



SHORT CASE PRESENTATION CTEV

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History & Examination

- A 2yr old male child was referred to paediatric orthopedic CTEV clinic for Lt foot deformity which had not improved since birth. No deformity had been noted following antenatal ultrasound screening. He was born at full term following an emergency caesarean section for foetal distress. There was no family history of congenital deformities. On examination, he had a normal spine, stable hips with negative Barlow and Ortolani tests. The ankle is in equinus, and the foot is supinated (varus) and adducted

Differential diagnosis

- 1) CTEV
- 2) Metatarsus adductus~ forefoot adduction with Normal hindfoot
- 3) Talipes calcaneovalgus ~ dorsiflex, abducted foot
- 4) Vertical talus
- 5) positional clubfoot~ foot and bony anatomy are completely Normal



- My diagnosis is a Left, idiopathic, neglected, congenital talipes equino varus in a 2 yr old male child with deep media crease, convex lateral border, uncovering of head of talus, posterior crease, equinus and empty heel, callosity over lateral border with normal hip spine and other joints

Why idiopathic

- Because no other cause could be found.
- Diagnosed when Child has normal upper and lower Extremities, spine, and normal neurological status apart from club foot.

Non idiopathic causes of clubfoot

- **Arthrogryposis**
- **Spinal problems like spine bifida, dysraphism**
- **Streeter's Dysplasia**
- **Diastrophic Dysplasia**
- **Freeman Sheldon Syndrome**
- **Mobius Syndrome**
- **Down's Syndrome**
- **Larsen's Syndrome**

Please don't say polio

Features of arthrogryposis

- Thin shiny skin
- Severe deformity of clubfoot
- Usually bilateral
- Deformity of other joints
- Typical facies



Theories

- Mechanical pressure in utero e.g.:
Oligohydramnios
- Neuromuscular defect
 - — Spina bifida
 - — Weak peroneal muscles
- Germ cell defect
- Intrauterine arrest of the growth
- Hereditary
- Multifactorial

NOMENCLATURES

- Neglected clubfoot: child older than two years who had little or no treatment
- Recurrent clubfoot: The deformity recurred during correction/ while t/t is still going on
- Relapse: Deformity recurs after full correction usually equinus recurs first

Resistant/rigid clubfoot

- no evidence of further improvement with manipulation

- Deformities-

- Cavus at Midfoot

- Adduction (Forefoot)

- Varus at Subtalar joint (Hindfoot)

- Equinus at Ankle (Hindfoot)

What would you like to do

- Radiograph—not required unless you are suspecting bony problems or associated hemimelia or syndromic child
- serial measurement of correction is clinical and not using radiographs
- Older child- radiograph
Upto 1 yr only, Talus, calcaneum and MT's are ossified

Angles that I will measure

- AP view: Talo calcaneal angle, Talo 1st MT
- Kites index: Sum of Talocalcaneal angle in AP and Lateral view. Should be more than 40 degrees after treatment
- Lateral view: talocalcaneal angle
tibio calcaneal angle

How to measure angles on lateral radiograph

1. Dorsiflexion



2. Tibio-calcaneal angle



3. Talo-calcaneal angle



4. Talo-1st Metatarsal angle





- | | Normal | CTEV |
|-------------------------------|--------------------|------------------|
| • AP Talocalcaneal angle - | 30-50 ⁰ | ~ 0 ⁰ |
| • Talus- 1st metatarsal angle | 5-15 ⁰ | ↑ |
| • Lateral Talocalcaneal angle | 25-50 ⁰ | ~ 0 ⁰ |

Assessment of severity

1. **PIRANI** – 6 point score (modified)

2. **Dimeglio et al** - 20 point score

Vital to monitor the progress of treatment

Modified Pirani scoring

Hind foot score	0	0.5	1
Posterior crease	No crease	2-3 small creases	Single deep crease

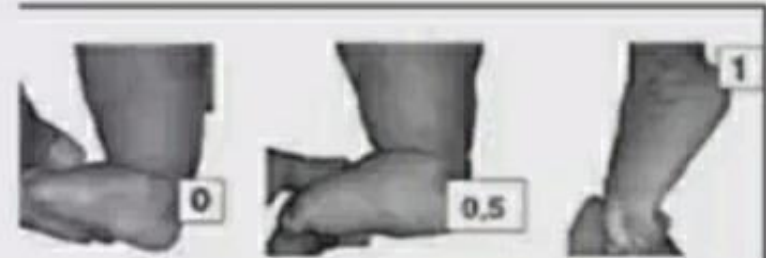


Hind foot score	0	0.5	1
Empty heel	Heel easily palpable	Difficult to palpate	Not palpable

