

Lengthening

&

Deformity correction

with

Fixator Assisted Internal Fixation

# External Fixation

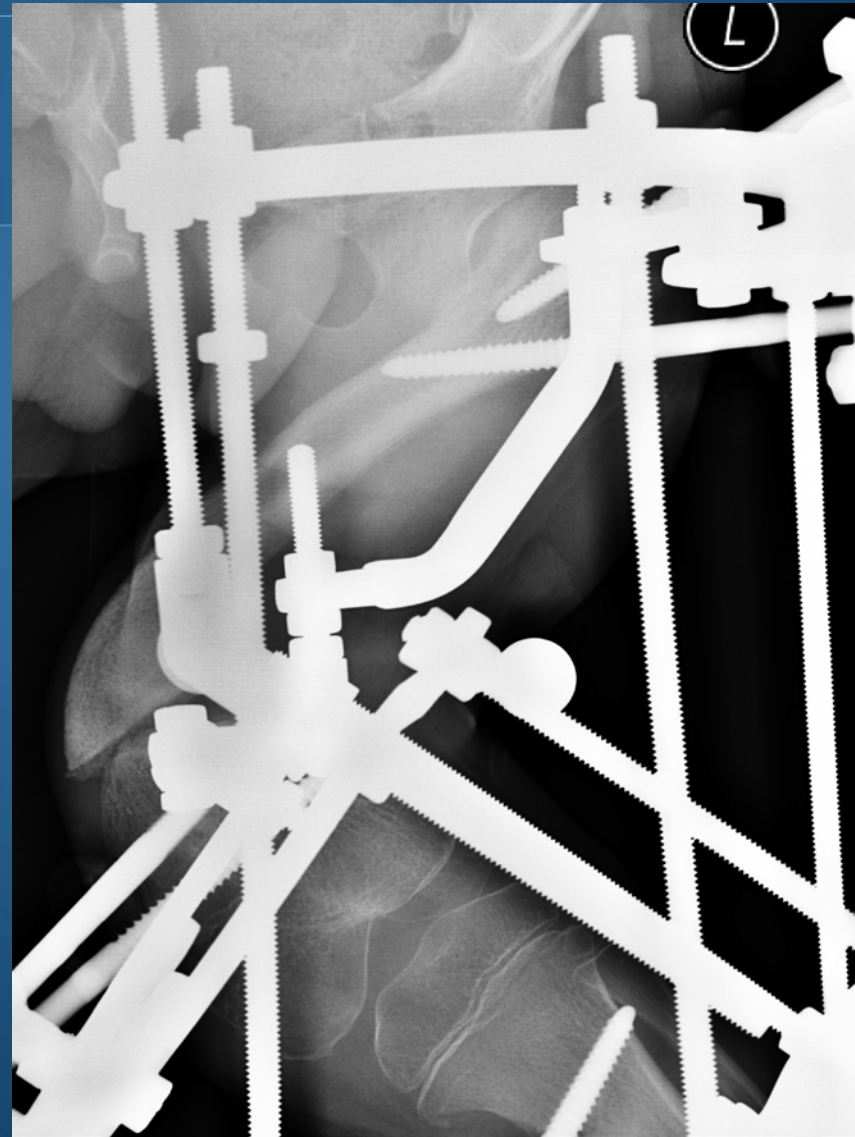
as

\*Intra-Op Alignment tool

\* for lengthening



the ilizarov fixator is the best for difficult deformity correction & limb lengthening.

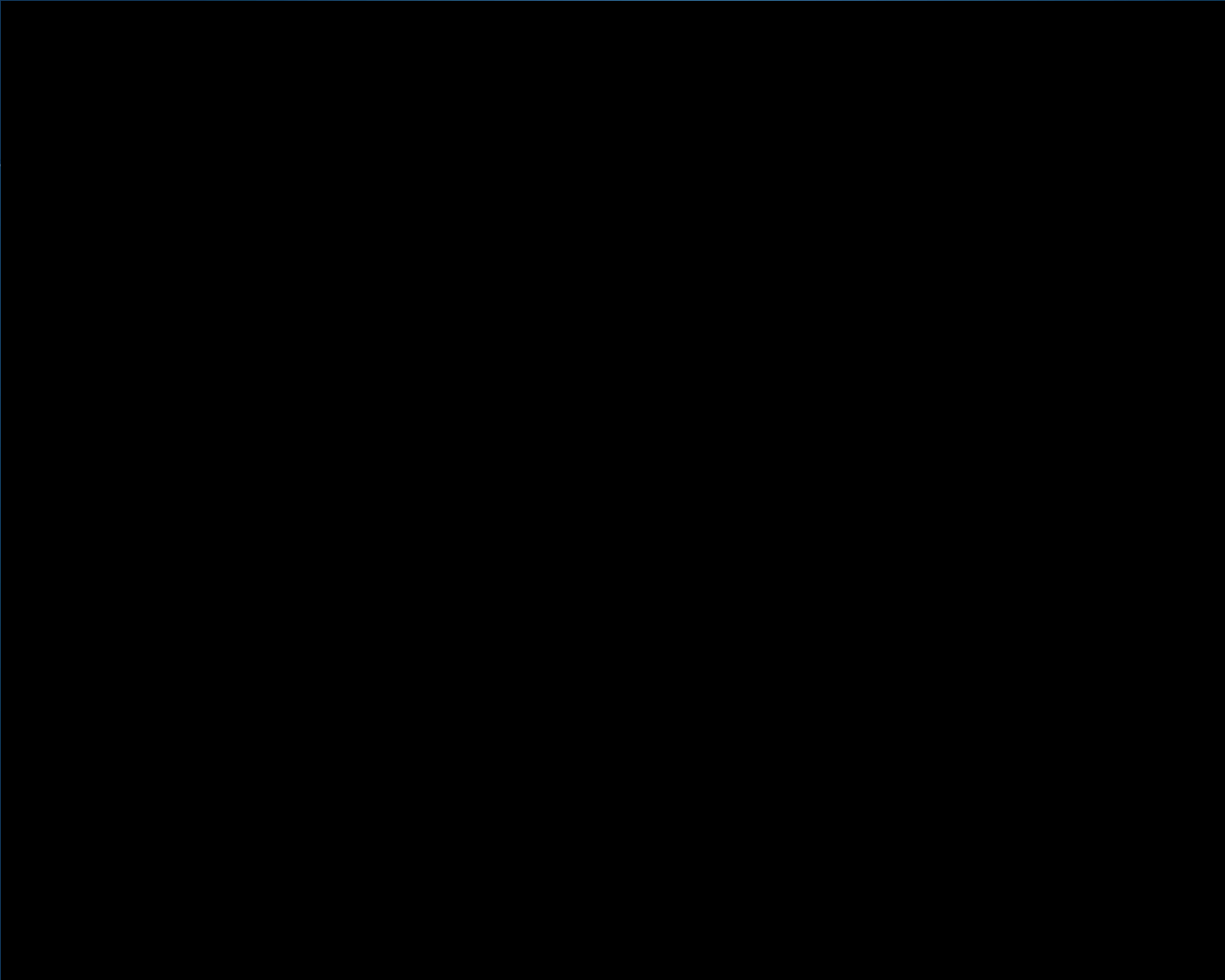


You can correct any deformity





Achieve great results & be tempted to believe you need no other device!  
However, we sometimes feel Ilizarov exfix is cumbersome to wear  
For long in these modern times!.



