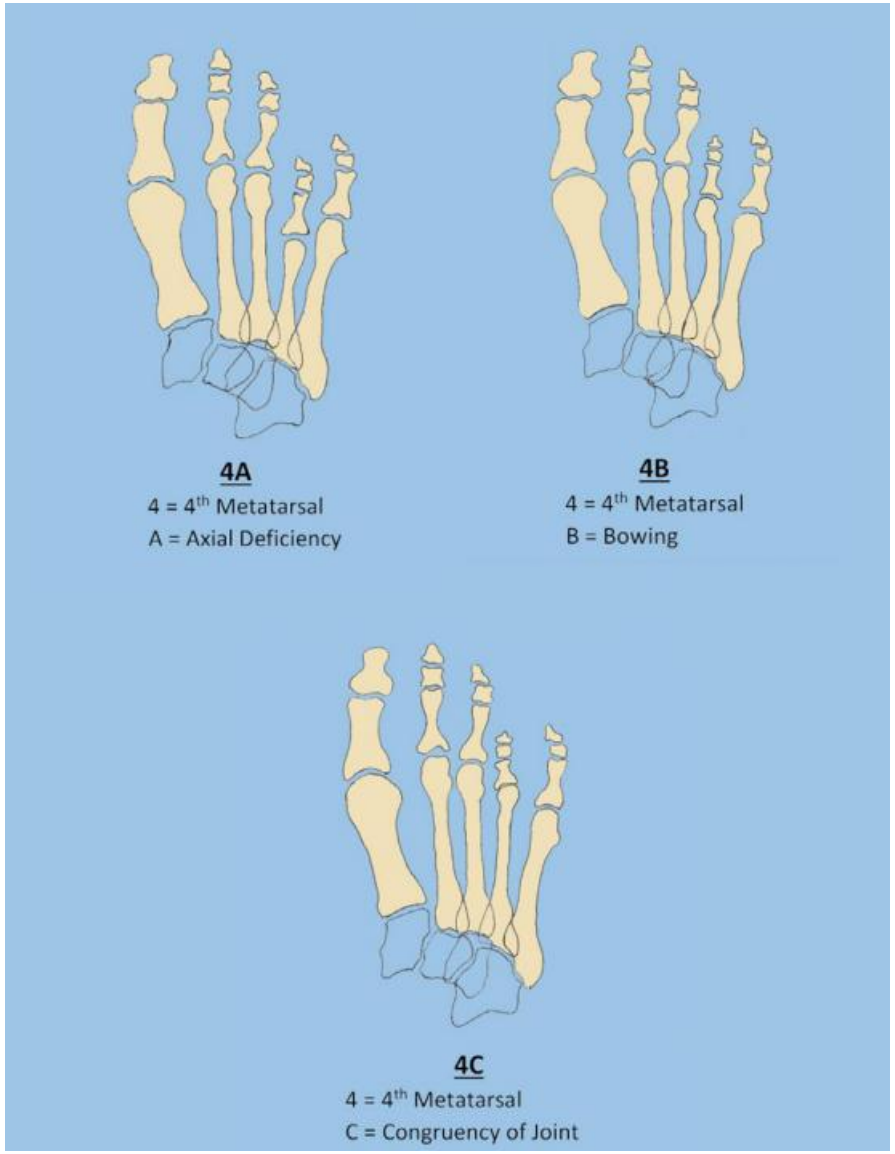
journal homepage: www.jfas.org

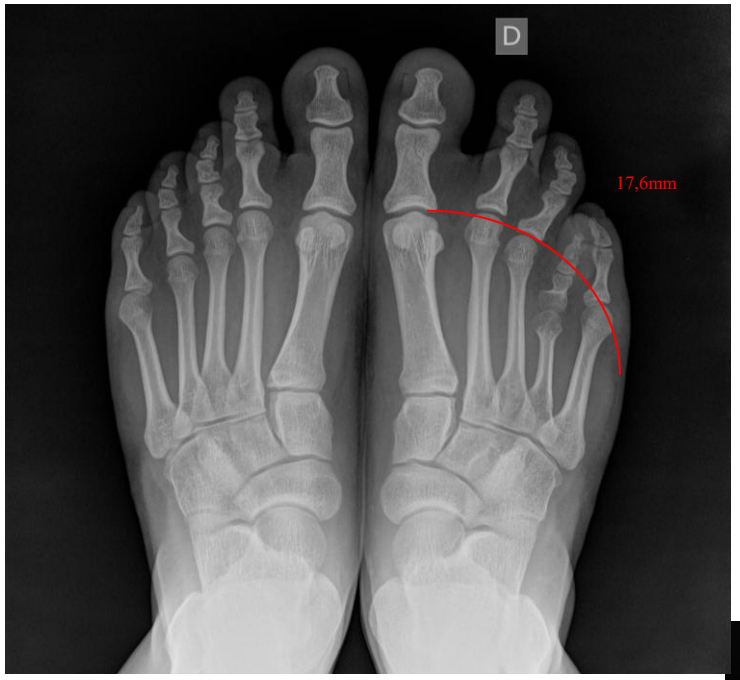
Brachymetatarsia: A Classification for Surgical Treatment

Bradley M. Lamm, DPM, FACFAS[1,2], Tyler B. Lamm[3]

[1] Chief, Foot and Ankle Surgery, St. Mary's Medical Center & Palm Beach Children's Hospital, West Palm Beach, FL
[2] Director, Foot and Ankle Deformity Correction Center and Fellowship at Paley Orthopedic and Spine Institute, West Palm Beach, FL
[3] Student, Oxbridge Academy, West Palm Beach, FL



BACKGROUND-AIM



Morphofunctional Study of Brachymetatarsia of the Fourth Metatarsal

Pedro V. Munuera Martínez, DP*
Guillermo Lafuente Sotillos, DP*
Gabriel Domínguez Maldonado, DP*
José Luis Salcini Macías, DP*
Luis Martínez Camuña, DP*