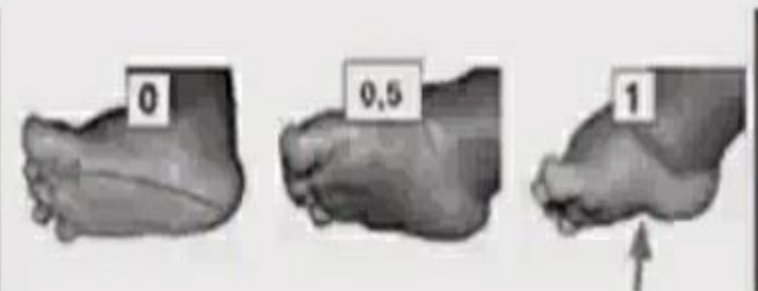


0 - easily palpable
 0.5 - palpable in depth
 1 - not palpable

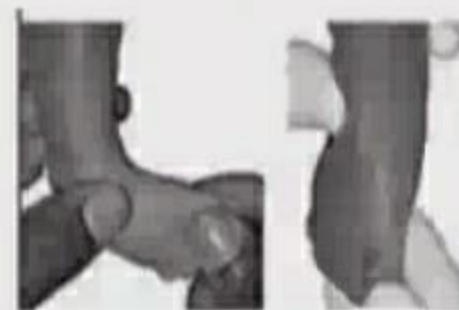
Hind foot score	0	0.5	1
Rigid equinus	Dorsiflexion possible	DF till neutral	< 90 degree



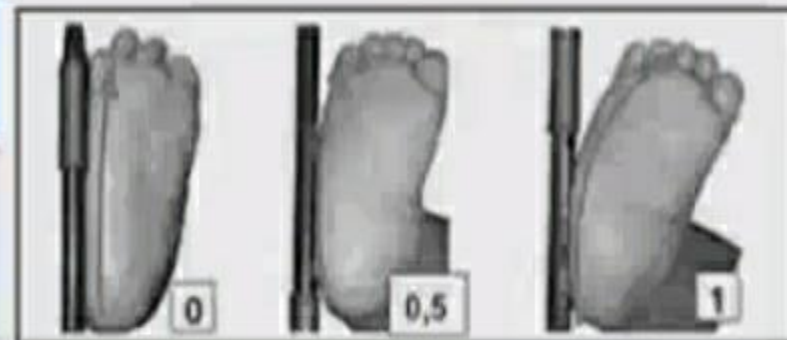
Mid foot score	0	0.5	1
Medial crease	No crease	2-3 small creases	Single deep crease



Mid.foot score	0	0.5	1
Lateral head talus	Reducible	Partially reducible	Not reducible



Mid foot score	0	0.5	1
Lateral curved border	Straight border	Mild curve (deviation @ metatarsal)	Deviation @ Calcaneocuboid jt



Classification of clubfoot severity by Diméglio

A. Equinus deviation B. Varus deviation C. Derotation D. Adduction.

- A-Sagittal plane evaluation of Equinus
- B-Frontal plane evaluation of varus.
- C-Horizontal plane evaluation of derotation of Calcaneopedal block.
- D-Horizontal plane evaluation of Forefoot relative to Hind foot.

Reducibility(degrees)	Score	Additional parameters	Score
90-45	4	Marked posterior crease	1
45-20	3	Marked mediotarsal crease	1
20-0	2	Cavus	1
0 to -20	1	Poor muscle condition	1

Conservative Treatment

Gentle Passive Manipulation and Casting

PONSETI: Gold Standard (95% success- 2 m or less)

- All components except equinus- simultaneously
- **Fulcrum- head of talus** cast change weekly

Kite:

- corrected each component of clubfoot sequentially
- Adduction, Inversion, Equinus
- **Fulcrum- calcaneo-cuboid joint**
cast change after 2 weeks

French method (Bensahel et al 1980)

- Manipulation & physiotherapy

PONSETI TECHNIQUE

- 1st cast :-Correct cavus by supinating the foot by elevating the 1st MT
- Next 3-4 casts:-Correction of adduction and varus by abducting the foot by pressure over head of talus
- Equinus correction by TA tenotomy if required

ANKLE EQUINUS corrected last
P/C TENOTOMY (90-95%)

Talar head sign 0

Heel in valgus

Mid foot score <1

Hindfoot score >1

Abduction >40 degree



FINAL CAST – 3 WEEKS – MAX. D/F & 70° EXT. ROT.

