

Ankle Distraction Arthroplasty

**Stryker Corporate Meeting
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Professor of Clinical Orthopedic Surgery



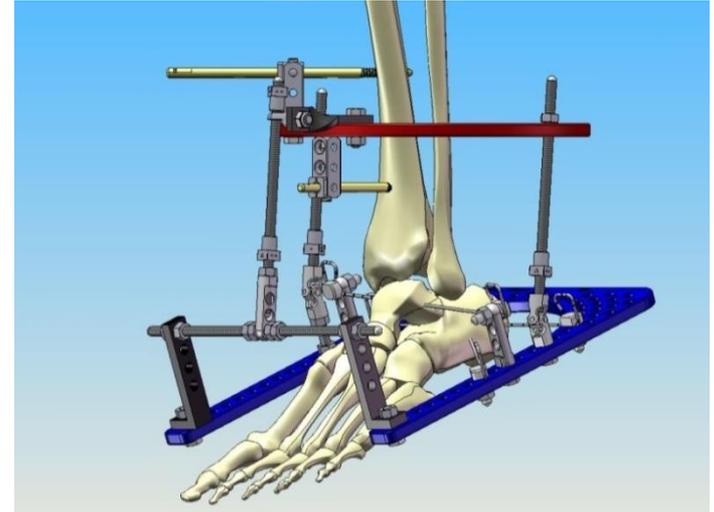
LIMB **LENGTHENING**.COM

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SPECIAL
SURGERY

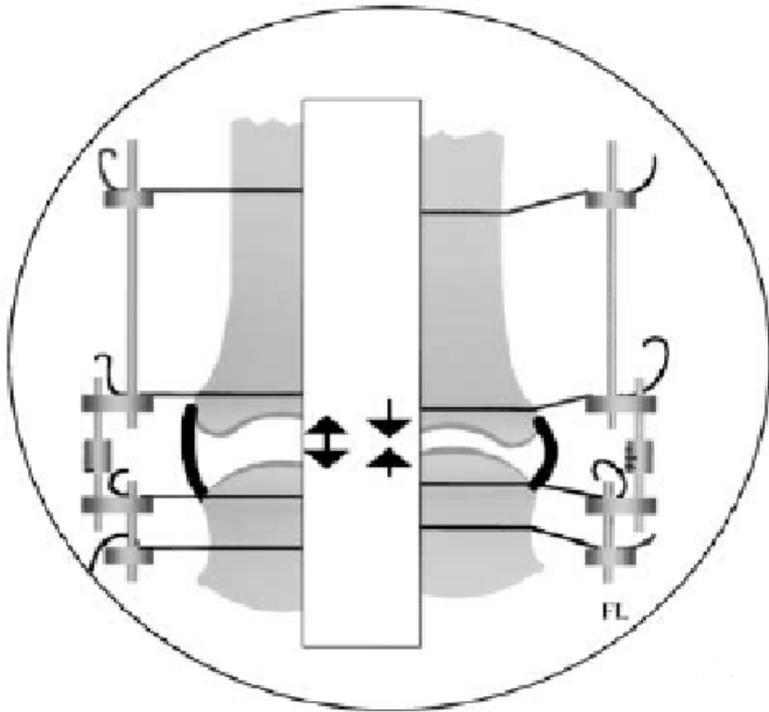
Ankle Distraction

- 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

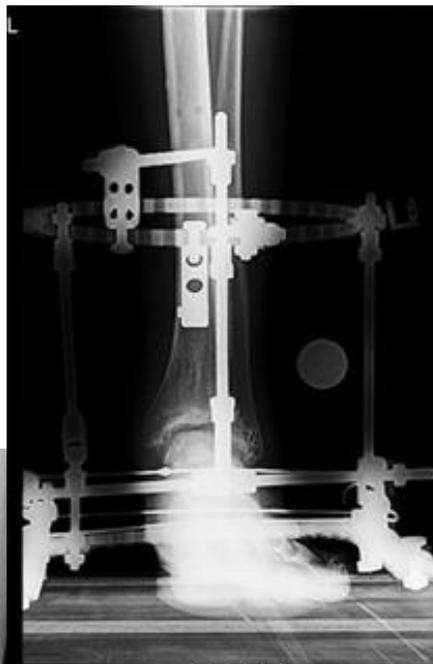
Ankle Distraction Components

- **Biology**
 - Microfracture
 - BMAC/Stem cells
- **Soft tissue**
 - Gastrocsoleus recession
- **Mechanical**
 - Anterior Osteophyte excision
 - Hinged frame
 - Maintain ROM
 - Correct equinus