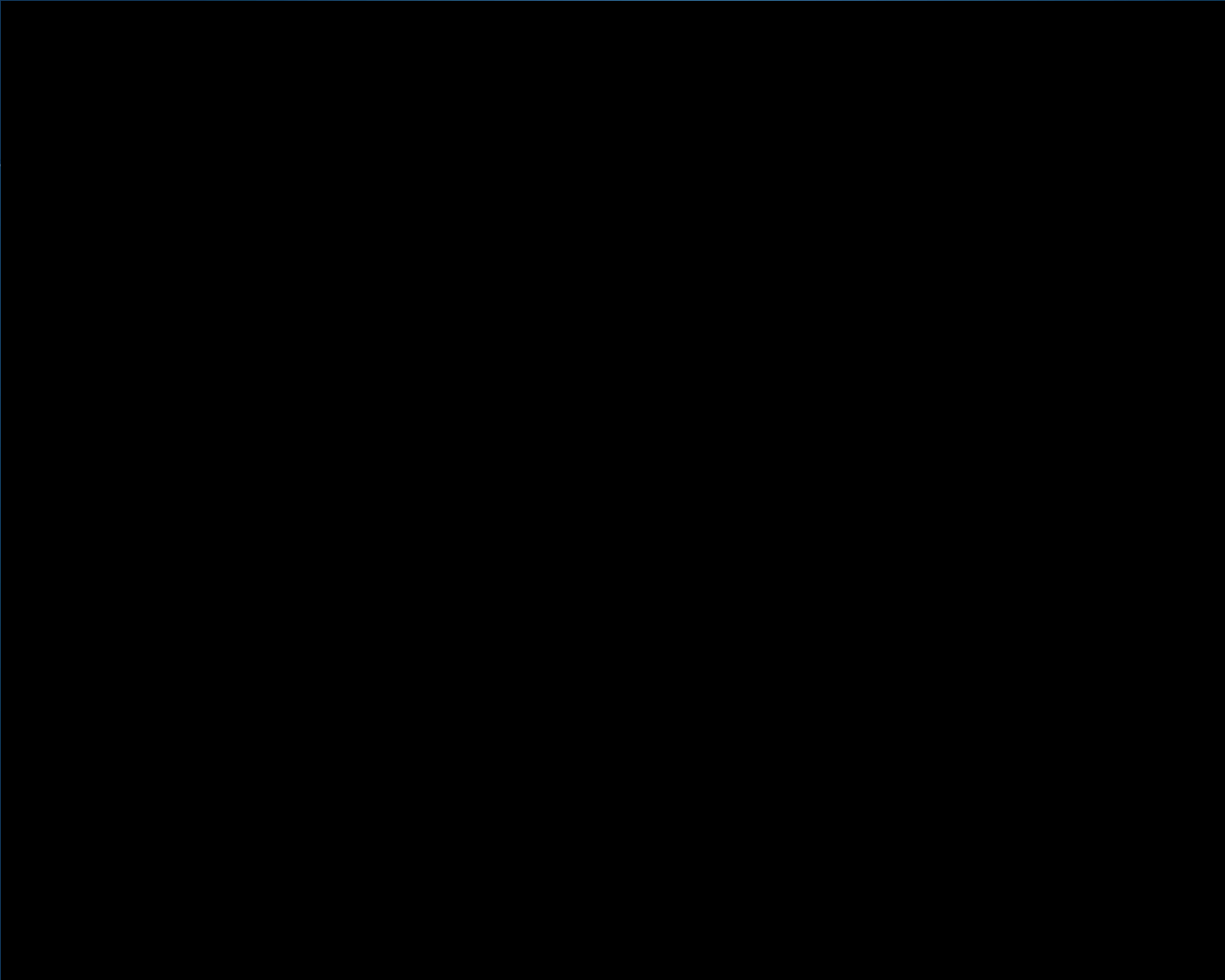


So we can use more convenient fixators like the LRS & Taylor Spatial Frame fixator





To achieve perfect alignment even in subtle deformities like this lady from Sweden did.





# ExFix Duration!

The biggest problem is TIME!

# Limb Lengthening

Min 45 days / cm

# Deformity correction

Min 4 to 5 months



We all love to travel!



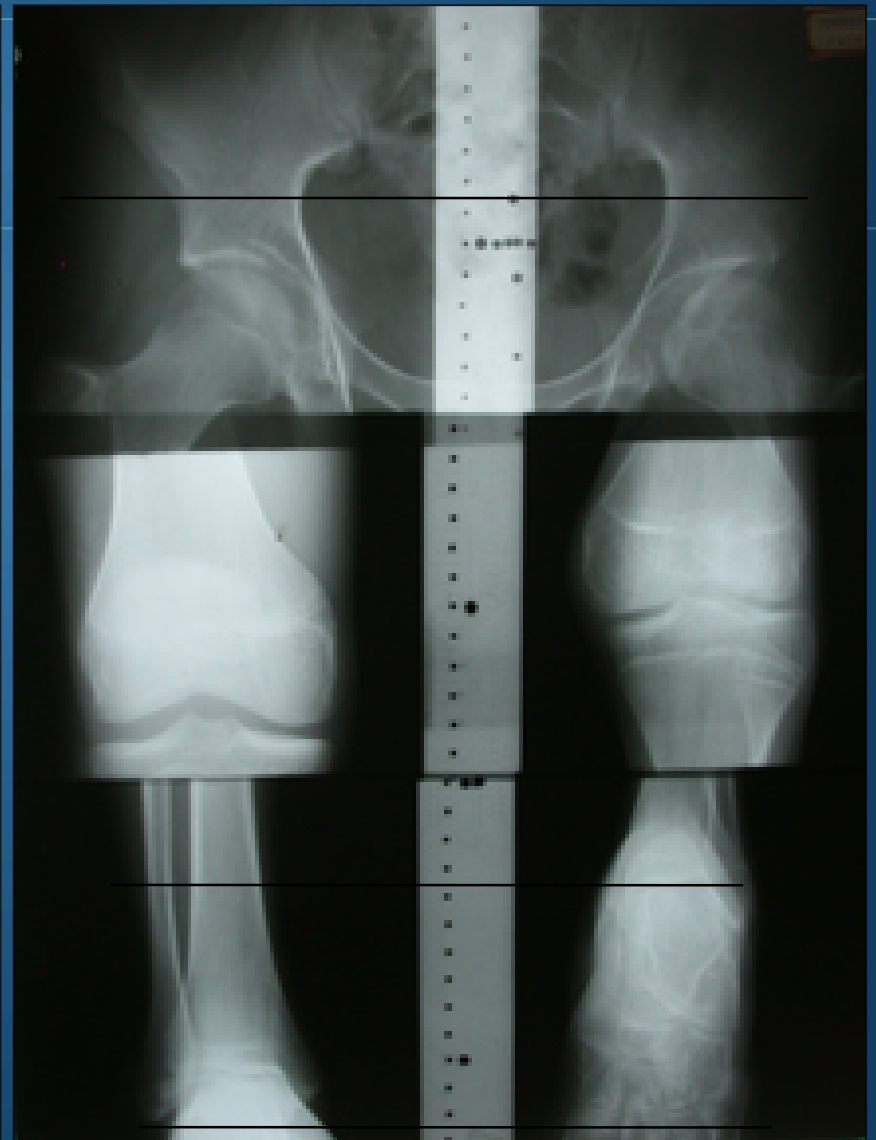
*Yoga & Meditation*

But know that the most important journey is inwards

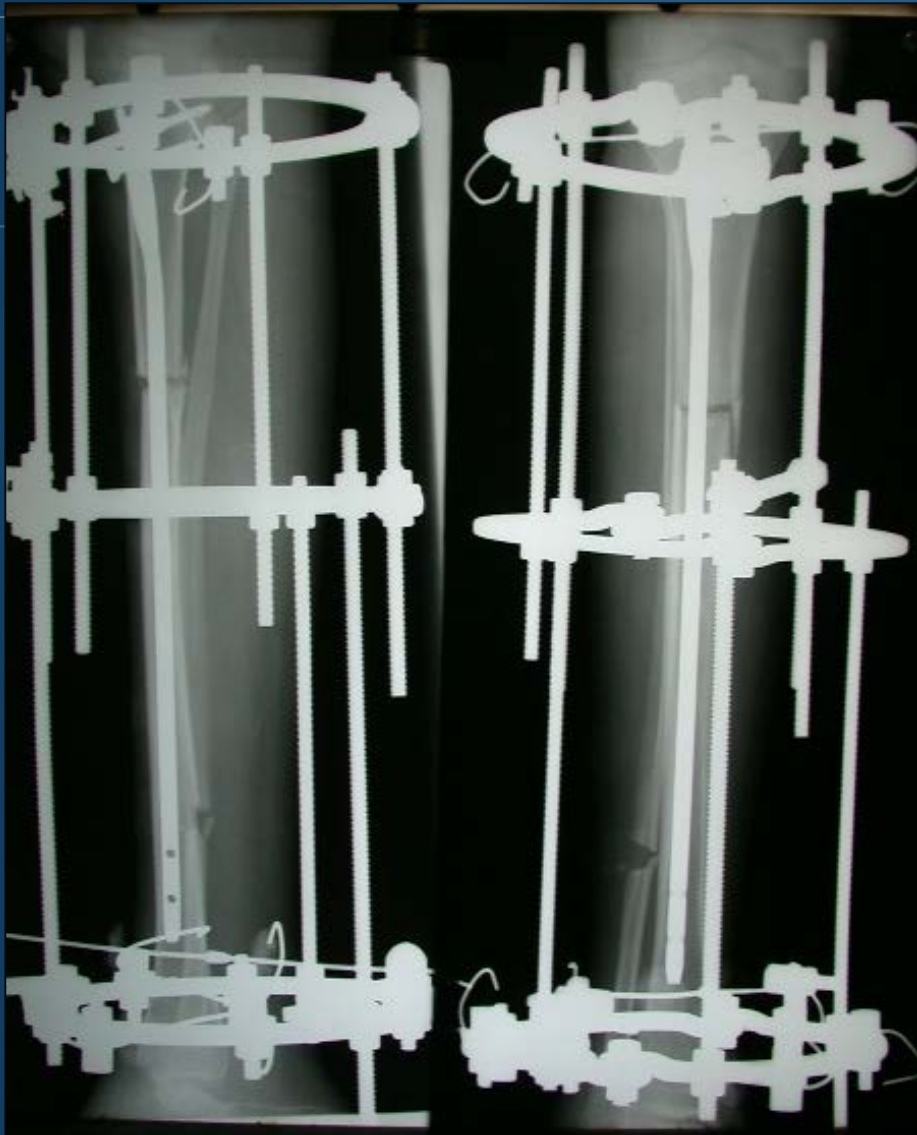
# Lengthening over Nails

We began this journey in 1994—the effort to reduce exfix duration





Lengthening 7 cm with Ilizarov would take no less than 11-12 months.