KITE'S ERROR



FULCRUM at calcaneocuboid joint, was a major error.

It would block the abduction of the calcaneum at subtalar joint – a motion that is fundamental for the correction of deformities.

Post manipulation protocol

- Dennis Brown splint in 60 degrees external rotation and dorsiflexion
- used for 23 hrs for 3 months and for 3-4 yrs at night



Foot Abduction Orthosis

Steenbeck Brace

Length of brace = Width of patient's shoulder



SURGICAL TREATMENT

- **Failure to achieve satisfactory correction.**
- **Recurred deformity**
- **Untreated clubfoot at ≥ 1 yr.**

WHAT PROCEDURE ?

- **Up to 3 years - Soft tissue surgery**
- **Beyond 3 years - Soft tissue + Bony procedure**
- **Secondary procedures – Tendon Transfers**

Operative- Turco posteromedial release

- Medial structures
- Posterior structures

- Ligaments
- Tendons
- Capsules

Posterior structures

- **Tendons**- Z plasty of Tendoachillis (cut medially) , FHL
- **Ligaments**- Posterior talofibular ligament,, interosseous tibio fibular ligament, calcaneo fibular ligament
- **Capsule**: Ankle and subtalar

Medial structures

- **Ligaments:** Spring ligament, Masters Knot of Henry, Bifurcated Y ligament, Plantar aponeurosis, talo calcaneal interosseous ligament
- **Capsule:** Talo navicular capsule
- **Tendon:** Tibialis Posterior, FDL, abductor hallucis

- Master knot of Henry → Fibrous slip that envelops the FDL and FHL tendons.

Structure which is not cut

- Deep part of deltoid ligament (tibiotalar ligament)

Cast

- Give cast in under correction and then change plaster after 15 days
- This cast is to be continued till 1 month followed by splints for 2 years

