

Congress on Ankle Distraction Arthroplasty

LLRS Specialty Day, AAOS annual meeting
New Orleans, LA, March 15, 2014

S. Robert Rozbruch, MD

Chief, Limb Lengthening & Complex Reconstruction Service
Professor of Clinical Orthopedic Surgery



HOSPITAL FOR
SPECIAL SURGERY



LIMB **LENGTHENING**.COM

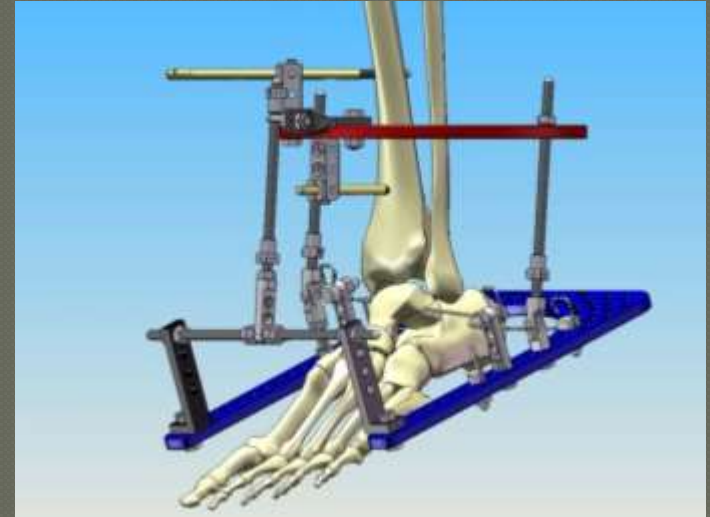
Disclosures

Small Bone Innovations: consultant and royalties

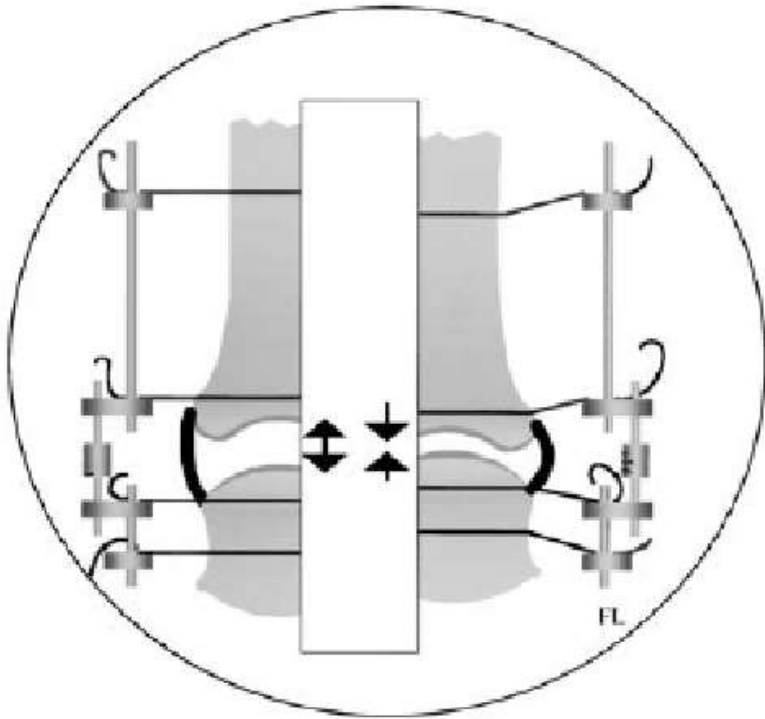
Smith and Nephew: consultant

Ankle Distraction

- Preserves motion
- Does not burn bridges
- “Cartilage” regeneration
- Questions:
 - Hinge
 - Duration frame
 - How much distraction
 - Acute vs Gradual
 - How much stability needed
 - Adjuvant procedures
 - Biological adjuvants
 - Patient selection
 - Prophylaxis for ankle fractures