A Modified humerus nail to match the lower herzog curve was used.  
An Ilizarov fixator with minimum pins was used



A Modified humerus nail to match the lower herzog curve was used.  
An Ilizarov fixator with minimum pins was used



Ex-Fix  
Removed in  
3 months  
&  
IM nail  
locked  
distally.

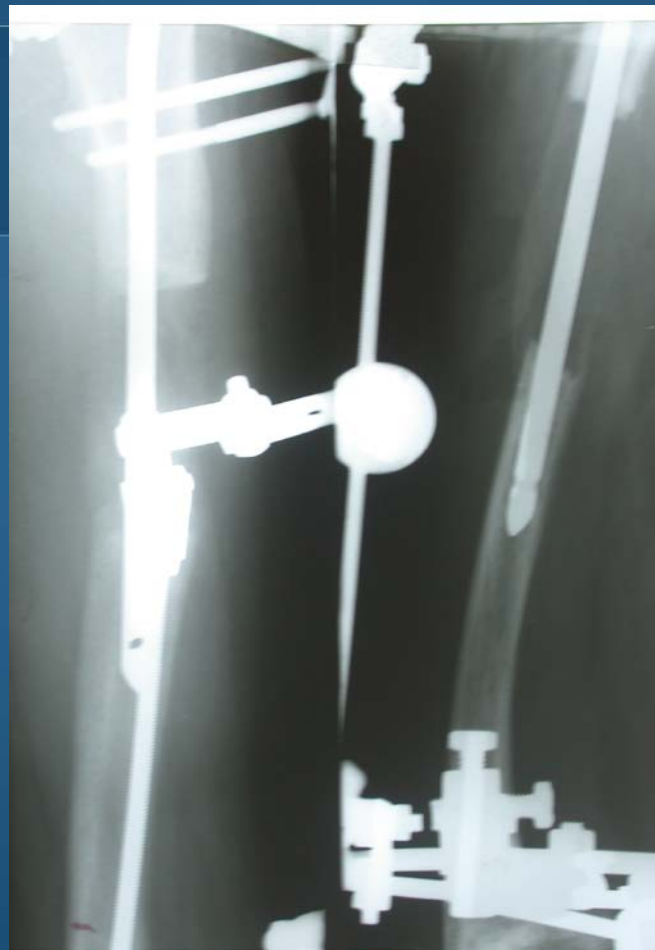
Happy patient with equal limb lengths in a very short exfix time



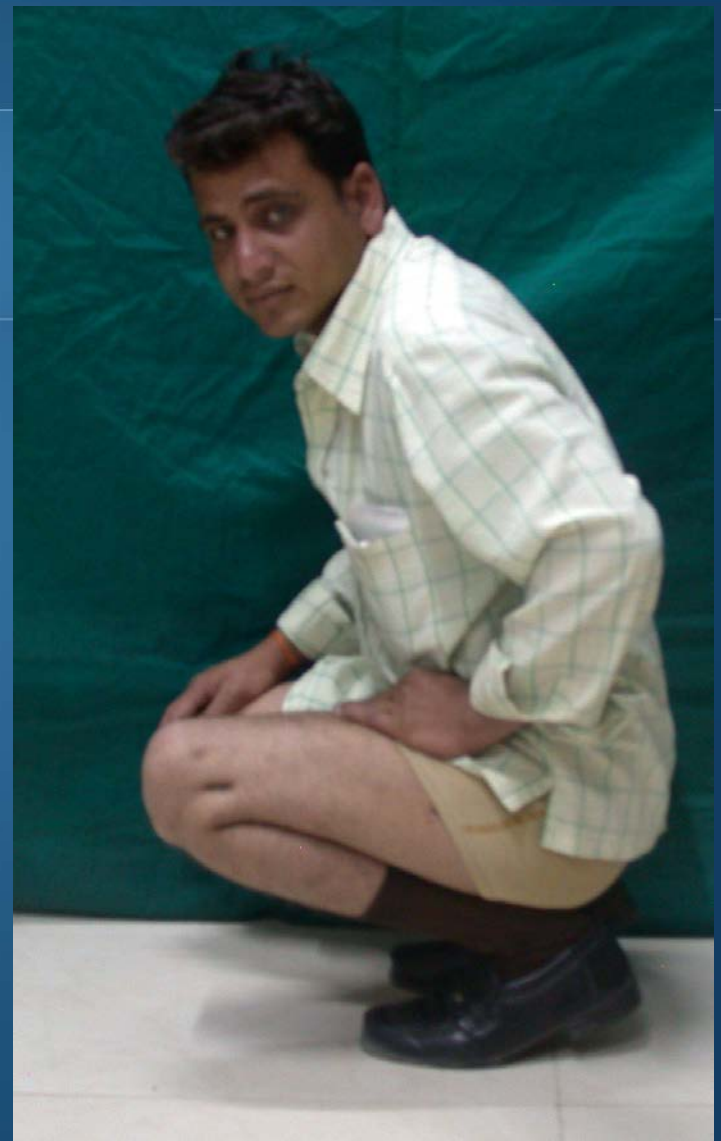


8 cm shortening of femur. Lengthening using an ExFix would take no less than 10 months, with a risk of knee stiffness.





Perfect marriage of internal device inside & gives static support.  
External device that can do lengthening easily.

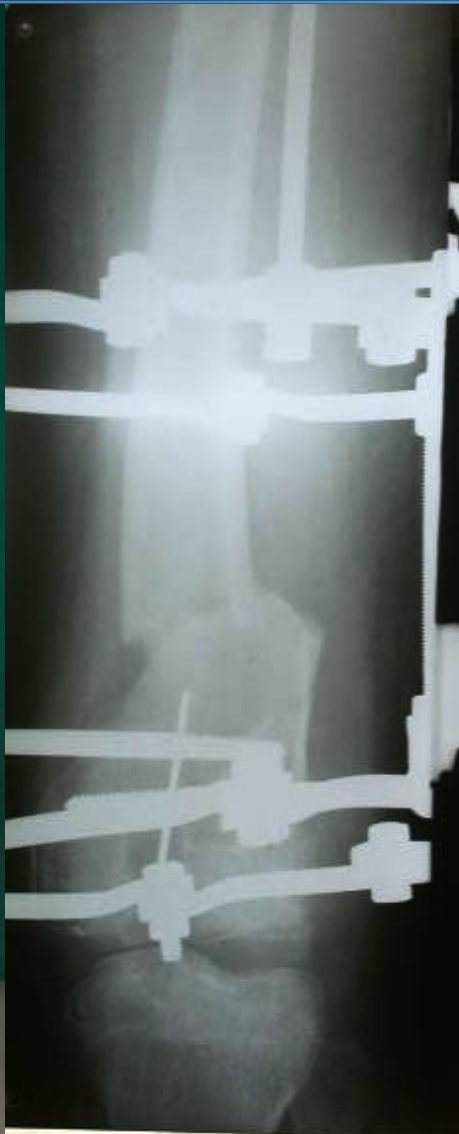


Nail is locked distally and exfix removed in 4 months.  
Equal lengths and Full ROM. Lengthening over an IM nail we  
performed similarly in many more cases. But when it comes to....

# Deformity Correction

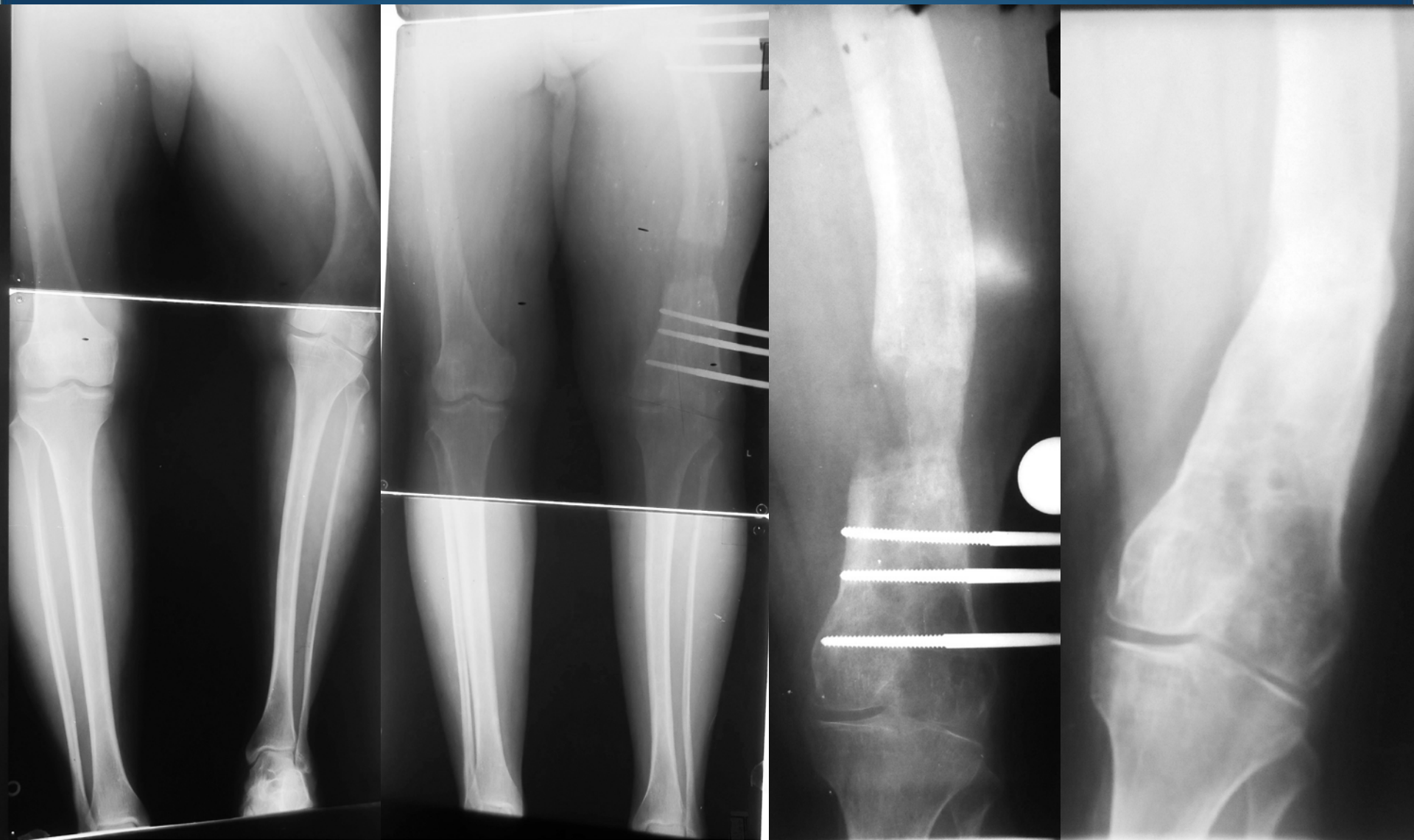
Deformity correction, the surgical technique difficulty goes up by several notches as we discovered over time