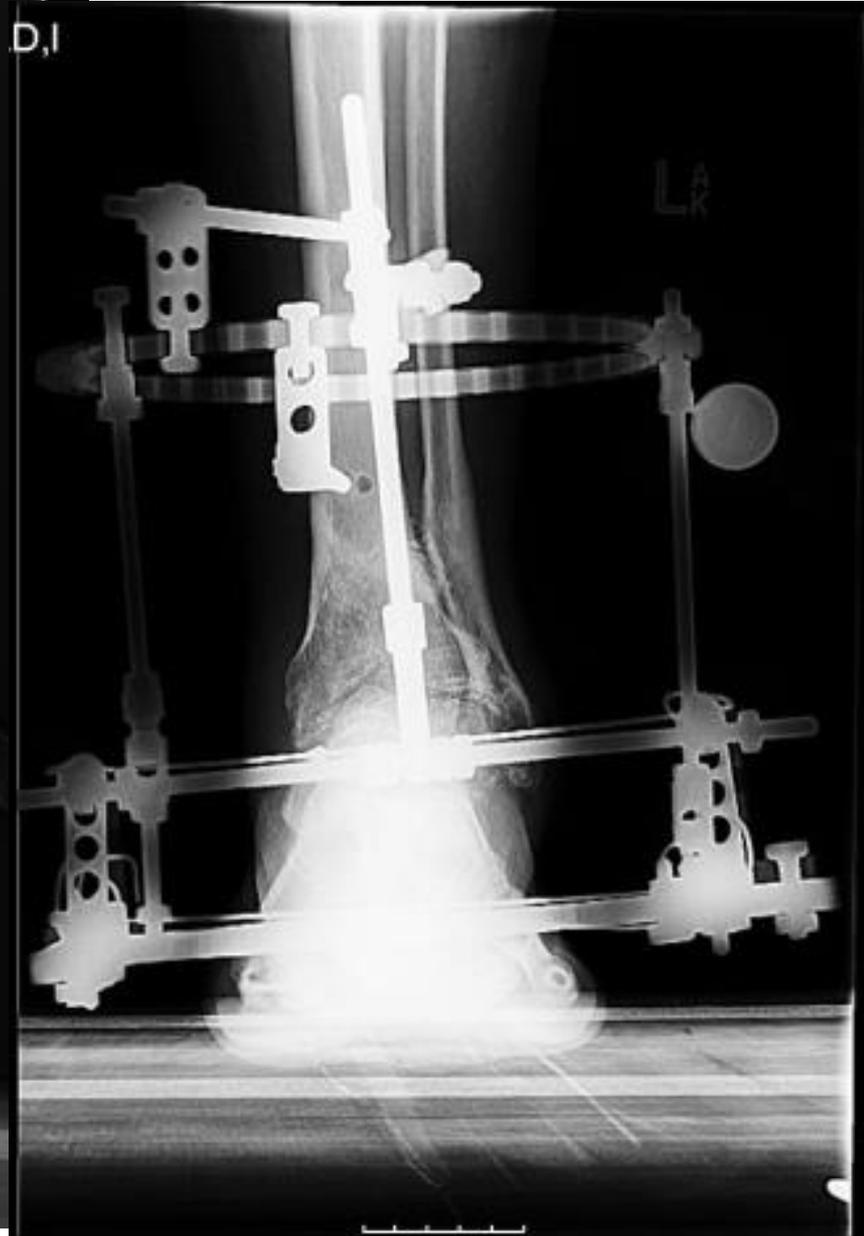


equines





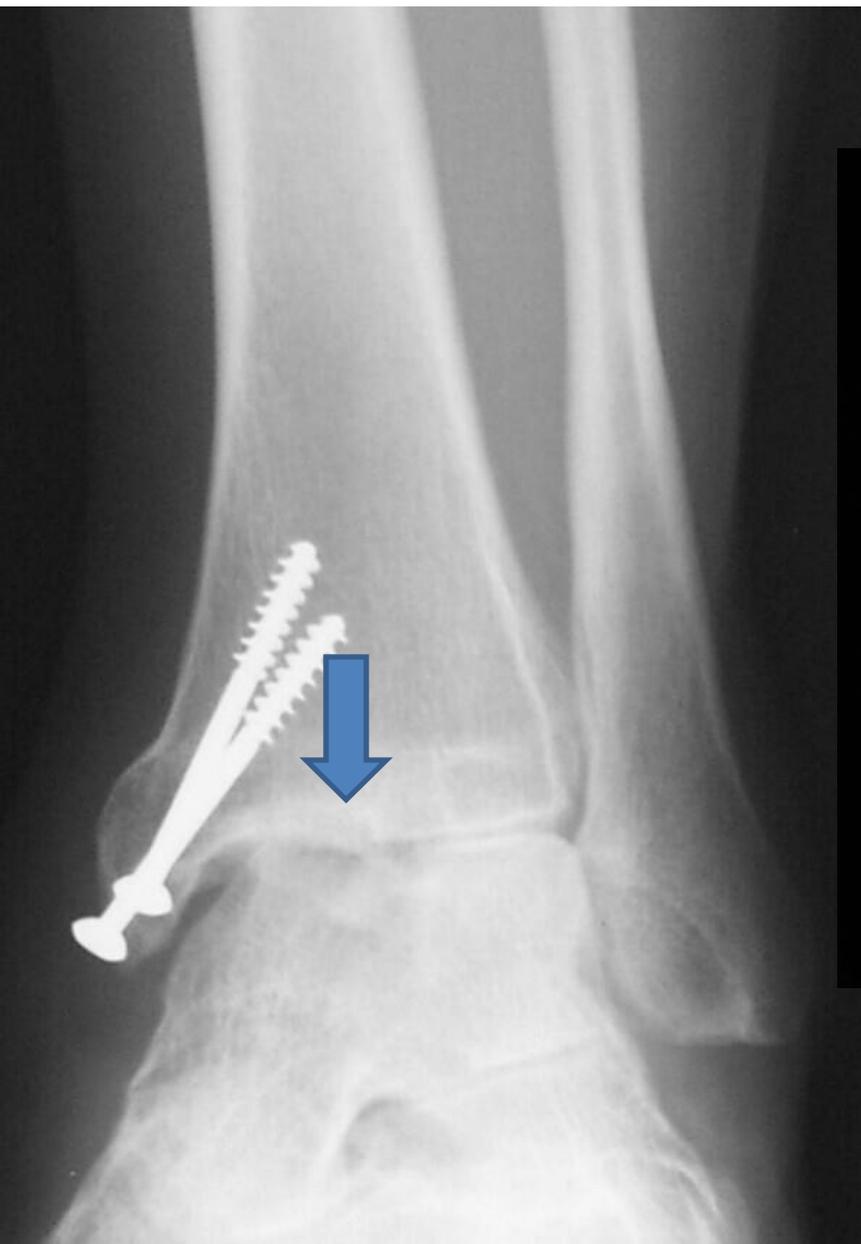