Ankle Distraction



Mechanical unloading of the joint

- Cartilage reparative process

Intermittent flow of joint fluid and changes in hydrostatic pressure

- Weight bearing and ankle movement in frame

Ankle Distraction Components

◎ **Biology**

- Microfracture
- BMAC/Stem cells

◎ **Soft tissue**

- Gastrocsoleus recession

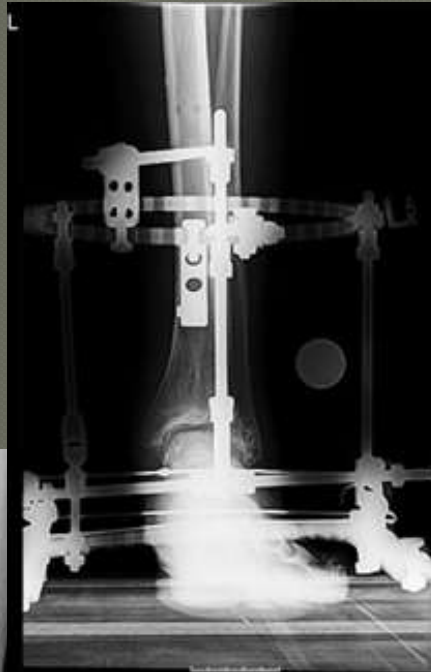
◎ **Mechanical**

- Anterior Osteophyte excision
- Hinged frame
 - Maintain ROM
 - Correct equinus

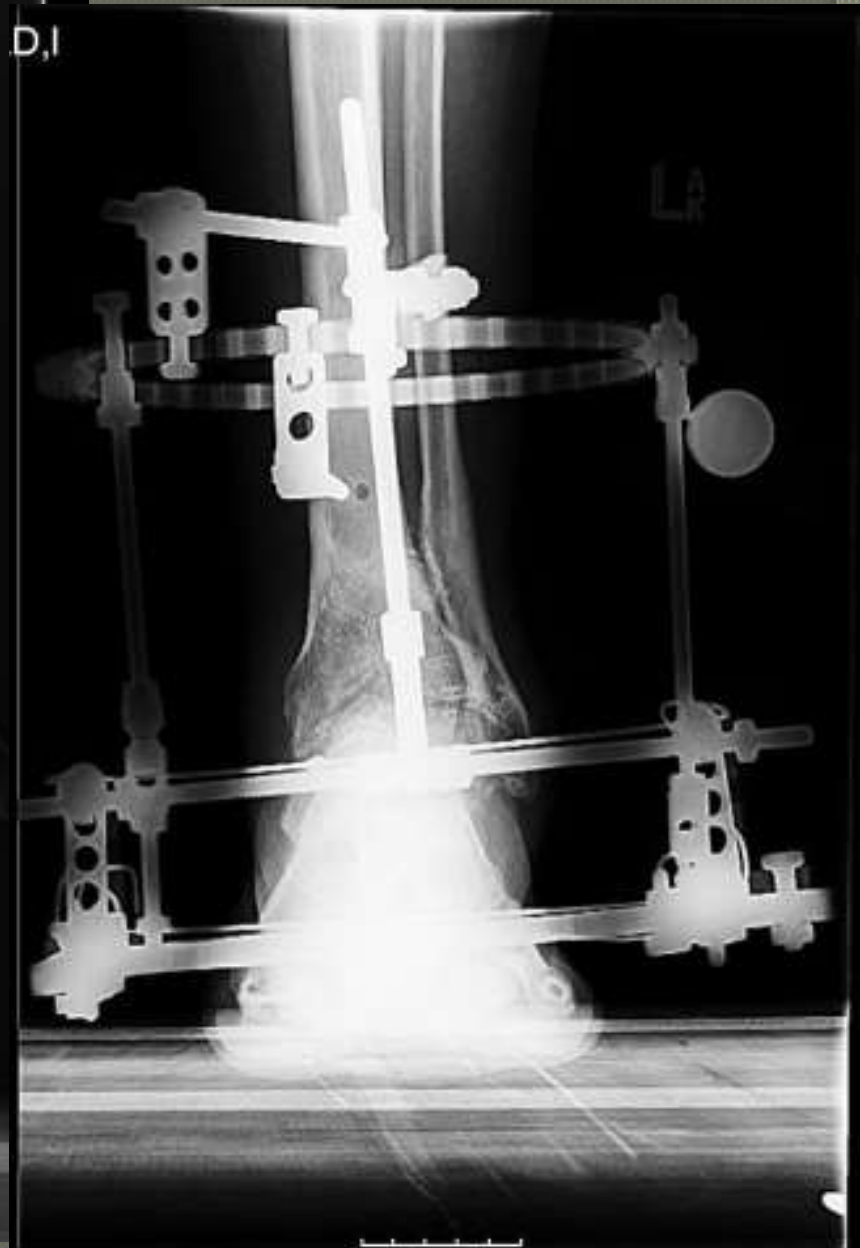


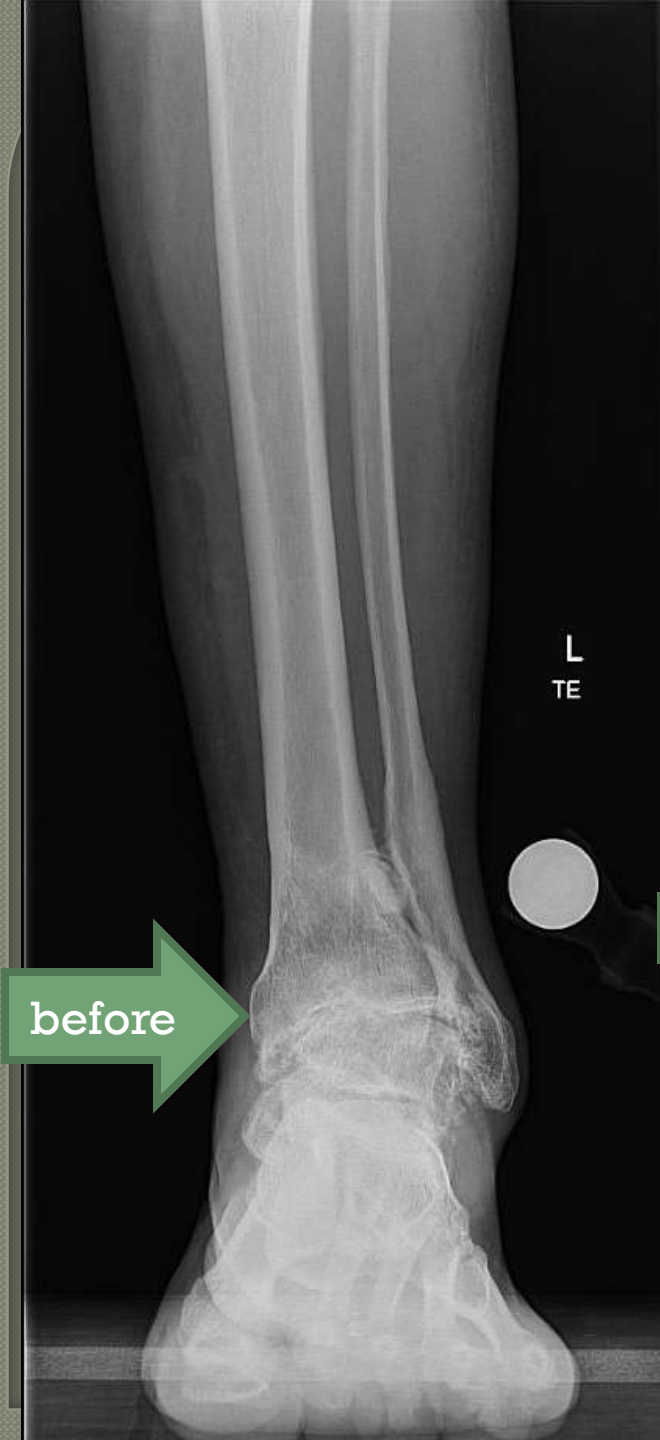
equines





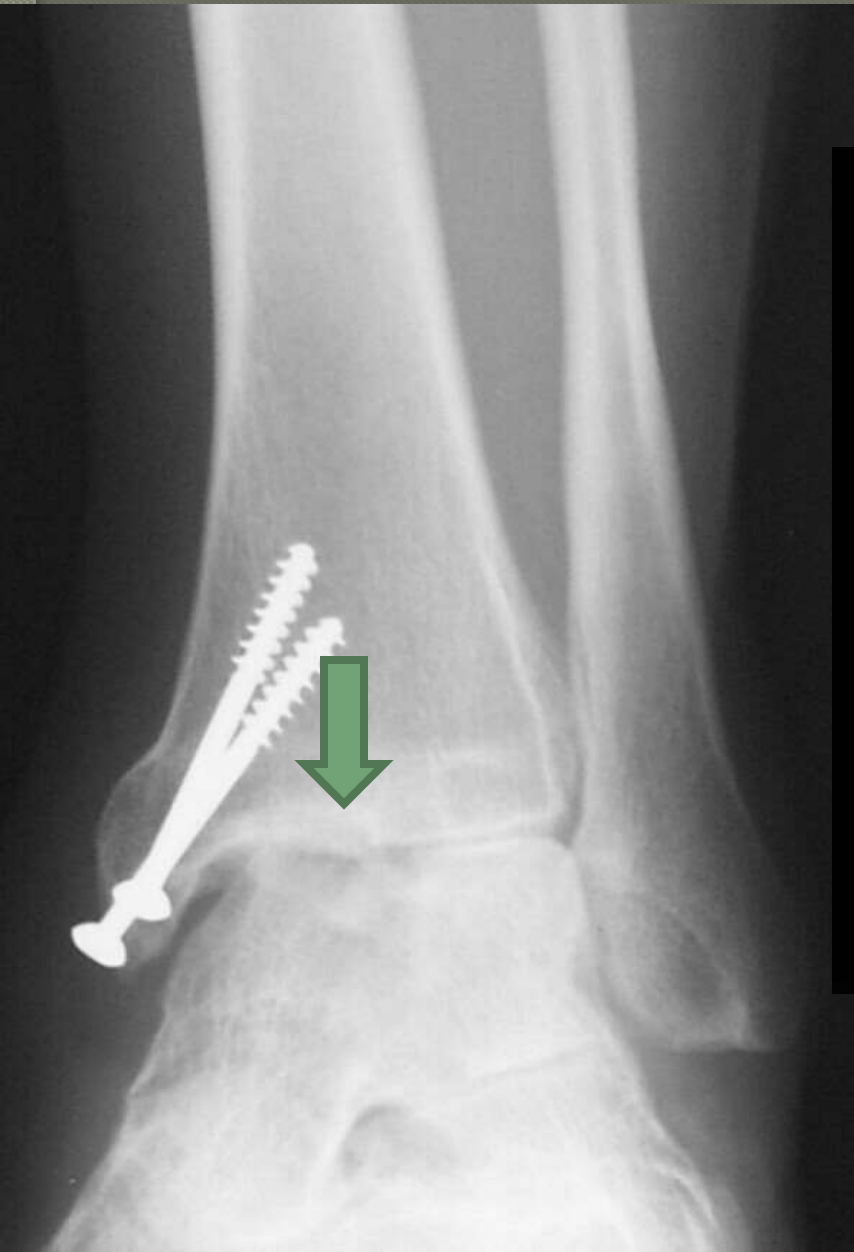
Frame Duration
10-12 weeks







Talar osteonecrosis





2 years



preop



1.3 years later



preop



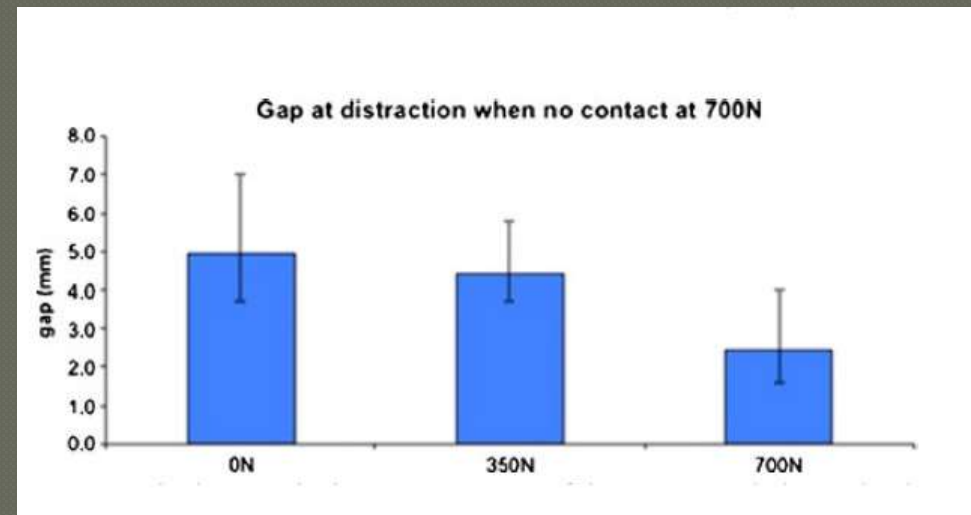
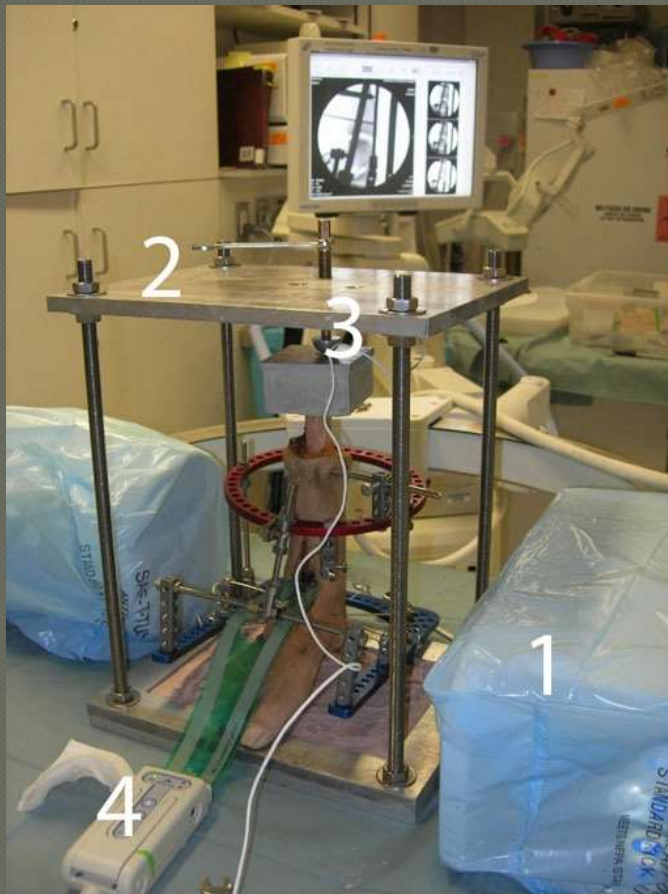
1.3 years later



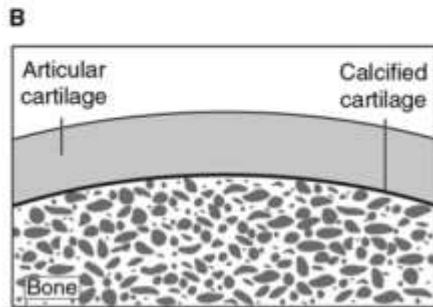
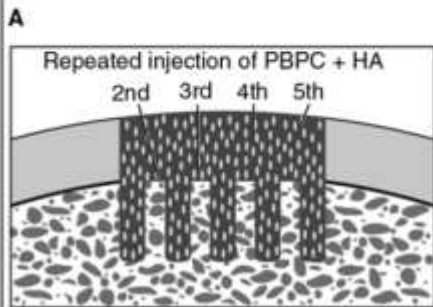
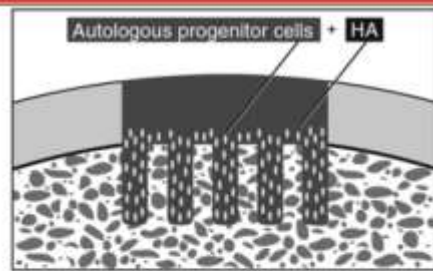
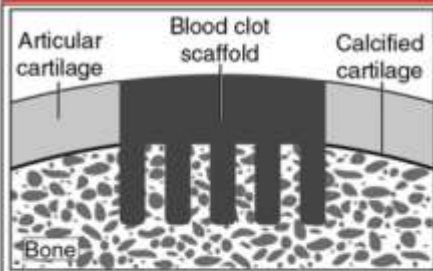
EMS, TRF_GEMS, , ,
ery MRD

Minimum Distraction Gap: How Much Ankle Joint Space Is Enough in Ankle Distraction Arthroplasty?