# Early Failures



We tried correcting the Genu Valgum with IM Nails and had to seek recourse to the trusty Ilizarov to save the day





We similarly failed to correct this varus & lengthen over an IM nail. The patient ended up with residual shortening & deformity.

5100 yrs ago!

we discovered the truth of what the big boss said to his junior consultant several thousand years ago.



आधिष्ठानं तथा कर्ता करणं च पृथग्विधम्।  
विविधाश्च पृथक्चेष्टा दैवं चैवान्न पञ्चमम्।



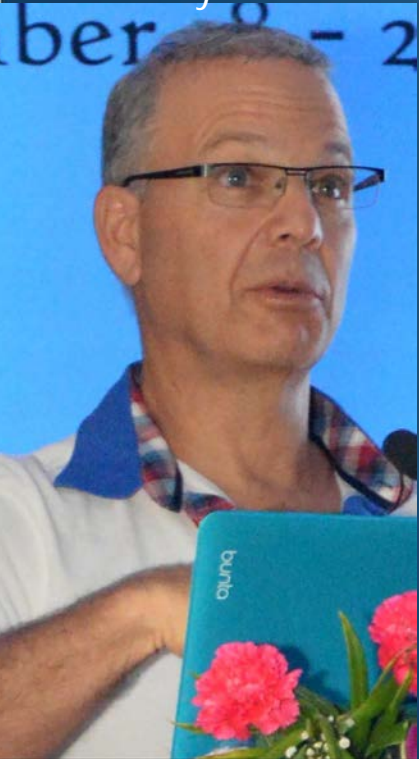
# अधिष्ठानं = Operation Theatre



We need a specially equipped OR

# कर्ता = Surgeon

Paley



Baumgart



Kocaoglu



Chaudhary





# पृथग्विधम् = Spl. Instruments

Full Length X-ray



# पृथग्विधम् = Spl. Instruments

## Entry Point accuracy



# पृथग्विधम् = Spl. Instruments

Straight  
Rigid  
Cannulated  
Reamers



Straight  
Nails





# पृथग्विधम् = Spl. Instruments



# पृथक्चेष्टा = Surgical Skills/ Actions

- Accurate Guide Wire positioning
- IM Nailing Skills
- ExFix Pin placement
- Percutaneous osteotomy
- FU care

# दैवं = Indications / Favorable Circumstances

- No previous Infection
- After Physcal closure
- Negotiable canal
- No sclerosis

Valgus FEMUR

with

OA



Lat Compartment OA due to valgus





Fixator Assisted nailing-small incisions, straight IM Nail, Poller screws

# Valgus & Shortening



Adolescent & overweight, she wouldn't tolerate exfix for long....





Guide wire is inserted at  $81^{\circ}$  to joint line, starting instruments enlarge the track. Two Poller screws are inserted on either side to narrow the track of the intended nail.



Osteotomy translated laterally with help of exfix pins and Poller Screws. Nail locked distally. Addnl Poller inserted medial to nail proximally to prevent chances of loss of correction by translation. LRS fixator well tolerated.





Limb Lengths equal and deformity corrected. Ex fix time 6 weeks



Full function

# Valgus & Procurvatum



Severe Genu Valgum, short stature. L side lengthening & DC with exfix.





Excellent correction & 7 cm length gain. 7 month exfix duration

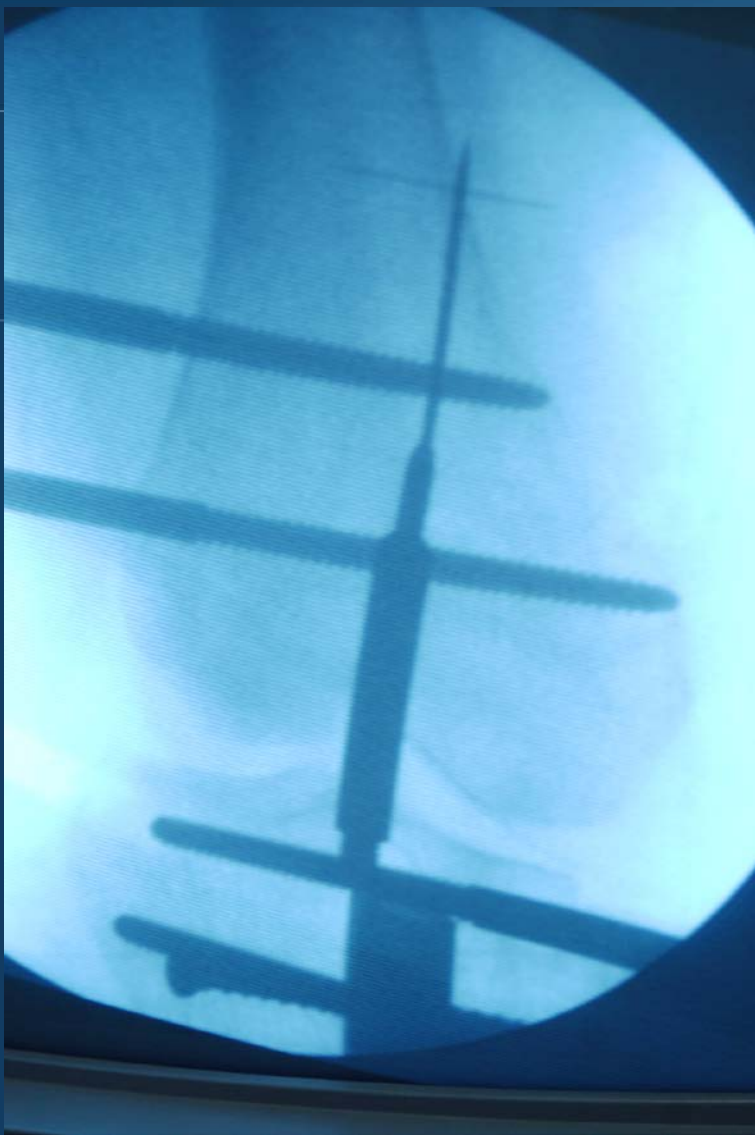




We analysed the deformity on R side, planning for FAN method.