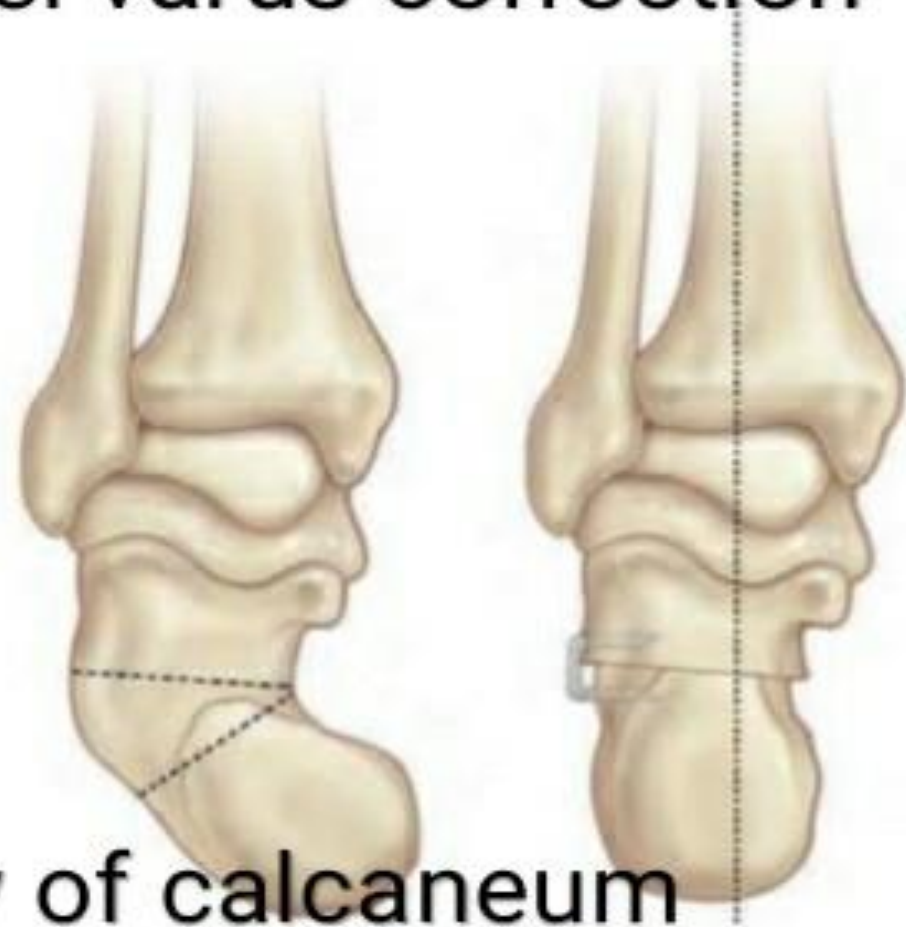
Bony procedures

- Cuboid decancellation- before 4 yrs
- Cuboid osteotomy, Dwyer osteotomy
- Evans Procedure- Calcaneo cuboid osteotomy and fusion- after 4 years(4-8 yr)
- Litchlablau procedure: lateral close wedge osteotomy of calcaneum
- Triple arthrodesis (> 12 yr)

for heel varus correction

DWYER OSTEOTOMY

- INDICATION- PERSISTENT VARUS DEFORMITY OF HEEL WHEN SOFT TISSUE SURGERIES ARE CONTRAINDICATED.
- AGE- 3-4YRS
- DONE BY MEDIAL OPEN WEDGE OSTEOTOMY OR BY LATERAL CLOSED WEDGE OSTEOTOMY