Brachymetatarsia is abnormal anatomical shortness of the metatarsals. We describe a new diagnostic test that enables quantification of the shortening of the fourth metatarsal in brachymetatarsia. The metatarsodigital alterations most frequently related to this deformity are presented. (J Am Podiatr Med Assoc 94(4): 347-352, 2004)

METHODS

- 20 pacients with 4th metatarsal brachymetatarsia
- Treated between 2007-2025.
    - 17 with external fixator
    - 3 acute lenghtening

METHODS

Review Summary (2007–2025)

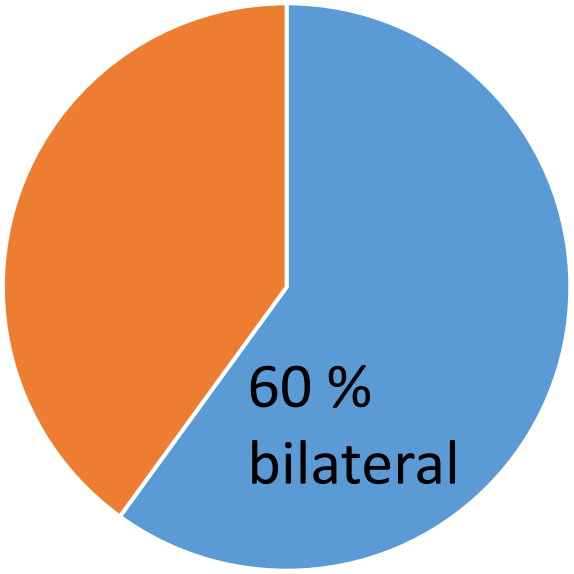
1. Patient Demographics
- Age at surgery
- Sex distribution
- Laterality (unilateral vs. bilateral)

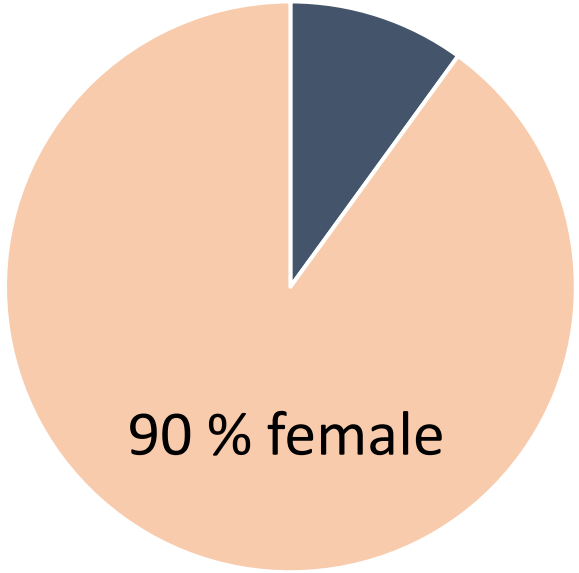
2. Surgical Techniques
- Gradual vs. acute lengthening
- Postoperative management

3. Complications
- Digital Malalignment
- Delayed bone healing
- Infections
- Others

4. Evolution of the techniques

RESULTS





14’82 main age

Details of the external fixator technique

Two distals pins and two proximals pins were placed.