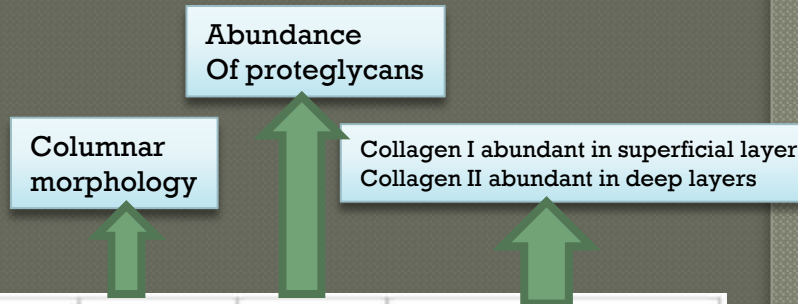
Austin T. Fragomen, MD · Thomas H. McCoy, MD · Kathleen N. Meyers, MS · S. Robert Rozbruch, MD



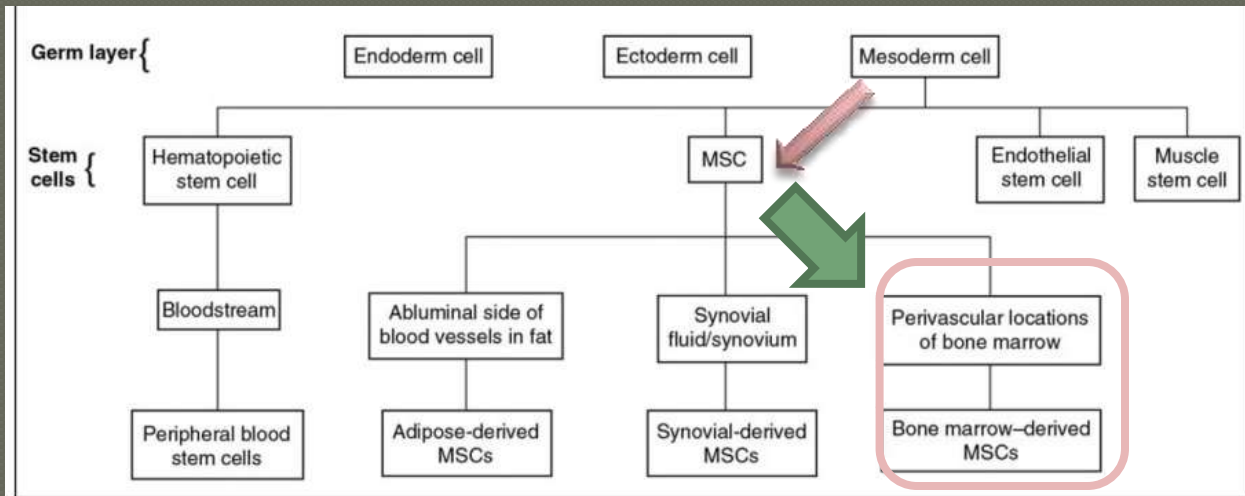
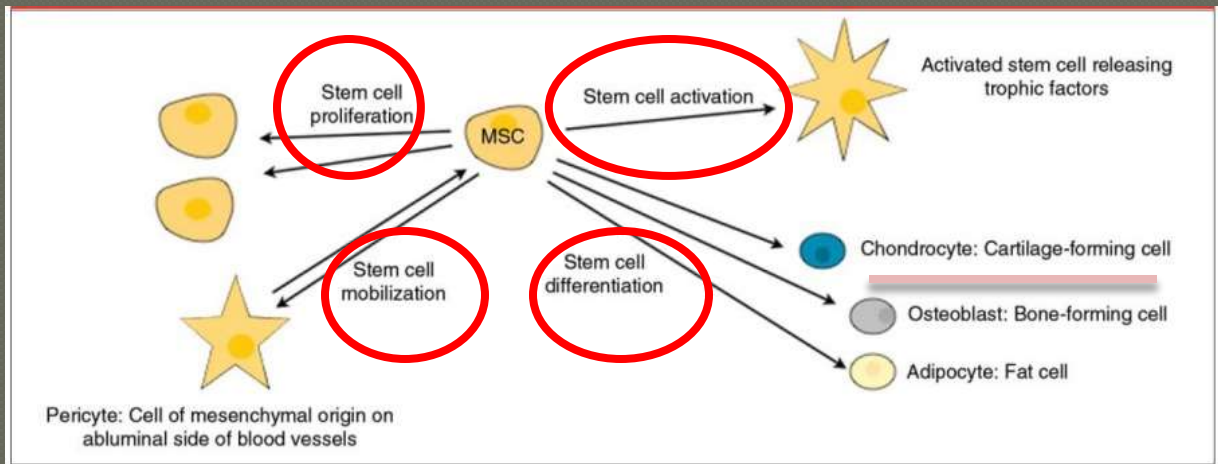
5.8 mm needed in bipedal
Weight bearing x-ray
I do 6 mm acute distraction



Saw, Anz, Arthroscopy 2011



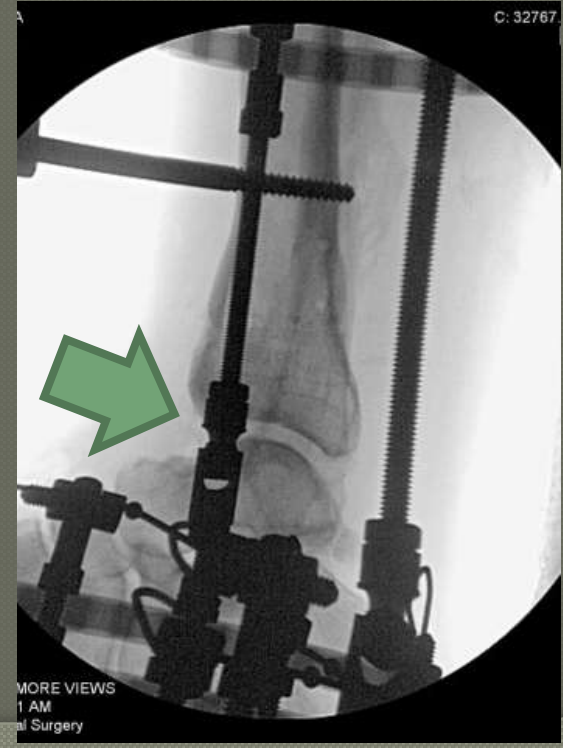
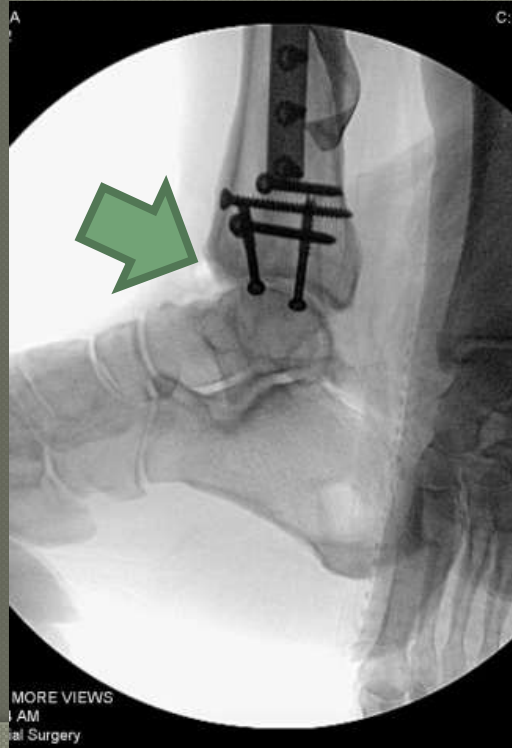
	Intra-Op	Post-op 2 years	H & E	Safarin-O	Collagen I	Collagen II
MTP						
MFC						