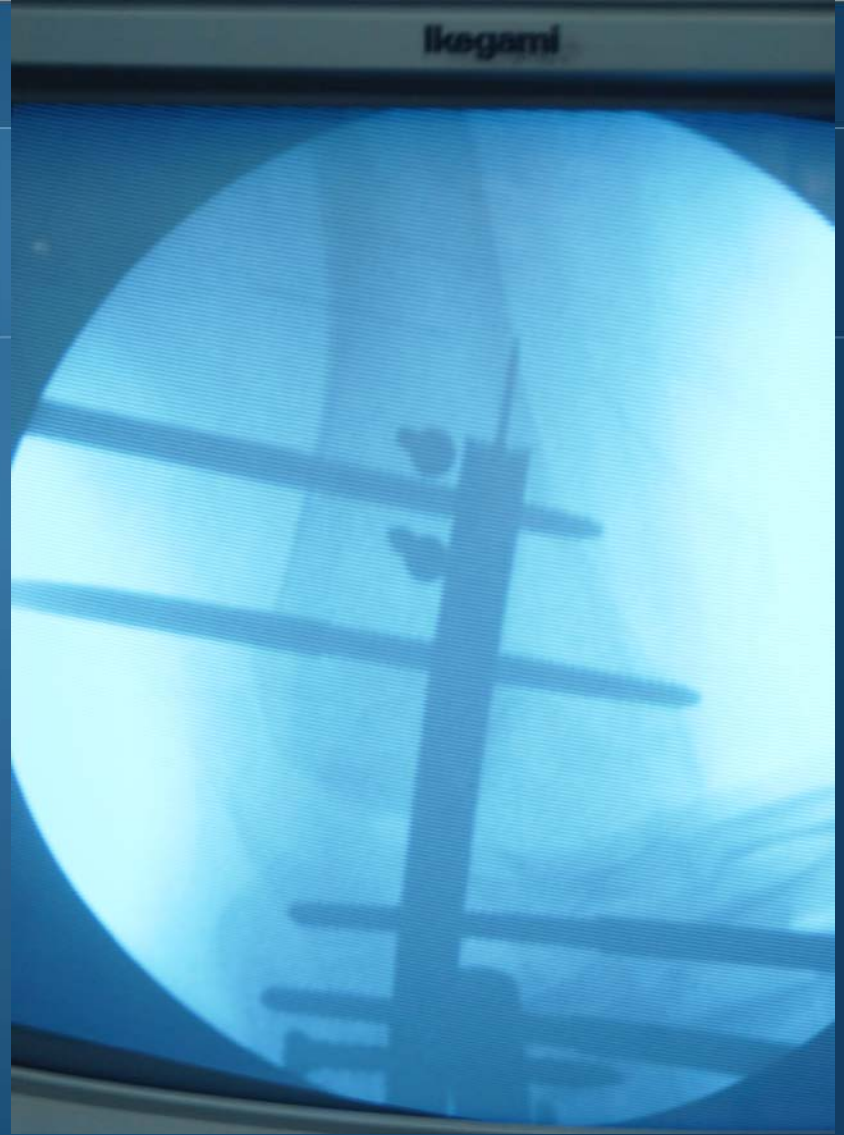


Exfix pins are inserted behind track of intended nail passage. Small opening in knee allows guide wire accurately passed, over which reaming is done

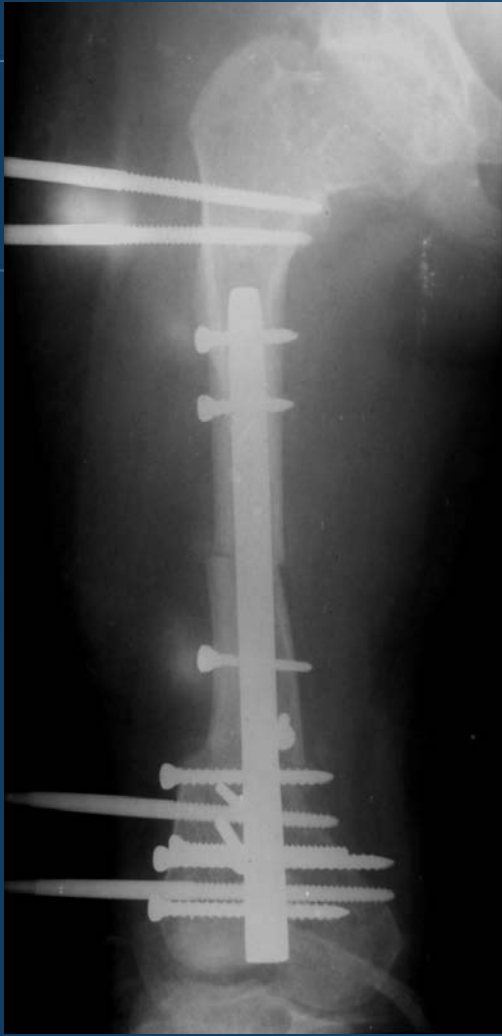


GW passed exactly at  $81^\circ$  to joint line. Starting point instruments  
And thin walled reamers inserted over it. Osteotomy site marked.





Poller screws are seen in narrowing the track of the reamers preventing The widening of the nail track.

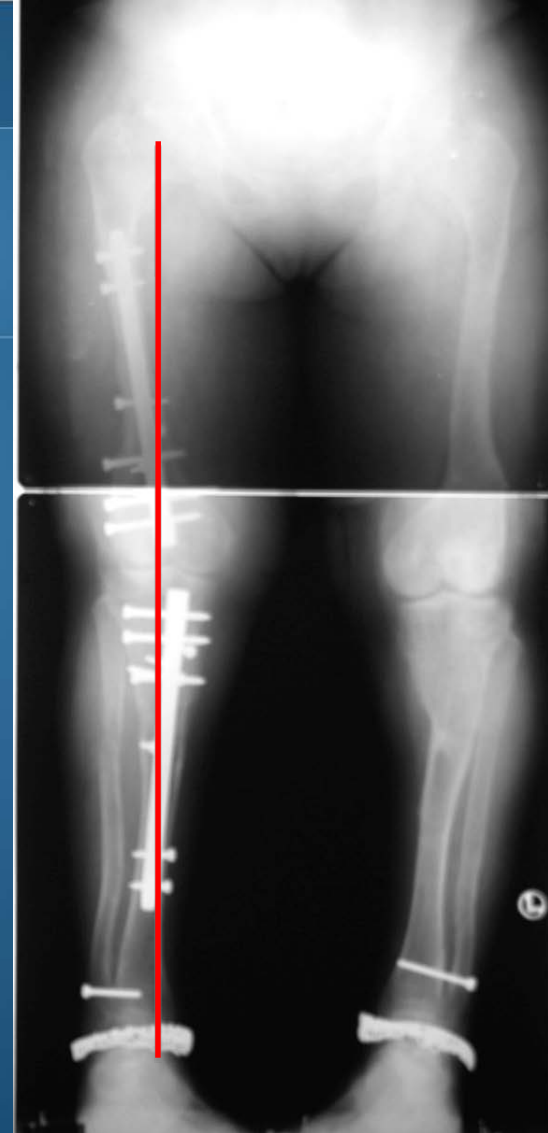


Nail passed thru narrow track. Where it encounters a deformity at The upper level it is osteotomised and nail passed thru. Locked at All three levels.





Tibial nail inserted from centre valgus deformity corrected. Nail stabilized  
By locking screws as well as Poller screws in both fragments. Lengthening  
In progress.



Good correction with accurate alignment and lengths equal

# Varus Femur



Varus deformity due to growth arrest with short Left limb.

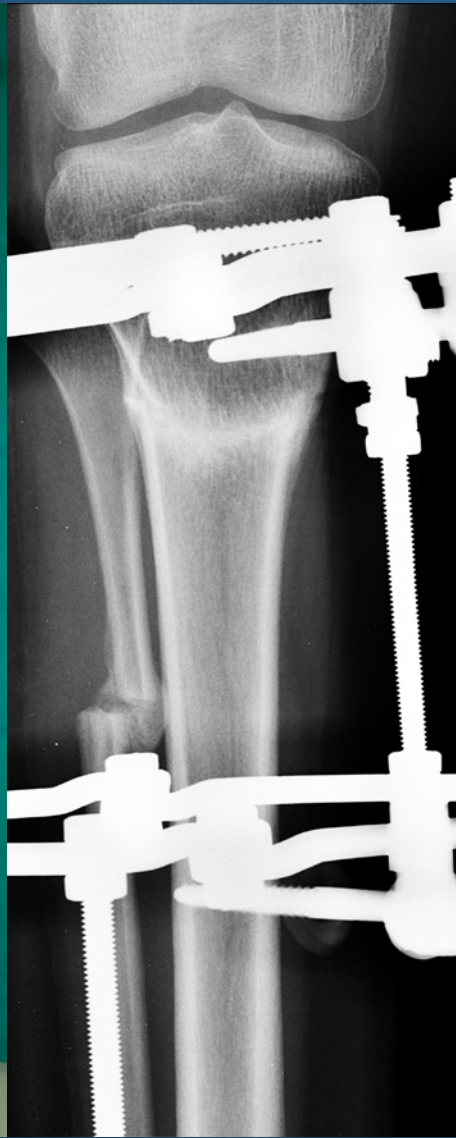


Varus in lower femur corrected well with straight nail, tibia lengthening, angular and rotation correction with Ilizarov fixator well tolerated .





Left limb completely straight. notice the subtle  
Medial translation of distal fragment & use of Poller screws



Finally mild varus on R tibia corrected with a Focal Dome osteotomy.  
Perfect alignment and limb lengths equal.

# Double Level correction

# Varus & Procurvatum





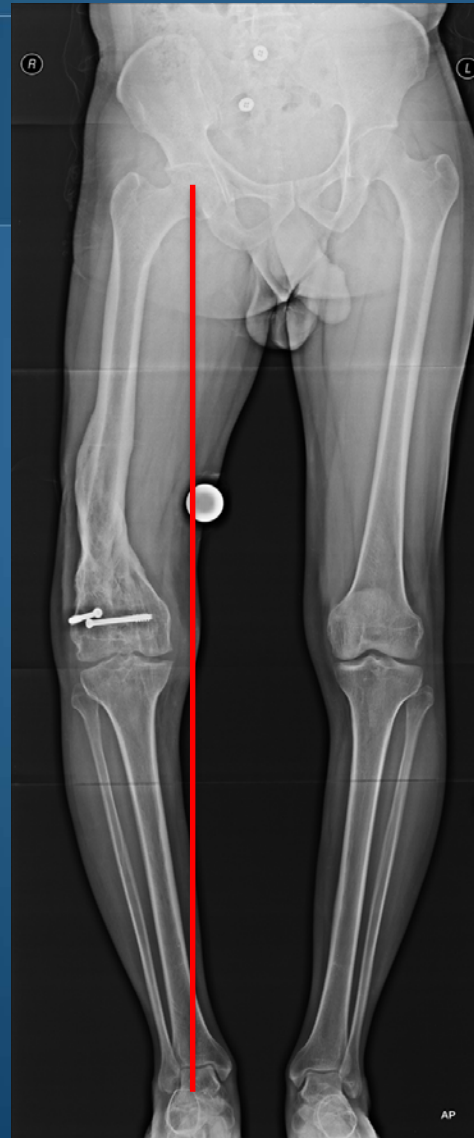
Varus deformity, procurvatum & shortening in CP and growth arrest.