Frame Duration
10-12 weeks







Talar osteonecrosis





preop



1.3 years later



preop

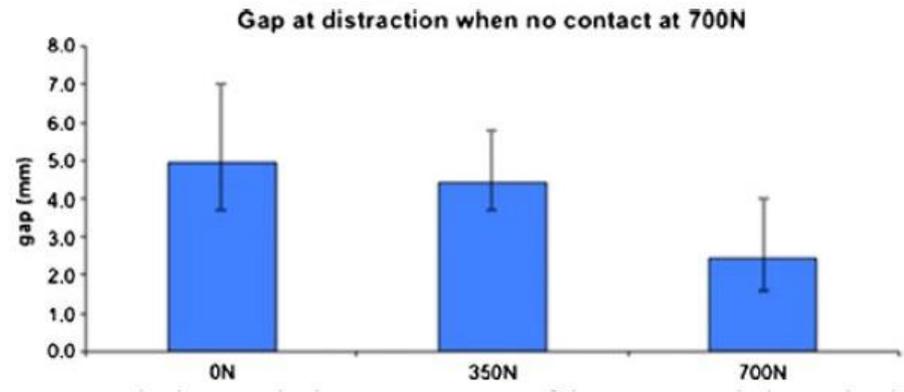
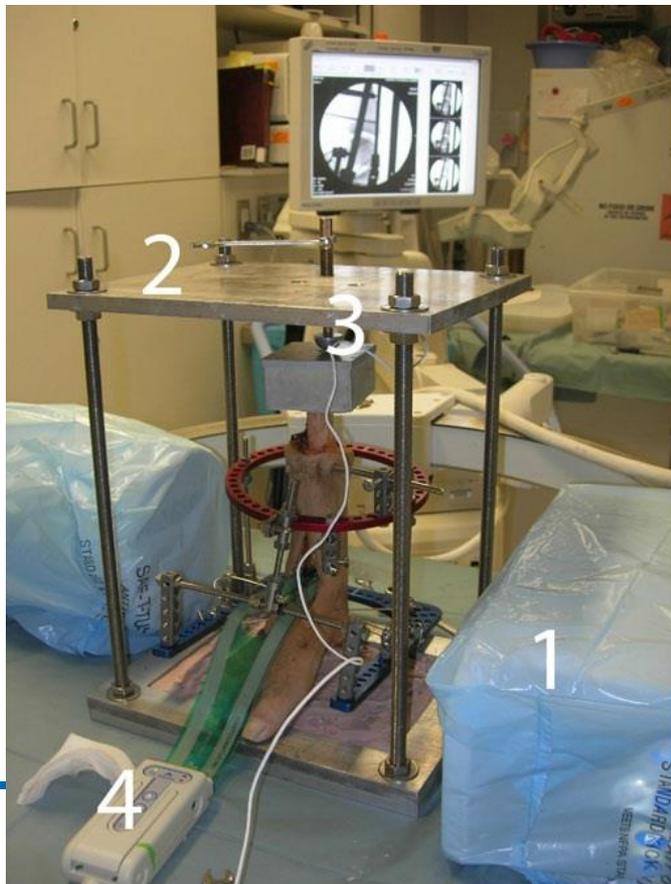