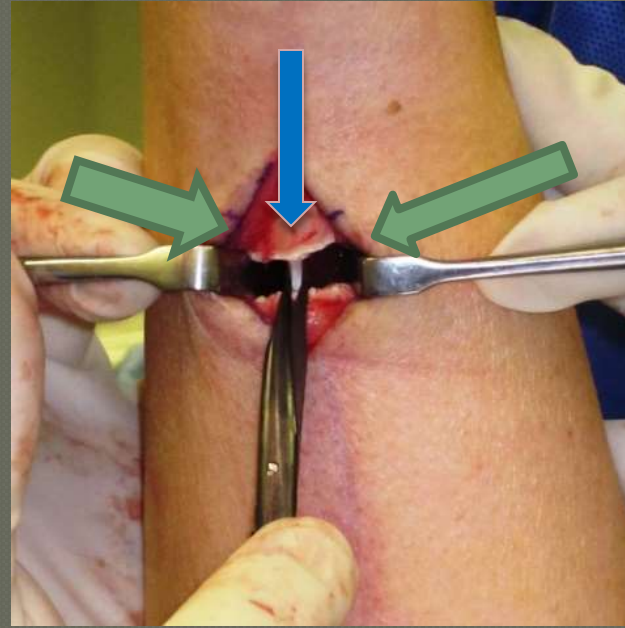
BMAC: Mesenchymal stem cells



Excision of anterior osteophyte

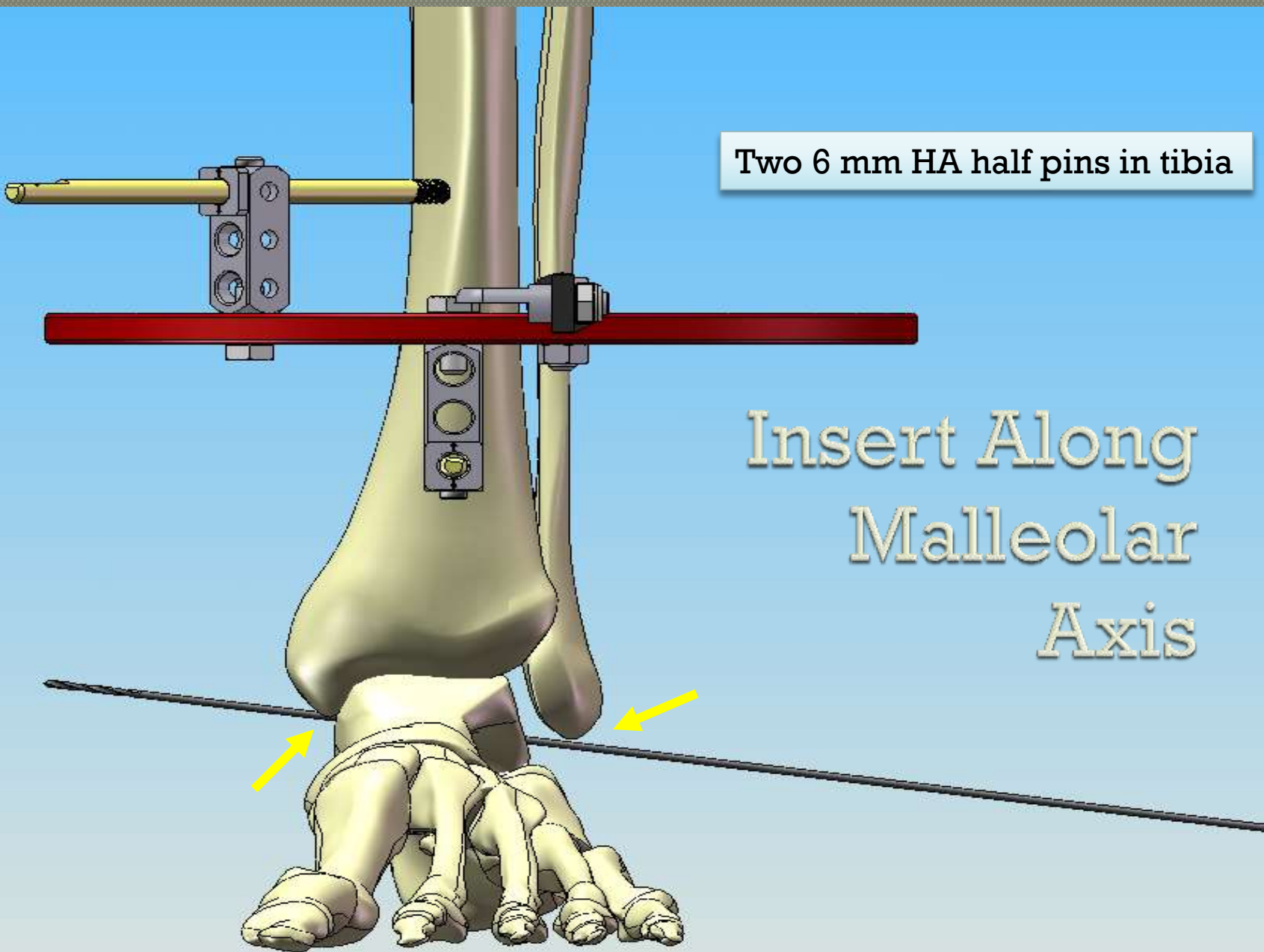


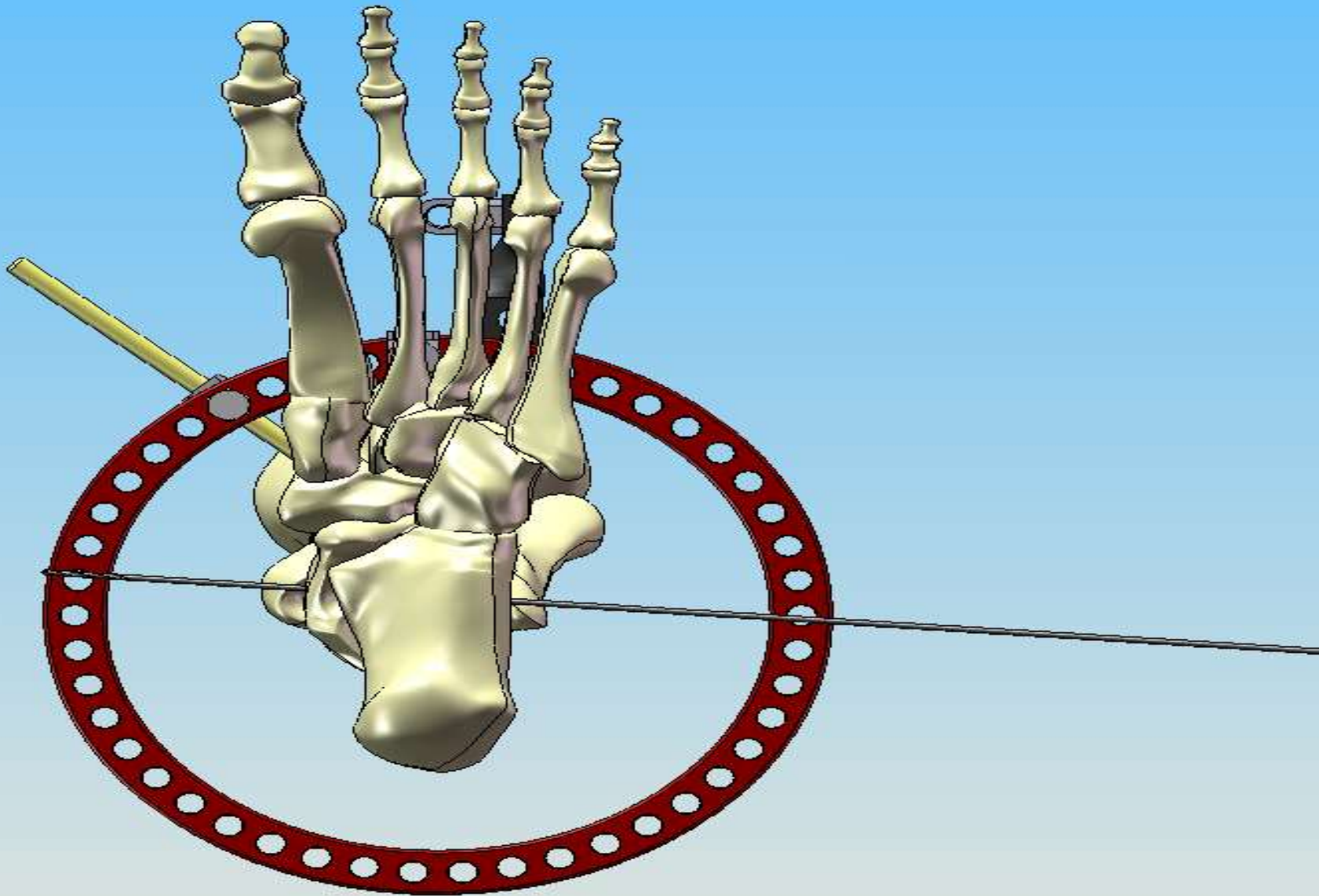
Gastrocsoleus recession



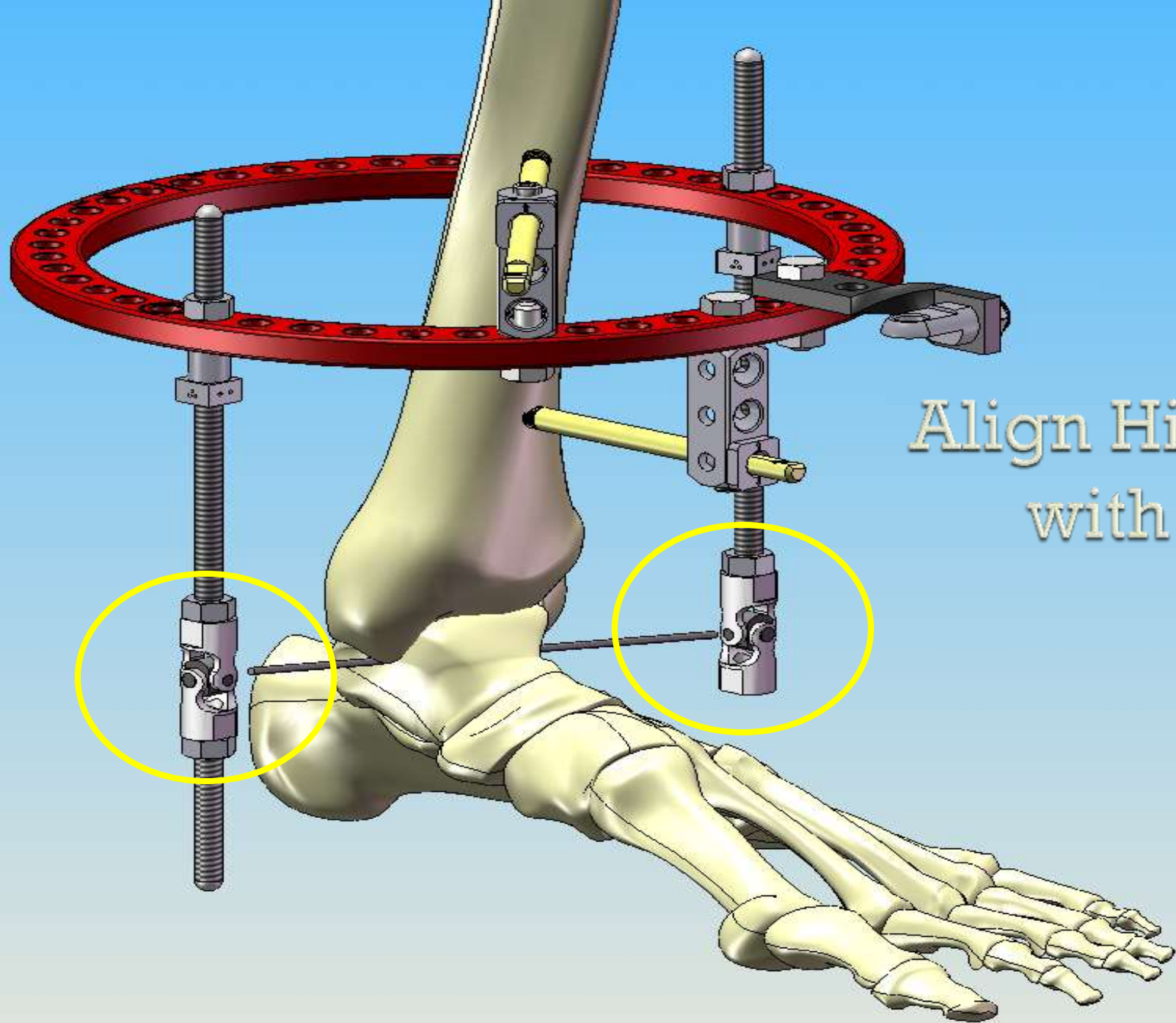
Two 6 mm HA half pins in tibia

Insert Along
Malleolar
Axis

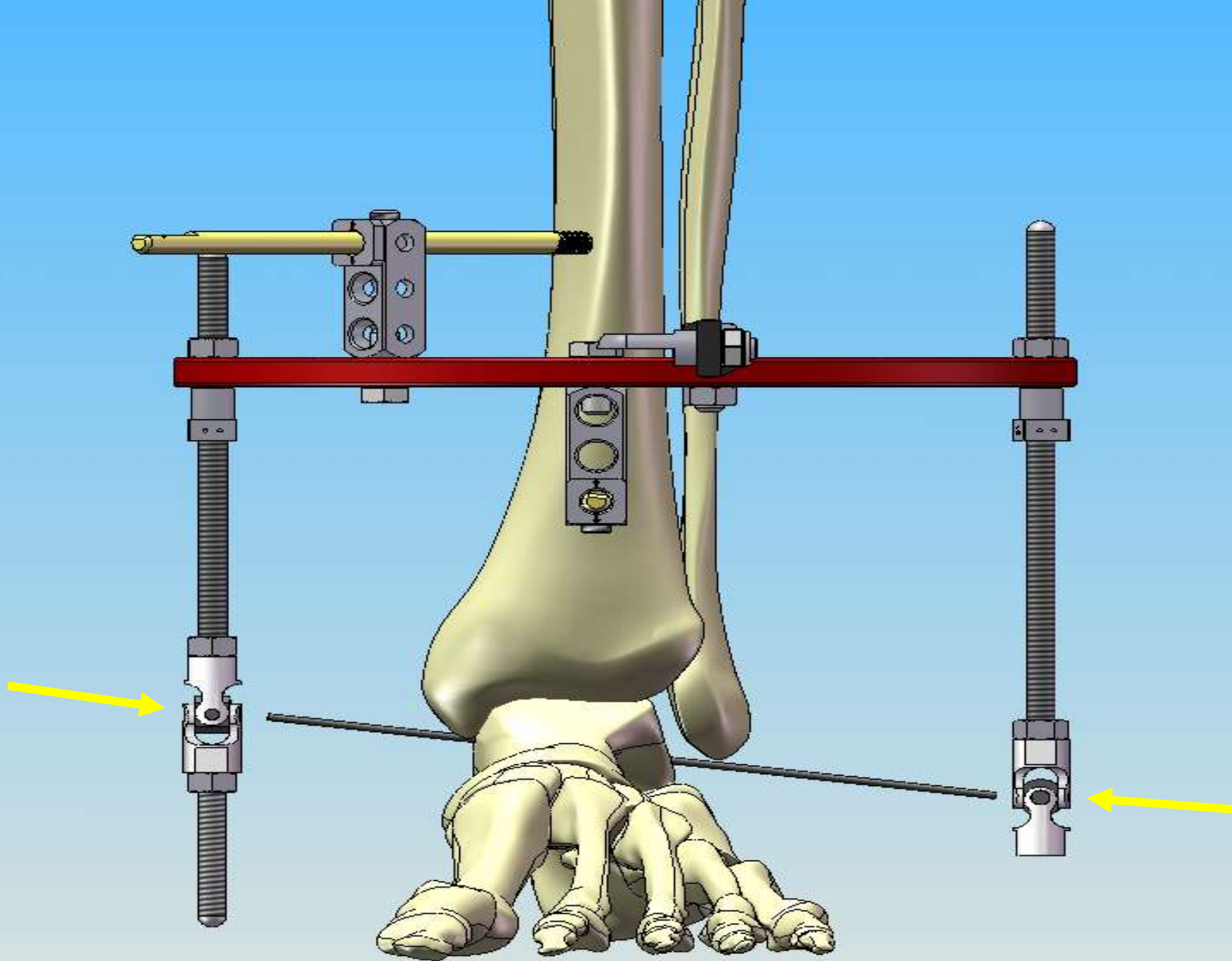




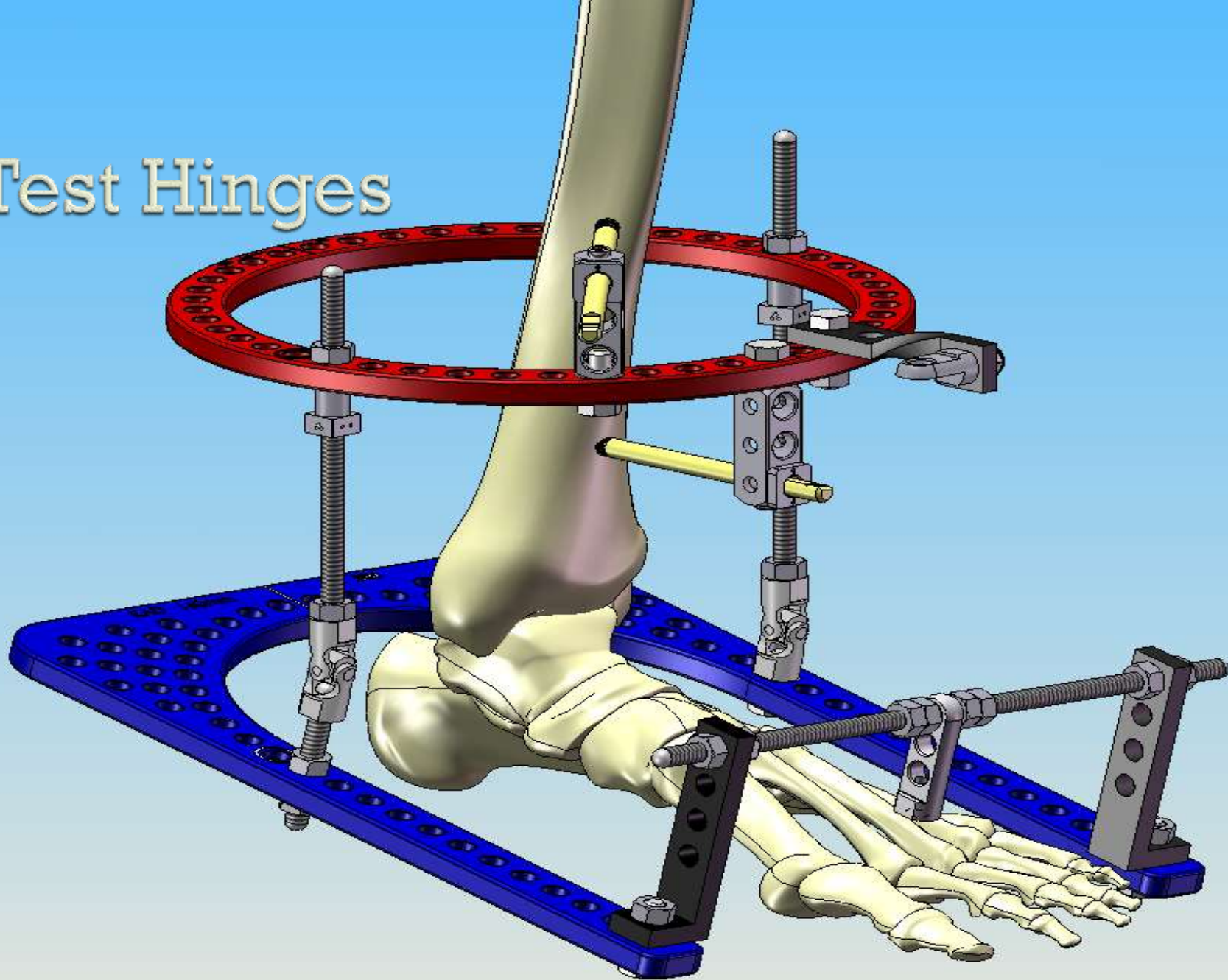


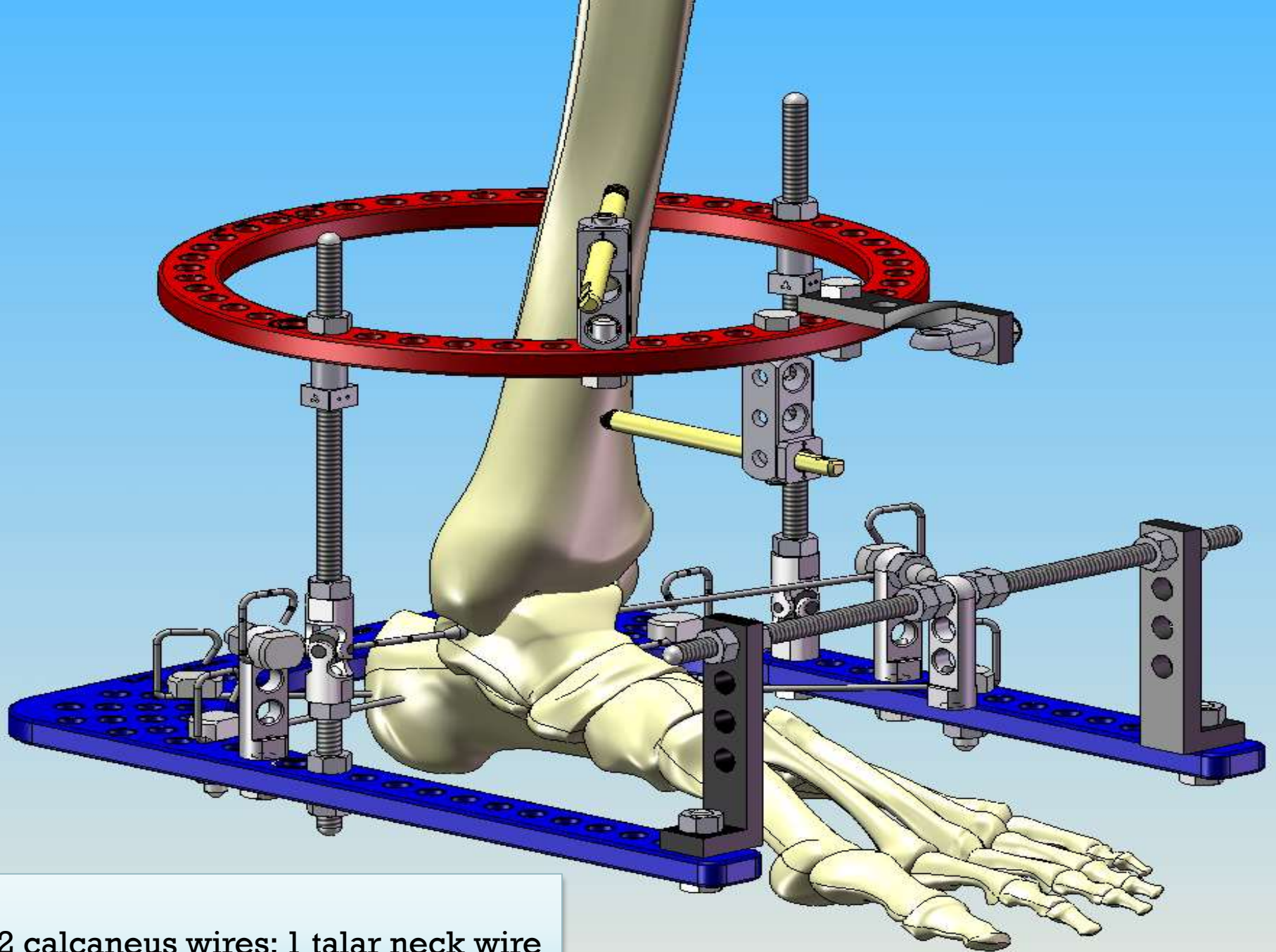


Align Hinges
with Wire

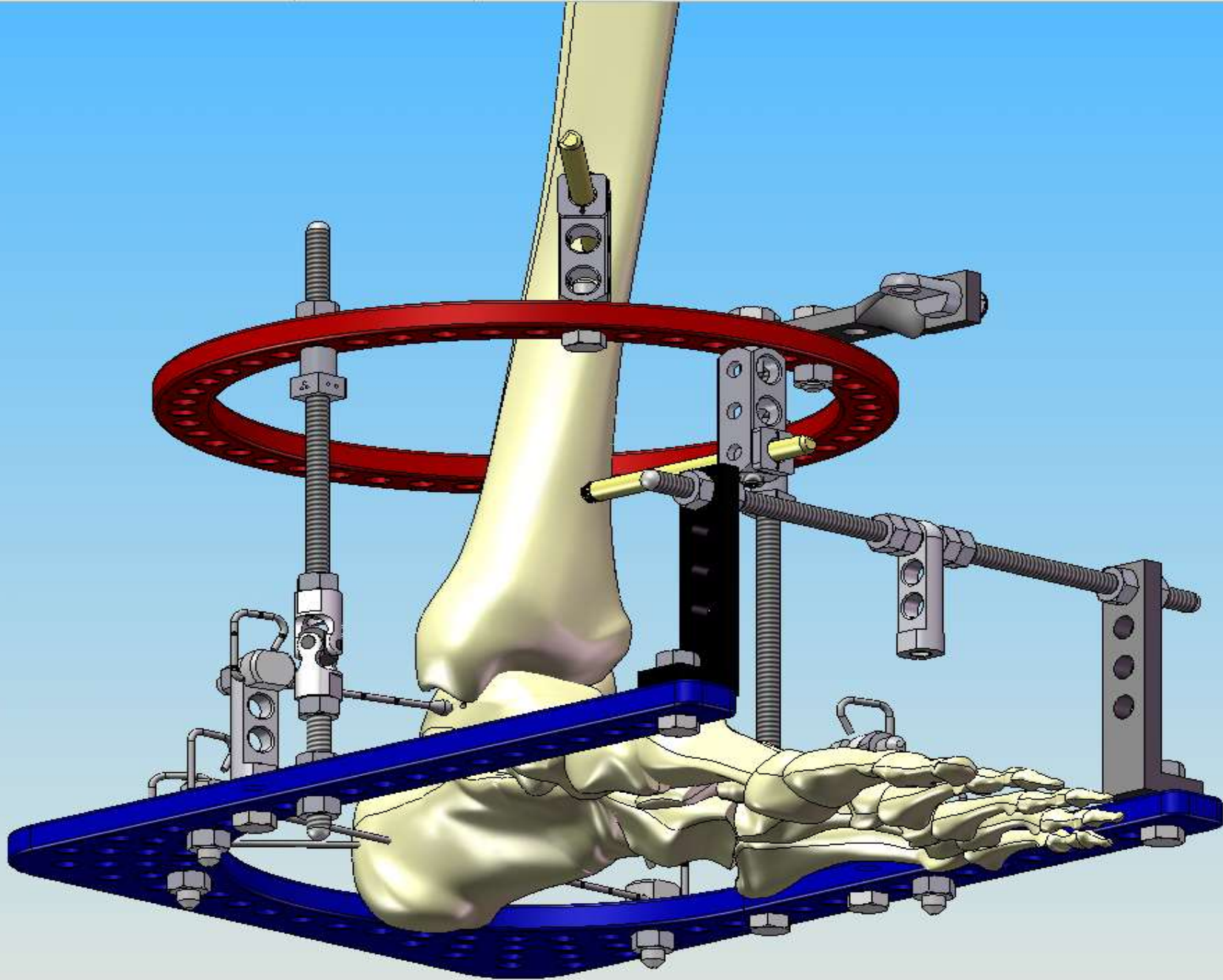


Test Hinges



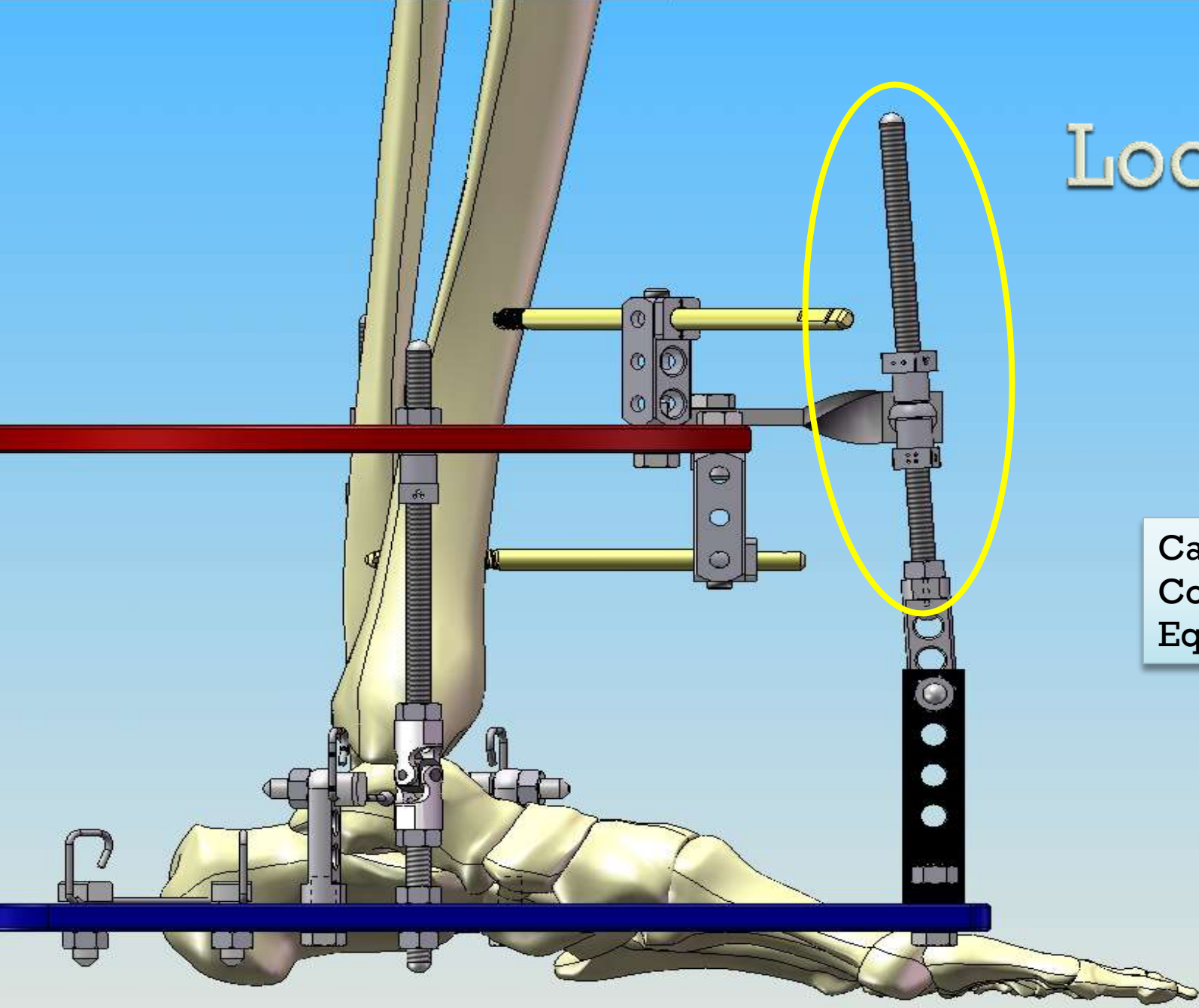


2 calcaneus wires; 1 talar neck wire