Double level osteotomy performed with good correction.

# Varus & Shortening



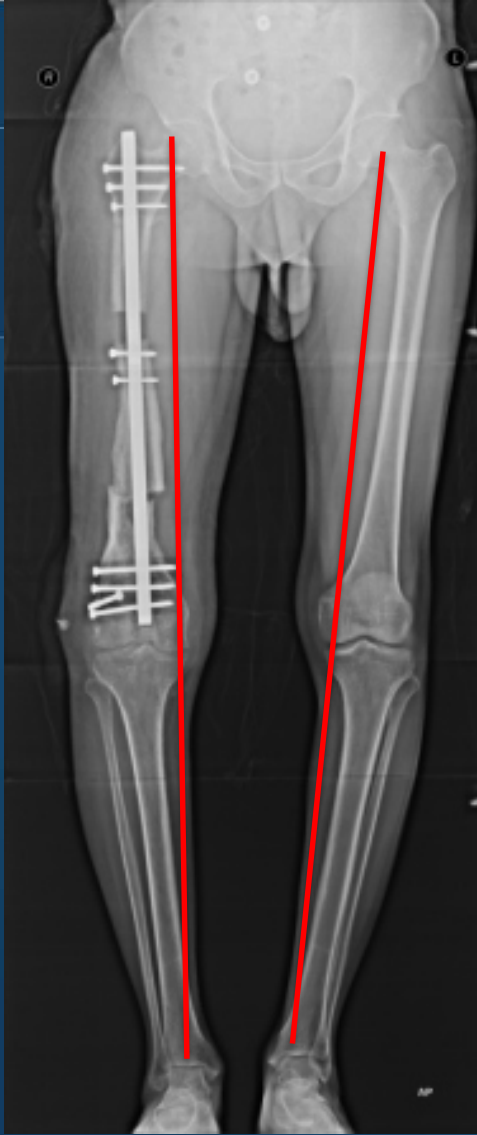
Varus Malunion with shortening in a software engineer.





Nail inserted antegrade. Lengthening osteotomy made proximally. Distal correction of varus MU. LRS allowed him to return to desk job.





Limb lengths equal, Alignment same as on other limb.  
Exfix time only 6 weeks.

# Procurvatum & Shortening



Hand to Knee gait with shortening due to Polio. 28 yr old Actor



Supracondylar osteotomy with posterior translation of distal fragment.  
Proximal osteotomy for lengthening. Nail locked distally & in middle.





Exfix duration only one month. Straight knee. Equal lengths.