wedge Osteotomy of calcaneum

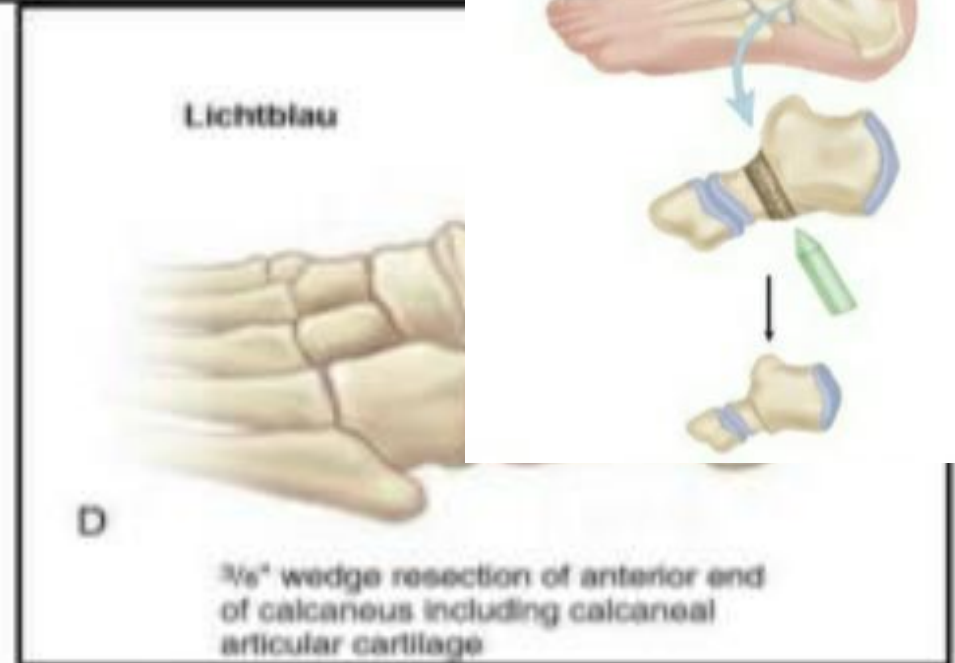
LATERAL COLUMN SHORTENING PROCEDURE

DILLWYN EVANS PROCEDURE



AGE- 4-8 YRS
INDICATION- MIDFOOT IN VARUS DUE TO TALONAVICULAR AND CALCANEOCUBOID SUBLUXATION

LICHTBLAU



AGE- 3-4 YRS
INDICATION- HEEL VARUS & RESIDUAL INTERNAL DEFORMITY OF CALCANEUS WITH LONG LATERAL COLUMN

TRIPLE ARTHRODESIS

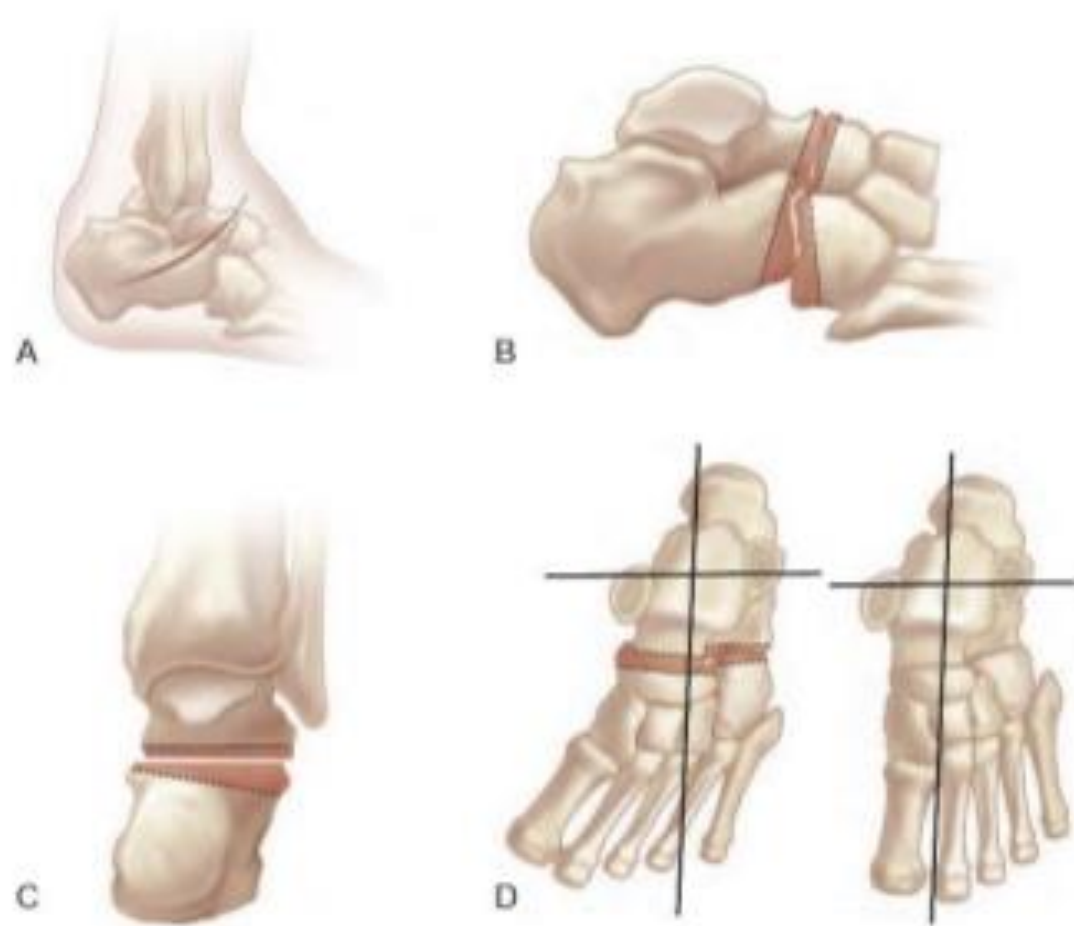
- INDICATION-

- PAINFUL STIFF FOOT WITH POOR FUNCTION
- DIFFICULT TO ACCOMMODATE TO FOOT WEAR
- ALL OTHER CORRECTION FAILED

- AGE – 10 – 12 YEARS

- PROCEDURE-

- OSTEOTOMY FOLLOWED BY FUSION OF TALONAVICULAR, TALOCALCANEUM AND CALCANEOCUBOID JOINT.



JESS / Ilizarov's FIXATOR

- Principle of FRACTIONAL DISTRACTION
- May be good for rigid, neglected, recurred and scarred foot above 3 years of age (Mukhopadhyay)
- No foot shortening
- Good cosmetic correction
- MAY LEAVE THE FOOT STIFF & PAINFUL



CTEV SHOES

- MODIFIED SHOES FOR CHILD WHO START WALKING.
- THESE SHOES ARE USE UNTILL 5 YEARS OF AGE.
- SPECIAL FEATURES:
 - STRAIGHT INNER BORDER
 - OUTER SHOE RISE
 - NO HEEL



B. OLD AND NEGLECTED CASES

< 3 YEARS OLD

SOFT TISSUE
RELEASE

4-8 YEARS OLD

SOFT TISSUE
RELEASE
+
OSTEOTOMY

10-12 YEARS OLD

**Triple Arthrodesis
(three fusions)**

*Joints to be fused
marked in purple*



ALREADY OPERATED



THANK YOU