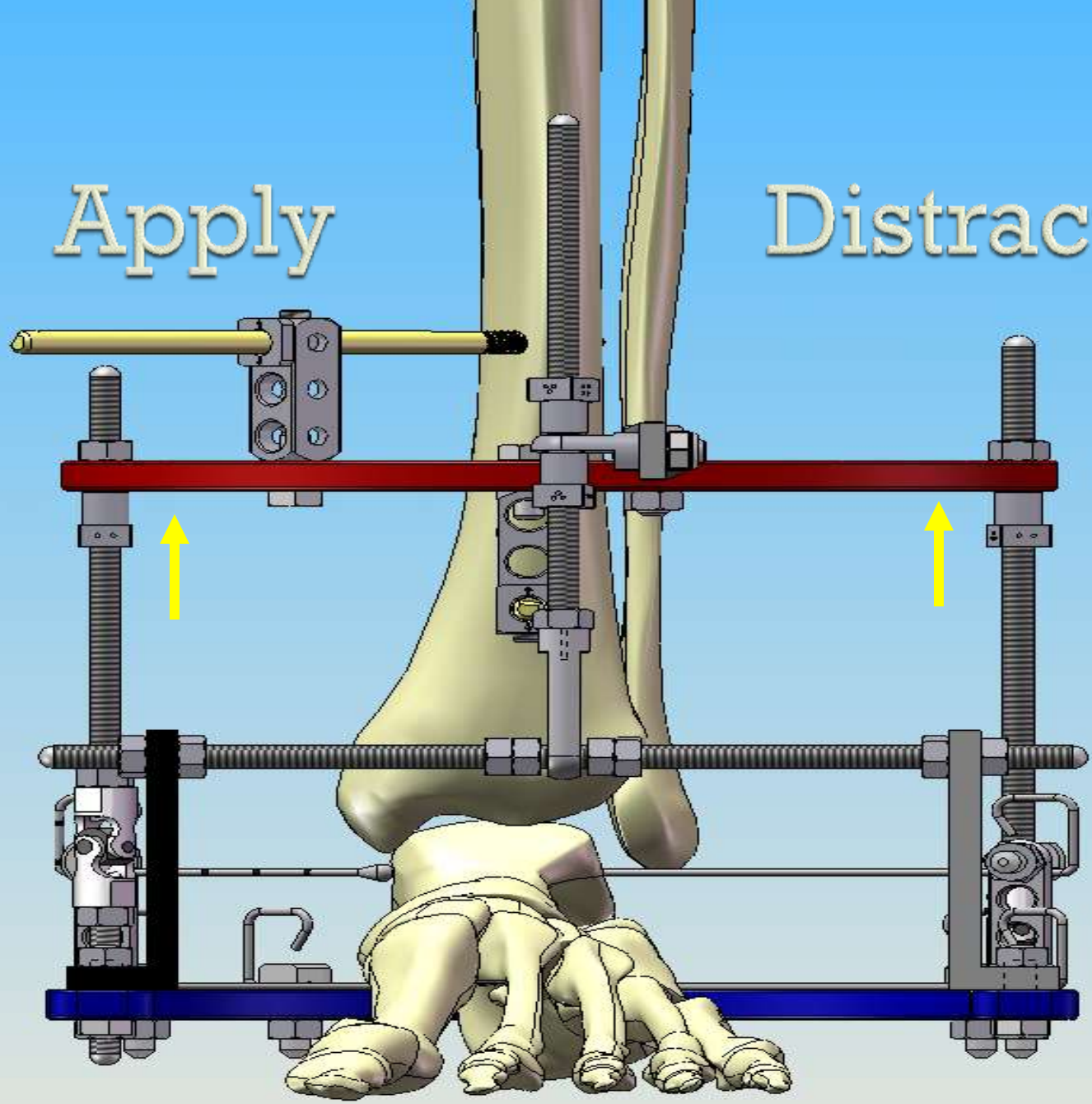
Locking Rod

Can do gradual Correction of Equinus contx

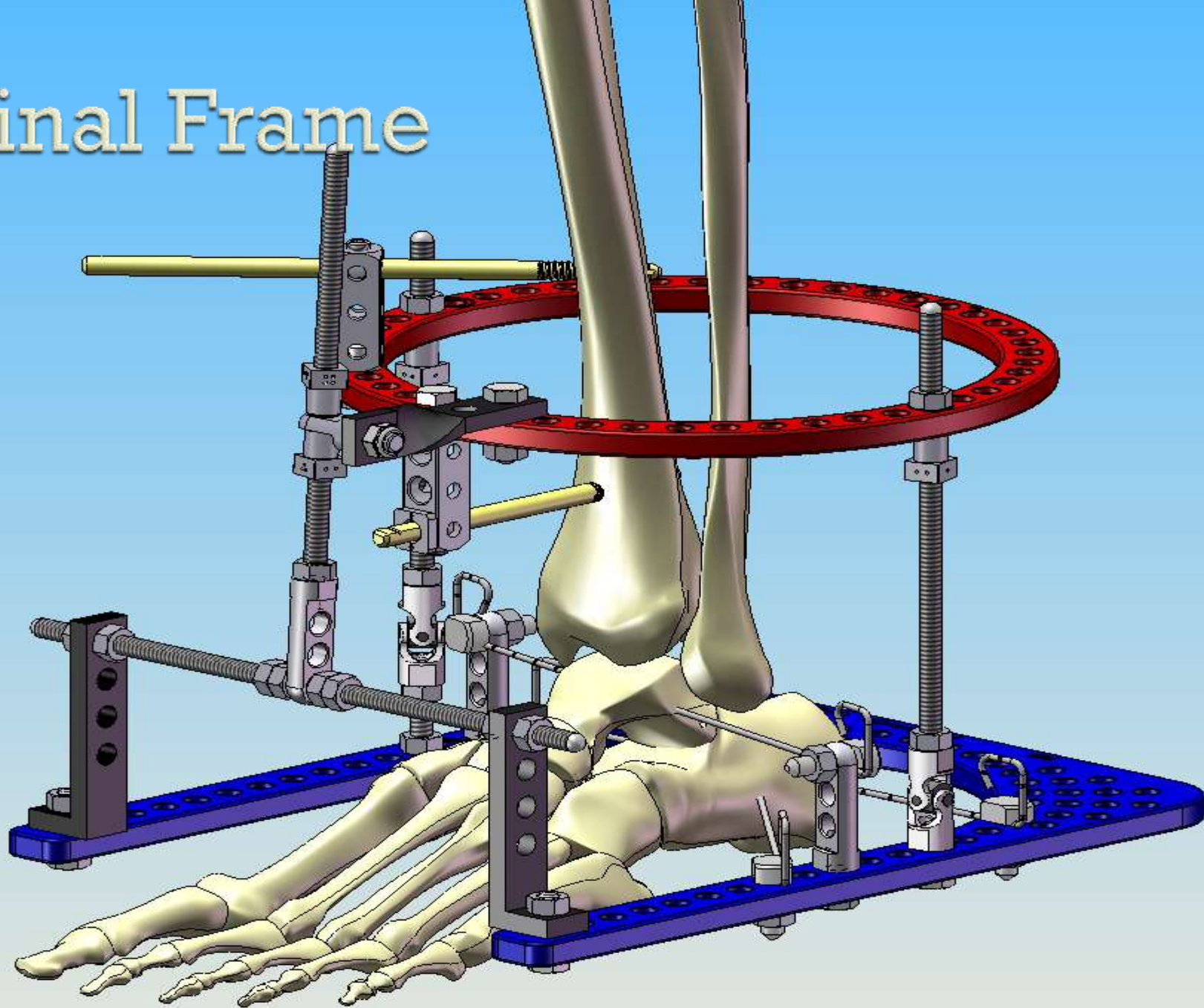


Apply

Distraction



Final Frame



Joint Preservation of the Osteoarthritic Ankle Using Distraction Arthroplasty

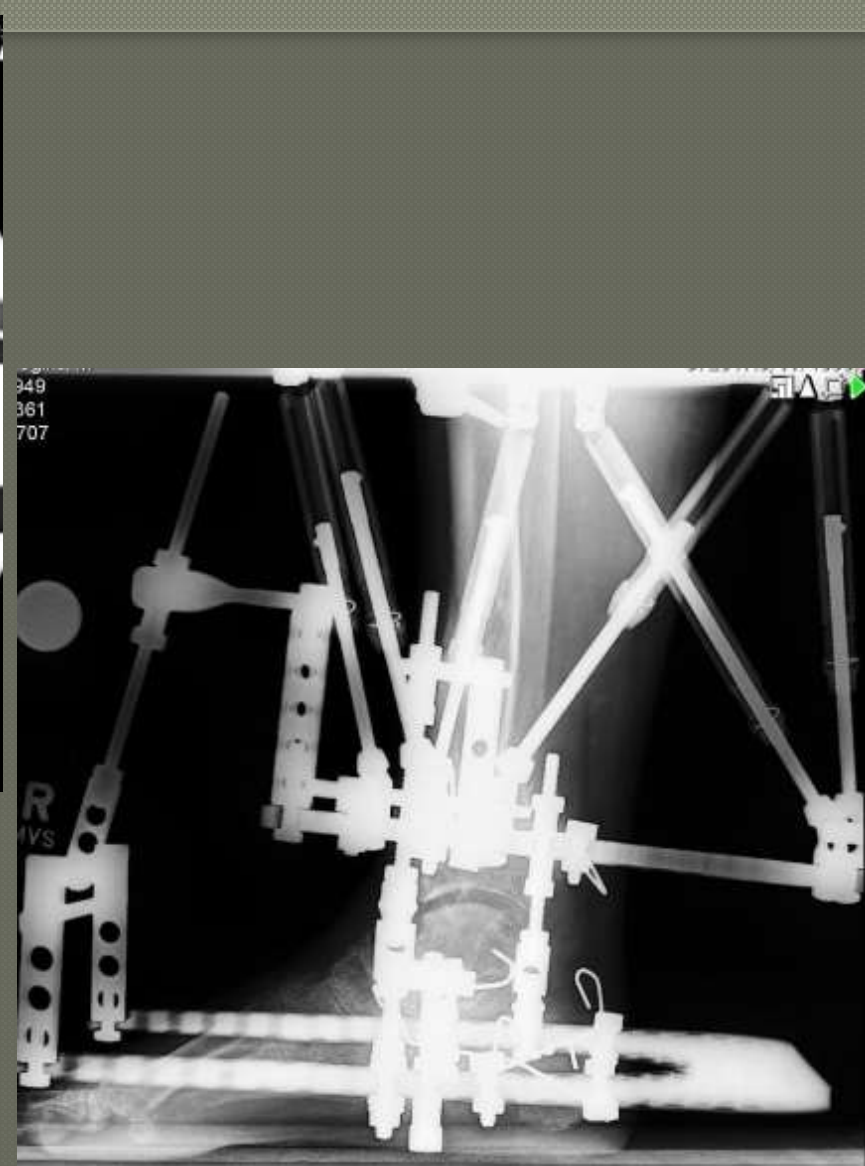
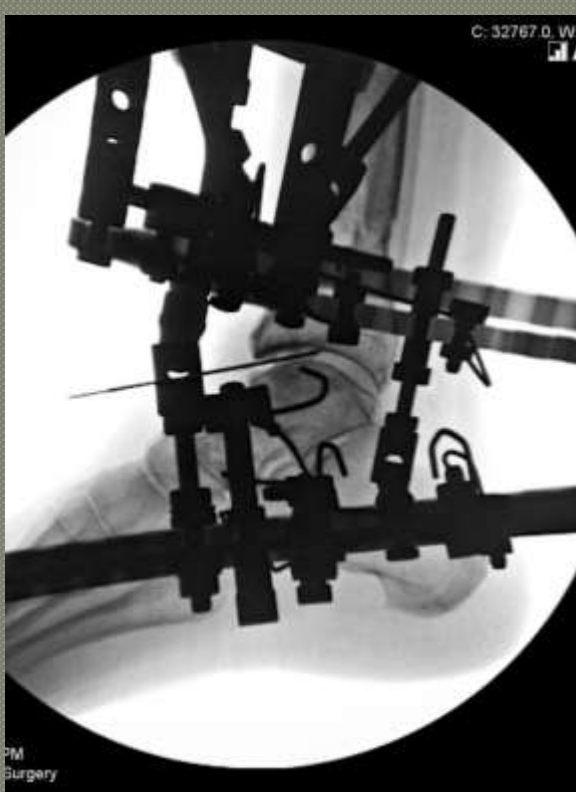
Nazzar Tellisi, MD; Austin T. Fragomen, MD; Dawn Kleinman, BS; Martin J. O'Malley, MD; S. Robert Rozbruch, MD
New York, NY

- AOFAS score improved from 55 to 74 *
- 91% of patients report improved pain
 - Best noted with increased follow-up
- Age not significant factor