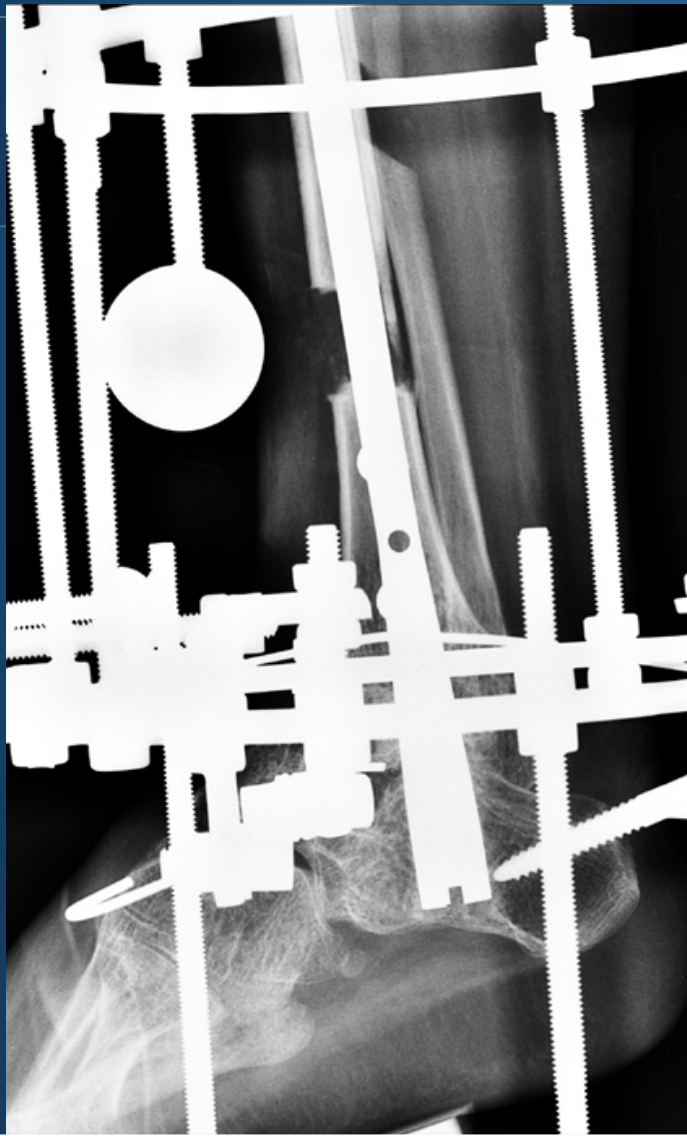
Varus & Shortening

+

Instability

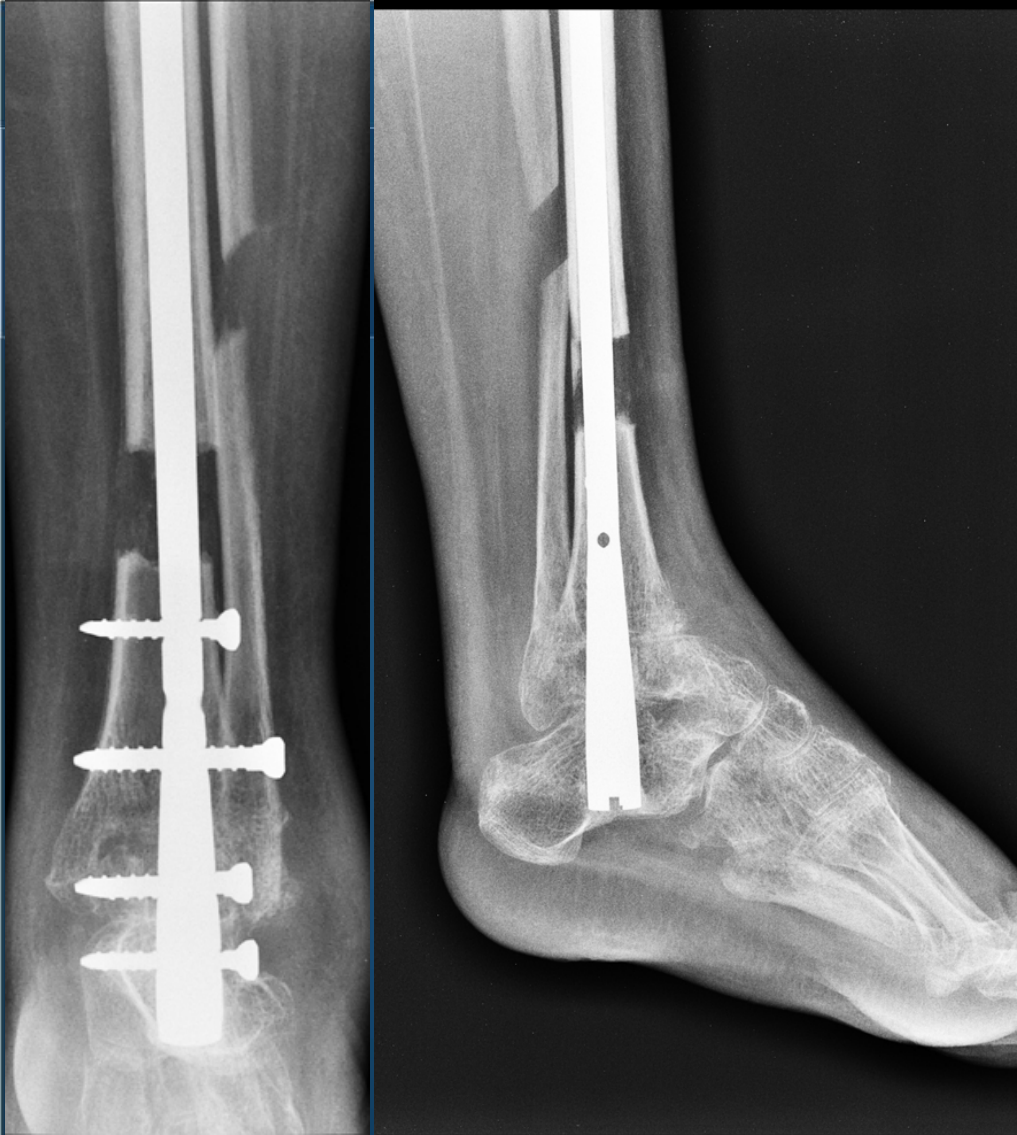


35 yr old teacher has unstable ankle with shortening due to Polio



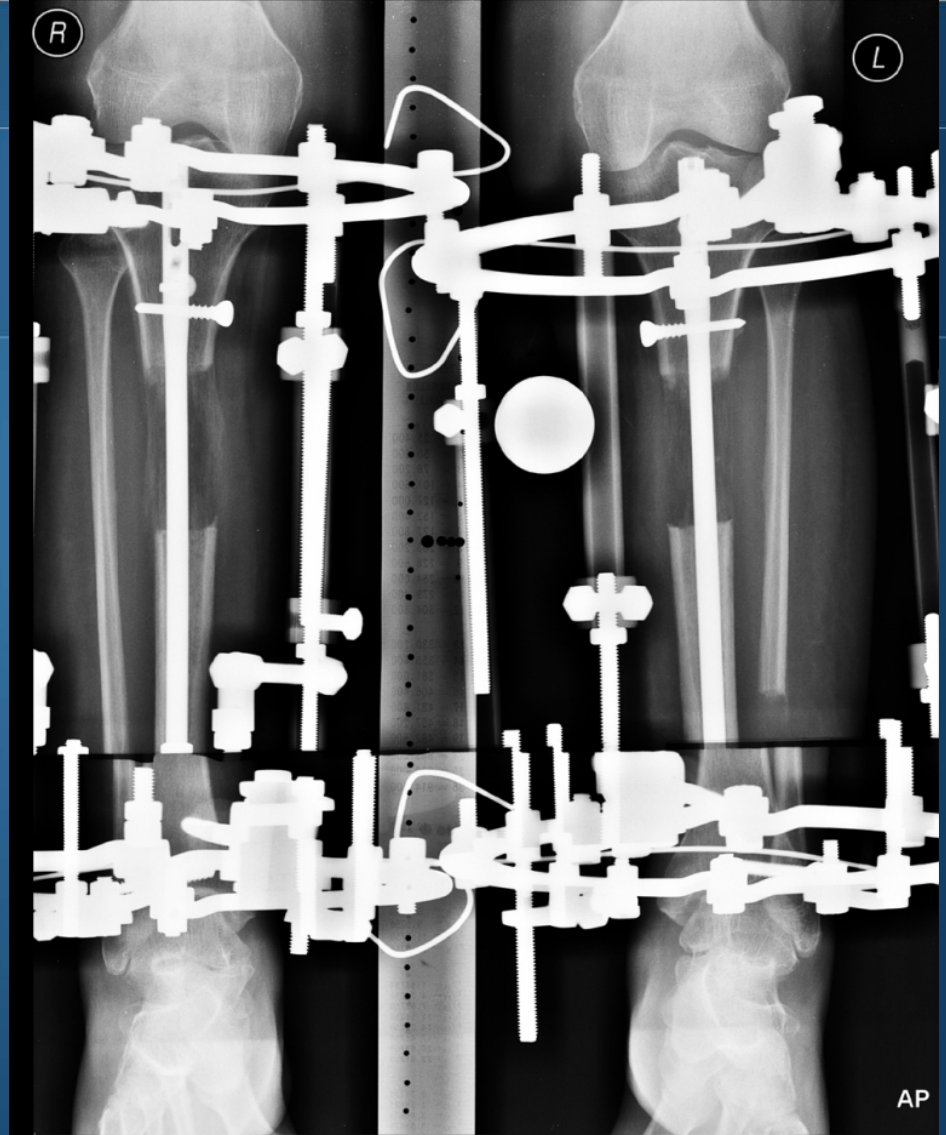
Distal entry nail after arthrodesis of ankle. Lengthening corticotomy just Proximal to ankle. Intervening fragment locked. Ilizarov fix for 2 mths .





Stable and plantigrade ankle with 3 cm length achieved.

# Stature Lengthening



Ophthalmologist wanted 2 inches stature increase. LON method used.





Exfix duration of 14 weeks. 5 cm length gain with good alignment





सहजं कर्म कौन्तेय सदोषमपि न त्यजेत्।  
सर्वारम्भा हि दोषेण धूमेनाग्निरिवावृताः॥

# COMPLICATIONS

# Premature Consolidation

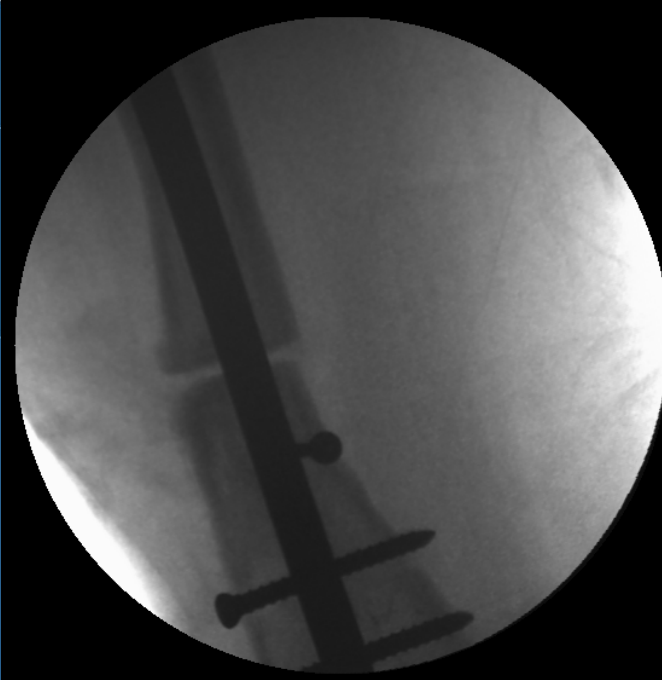
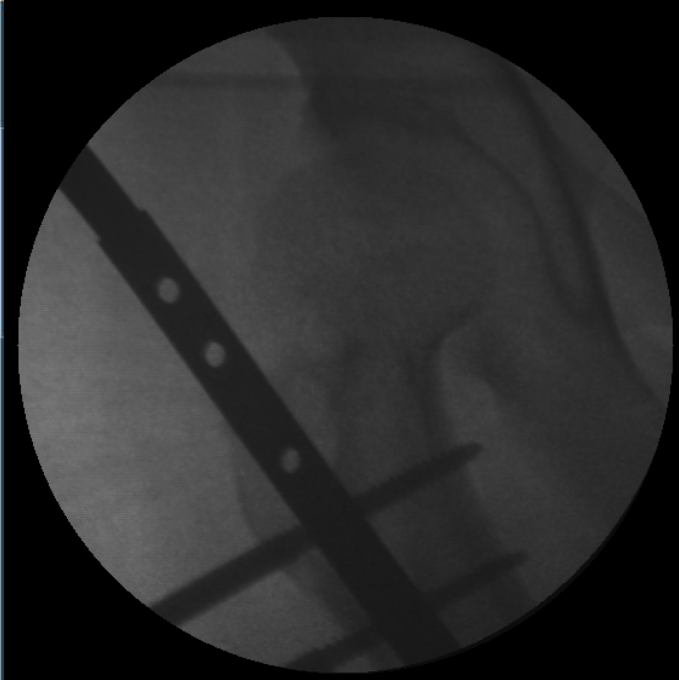


15 cm shortening due to growth arrest. Tibial correction with Ilizarov





Nail inserted in femur from proximal end, but locked distally.



Nail extracted partially. Repeat Corticotomy done. Lengthening resumed



7 cm length gained in femur. Exfix duration 4½ months





Lengths equal, alignment good with full function.



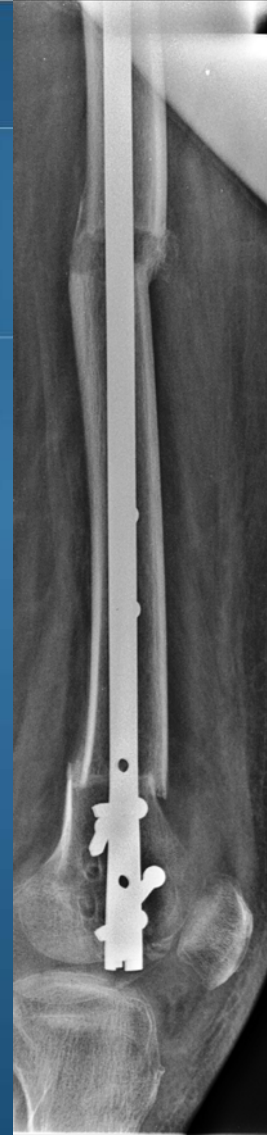
# Deep Infection



30 yr old banker with CMD. 5 cm length gain with LON. Deep infection.



Nail removed, reaming, ABC rod inserted. Fixator retained for longer.  
Problem solved.



SCO with femur lengthening over nail. Knee Stiffness.