Lengthening protocol was 0,5 mm per day.

The average duration of lengthening was 57,88 days.

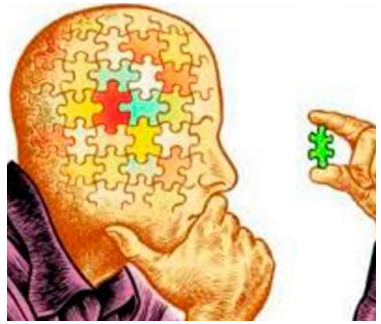
The average time for neutralization was 97 days.

The duration of external fixator use range between 130 and 160 days.

COMPLICATIONS

- 29 % stiffness, metatharsal subluxation or claw deformity of the toe
- 17,64% needed a surgery to solve this complication

RESULTS



To Fix or not to fix
How long to fix

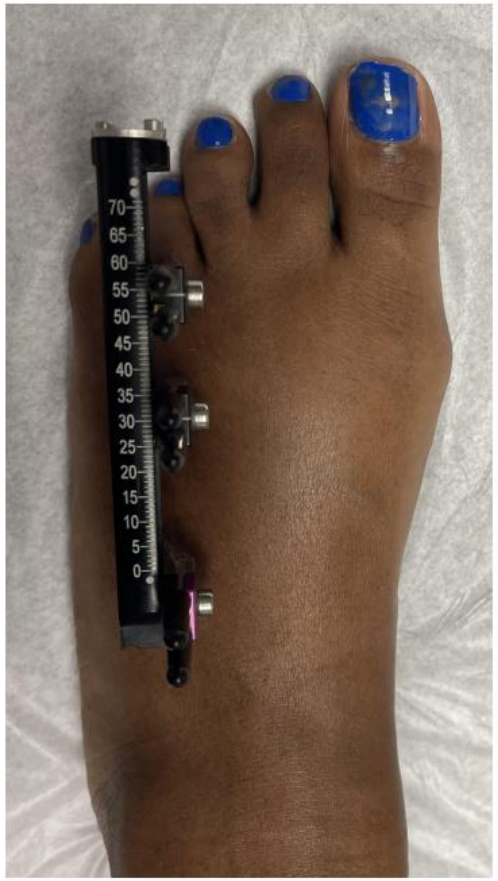
RESULTS

RESULTS

COMPLICATIONS

Pseudoarthrosis 17,74 %

RESULTS



Risk of stiffness and metatarsalgia

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RESULTS

Lengthening

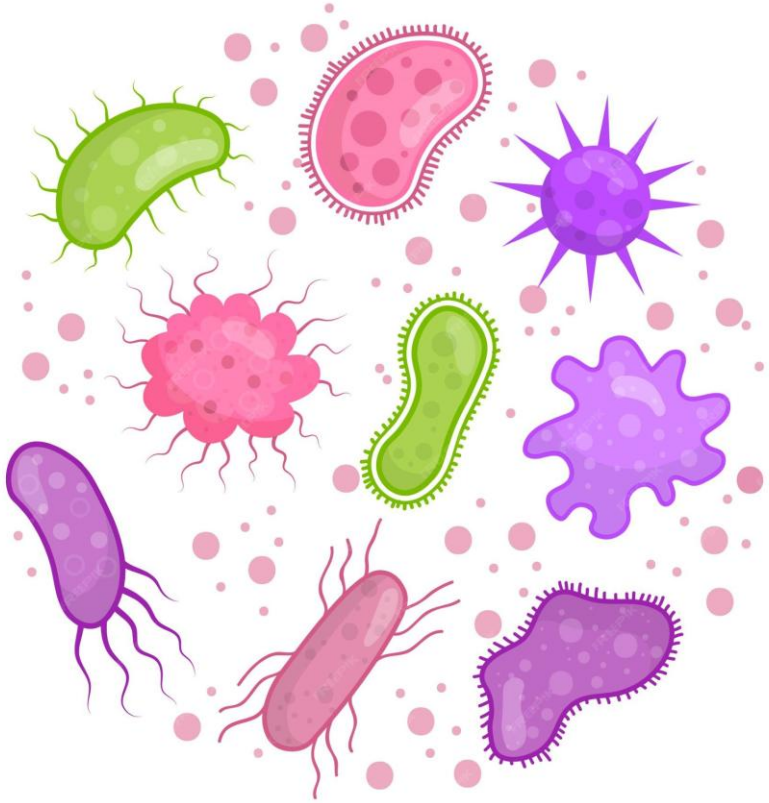
Time for neutralization

RESULTS

COMPLICATIONS

Infection

- 58,82 % used antibiotics for superficial infection
- 1 case required surgical debridement



Details of the acute lengthening technique used in our department

RESULTS

Non-weight-bearing period: 4 to 6 weeks.

Hardware removal: Pin removal followed by initiation of weight-bearing using regular footwear.

Rehabilitation: Patient-directed mobilization of the metatarsophalangeal joint.

Follow-up: At three monts, patients showed satisfactory weight-bearing and ambulation without pain.

Complications: No infectious complications or associated metatarsalgias were observed in our series.