 - Older patients tended to have better results
- Arc of motion maintained (38 deg.)
 - Improved DF in patients with equinus
- This was first 25 patients (f/u 30 months)
 - Now we have done 250 patients

Table 4: Level II, III, and IV Evidence to Support the Use of Distraction Ankle Arthroplasty in the Treatment of Post-traumatic Arthritis

Author (Year)	Level of Evidence	Control Population	Diagnostic Groups Included	Length of Minimum Followup	Good and Excellent Outcome Rate	Study Type
van Valburg <i>et al</i> (1999)	II	None	Severe OA who were considered for arthrodesis	2 years	13/17 (76%)	Prospective
Marijnissen <i>et al</i> (2002)	II	None Debridement group	Severe OA who were considered for arthrodesis	1 year 1 year	38/54 (70%) 14/17 (82%)	Prospective Small RCT
van Roermund <i>et al</i> (1999)	II/III	None None	Post-traumatic ankle OA	1 year 1 year	N/A N/A	Prospective Retrospective
van Valburg <i>et al</i> (1995)	III	None	Post-traumatic ankle OA	9 months	6/11 (55%)	Retrospective
Ploegmakers <i>et al</i> (2005)	III	None	Severe OA previously treated with distraction	7 years	16/22 (73%)	Retrospective
Paley <i>et al</i> (2008)	IV	None	Painful ankle arthrosis recommended for fusion	2 years	14/18 (78%)	Case series