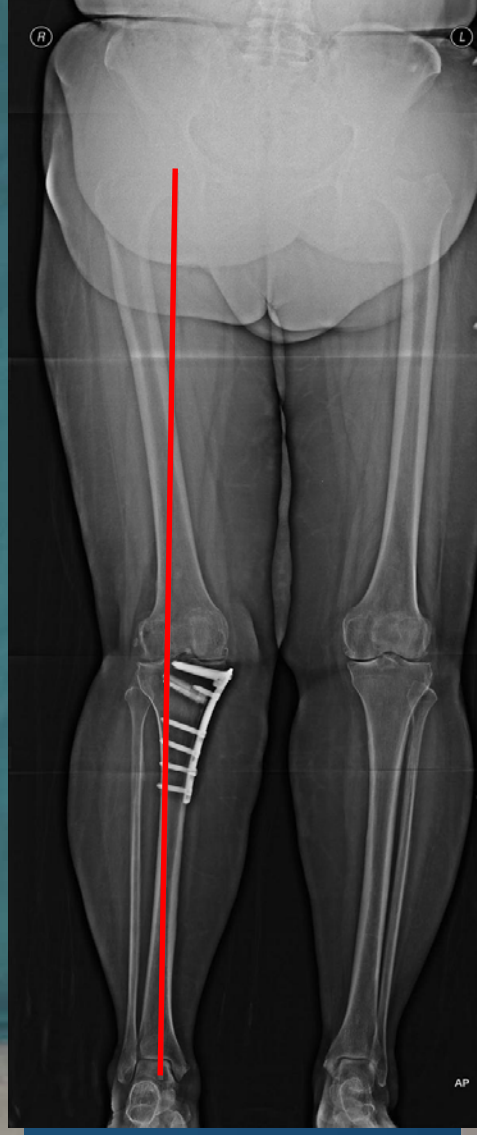


# Quadricepsplasty!



Full knee flexion achieved after Quadricepsplasty

# High Tibial Osteotomy



Medial opening wedge osteotomy is very reliable for correction of small Varus deformities with medial locked plating





With large deformities ( masked by FFD here), opening wedge can  
Have problems. Exfix not tolerated at this age.





Fixator Assisted plating done with a distal focal dome osteotomy.  
Temporary ilizarov exfix. Lateral locked plate. Good alignment



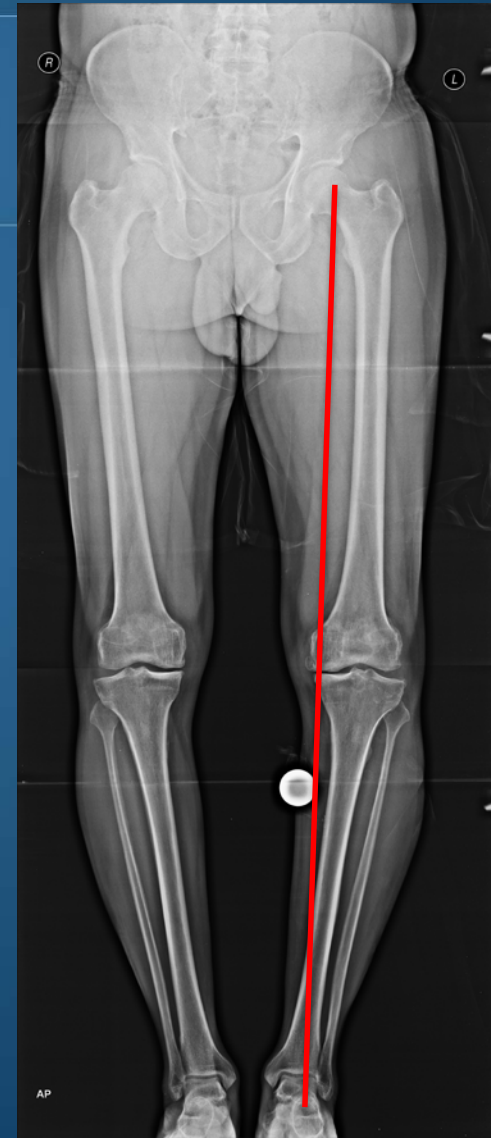
Good pain relief and excellent function.



Speical tools needed = long cassettes & tall xray machine

The Future  
is  
here!





Gradual correction of varus deformity in medial compartment OA

Instability  
&  
Shortening

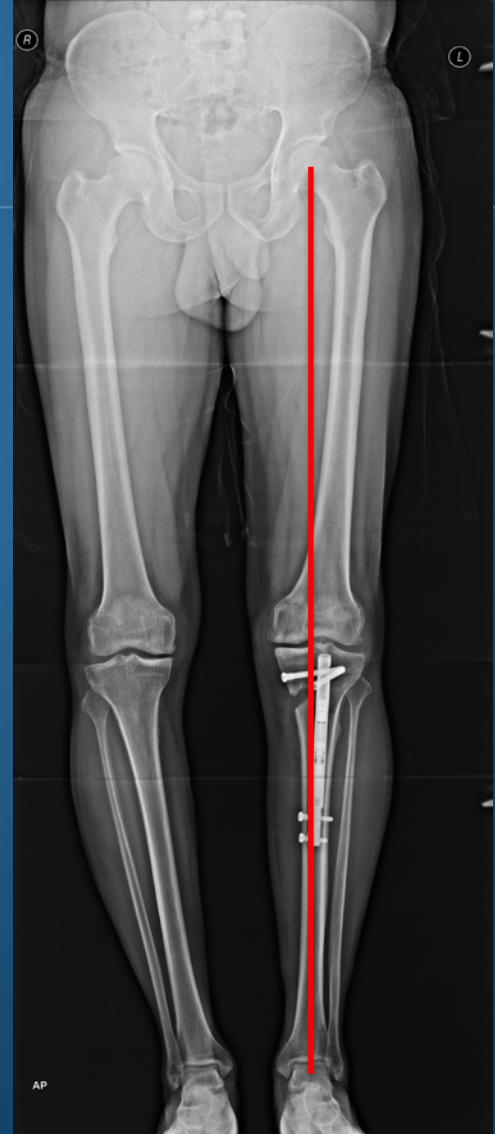


PRECICE HTO nail inserted after medial opening wedge osteotomy

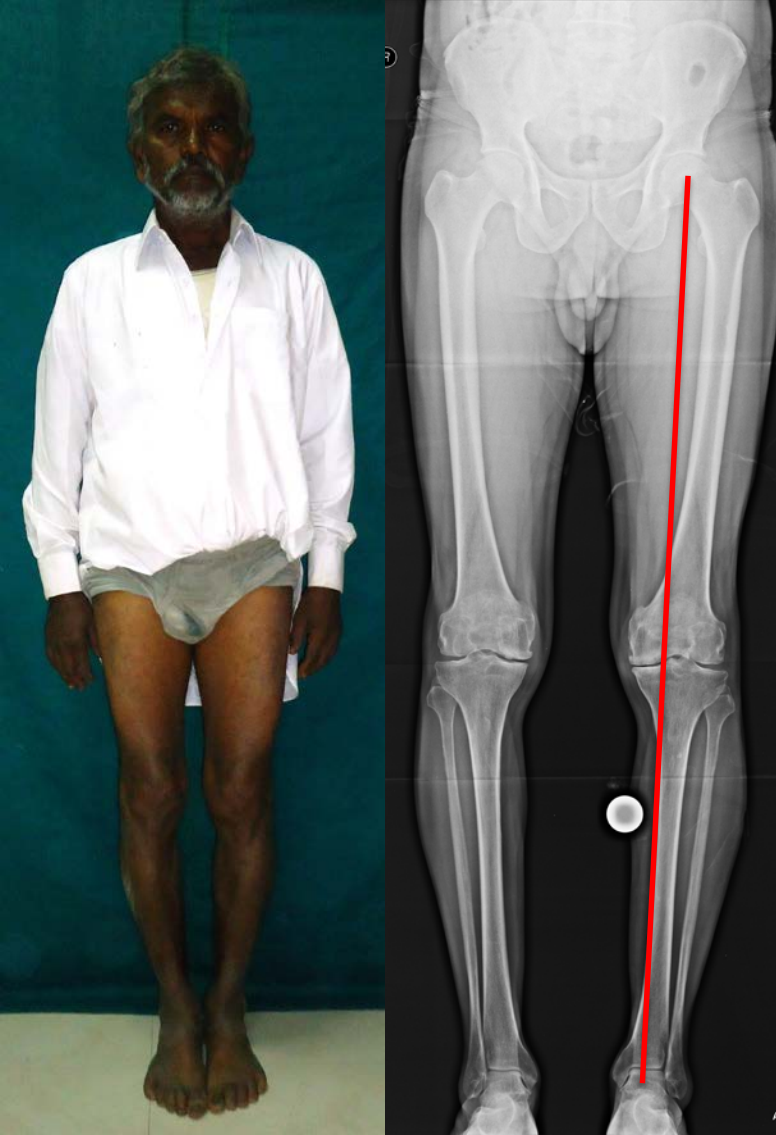


ERC= External Remote controller gives gradual and accurate correction





Full Correction achieved.



Is ideal for accurate correction of smaller deformities

Thank You!

[www.ilizarov.org](http://www.ilizarov.org)

# Dr. Milind Chaudhary

- Director,
  - Centre for Ilizarov Techniques
    - Akola
- Consultant

Jaslok Hospital

Mumbai, India