RESULTS

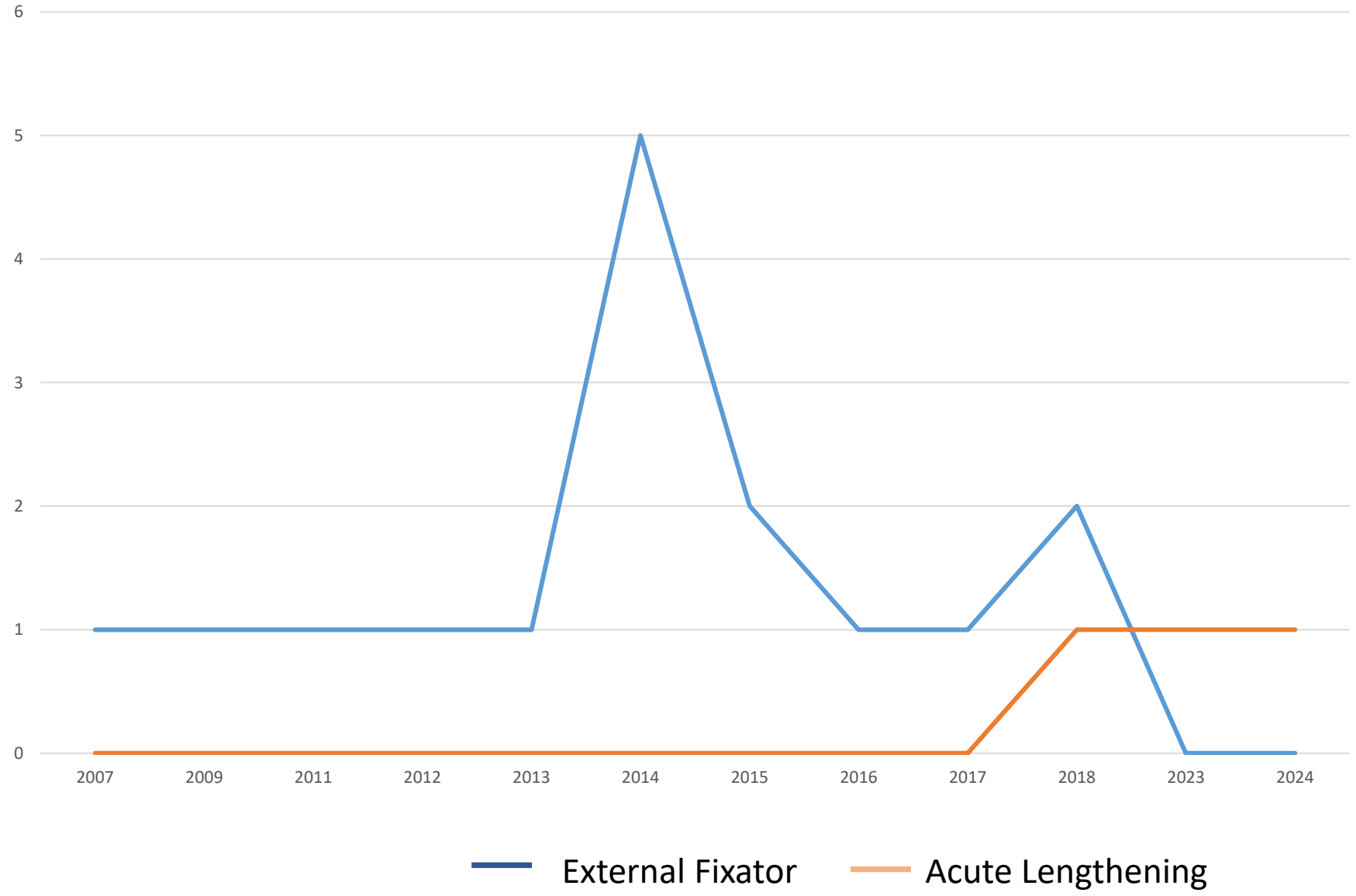
PRE

POST

PRE

POST

CONCLUSION


6
5
4
3
2
1
0
2007
2009
2011
2012
2013
2014
2015
2016
2017
2018
2023
2024
External Fixator
Acute Lengthening

Evolution of the indications

Aesthetics

Pain and excessive deformity

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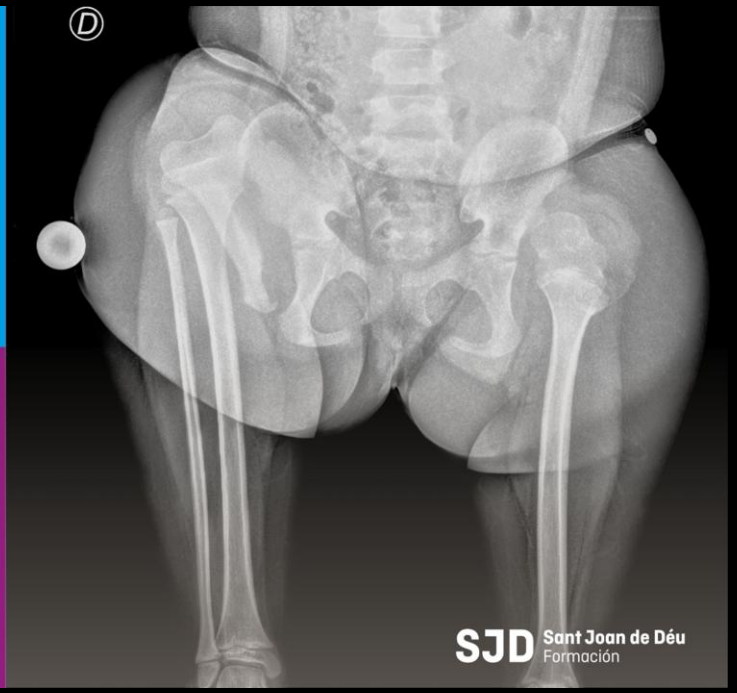

HBO

Pediatric complex Limb Reconstruction with a full range of Internal and External Fixation devices

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Hospital Sant Joan de Déu
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Faculty:
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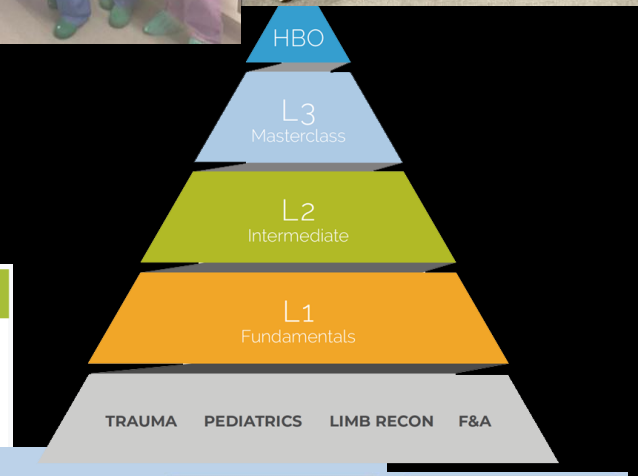

1 - 3 Jul 2025 PED

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