Tellisi <i>et al</i> (2009)	IV	None	Post-traumatic ankle OA	1 year	21/23 (91%)	Case series





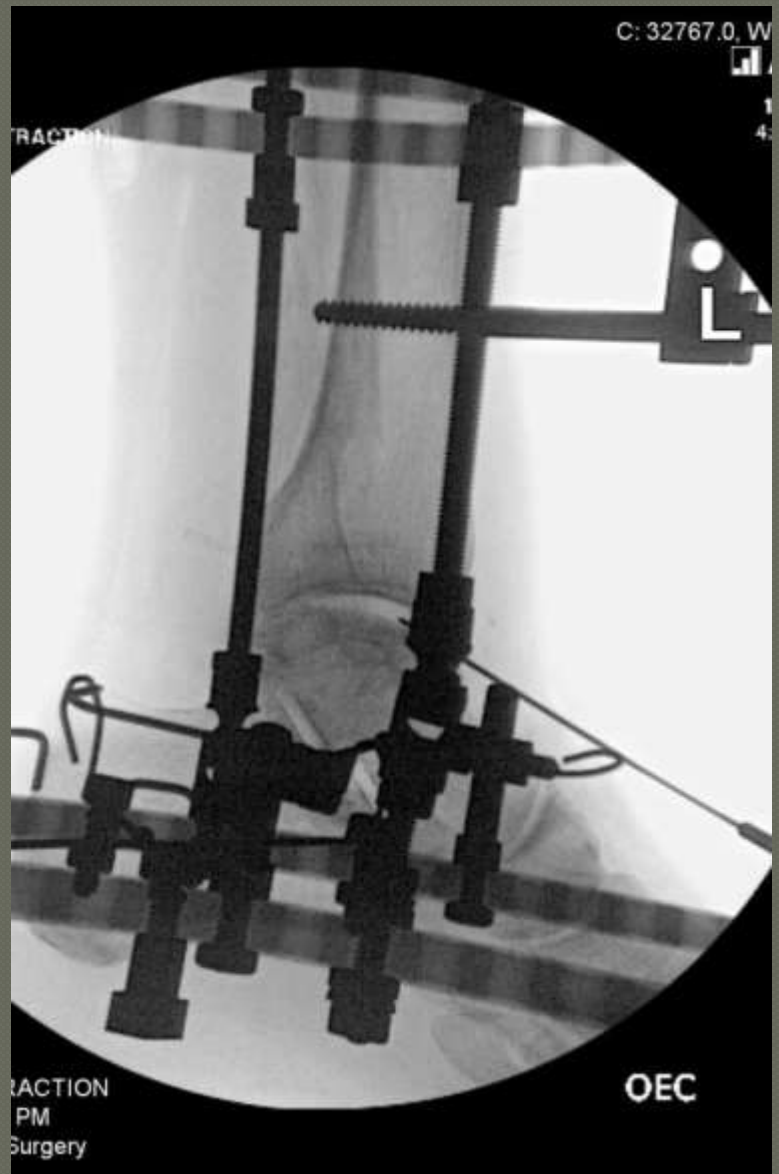




After Distraction
+ SMO











Patient selection

- ⊙ Alternative to fusion and replacement
 - Works well for advanced arthrosis
- ⊙ **Joint ROM worth saving**
 - **Correct equinus contx**
- ⊙ Too young for TAR
 - Older patient did just as well
- ⊙ **Motivated for joint preservation**
- ⊙ Avoid in pt. with stiffness, infection

Why does this work?

- ◉ Generate *reparative* tissue
- ◉ Correct equinus
- ◉ Maintain ROM
- ◉ Decrease subchondral sclerosis

Thank You



LIMB .COM

www.hss.edu/limblengthening