1.3 years later

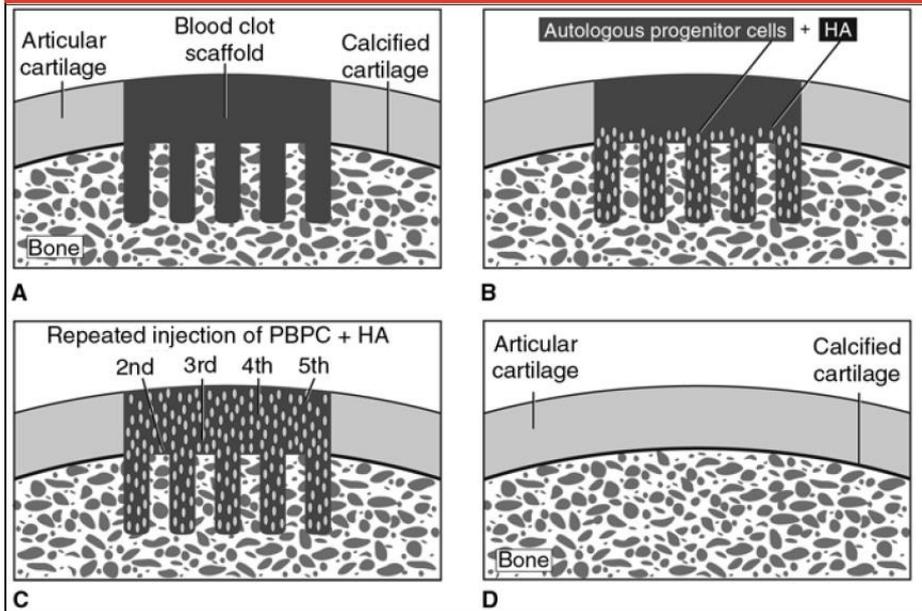


Minimum Distraction Gap: How Much Ankle Joint Space Is Enough in Ankle Distraction Arthroplasty?

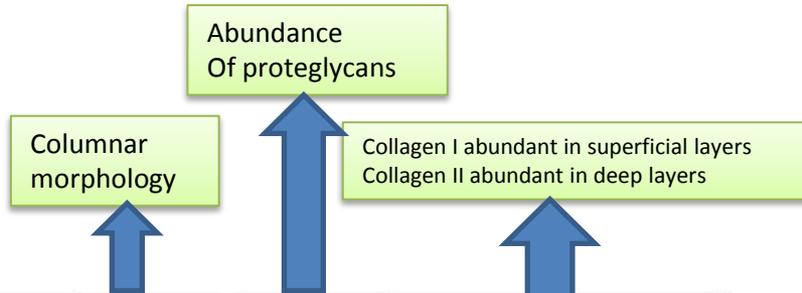
Austin T. Fragomen, MD · Thomas H. McCoy, MD · Kathleen N. Meyers, MS · S. Robert Rozbruch, MD



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

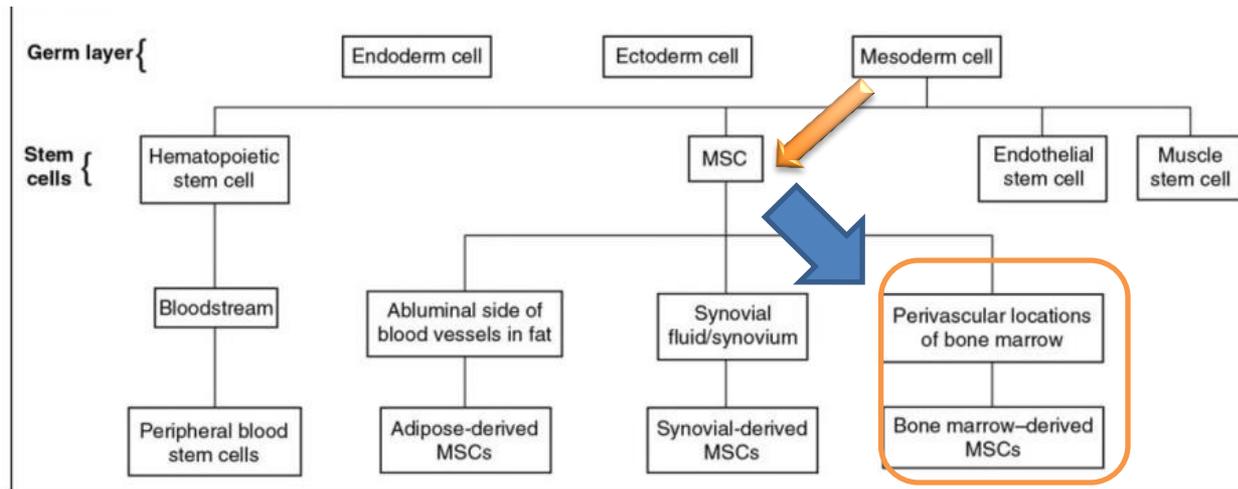
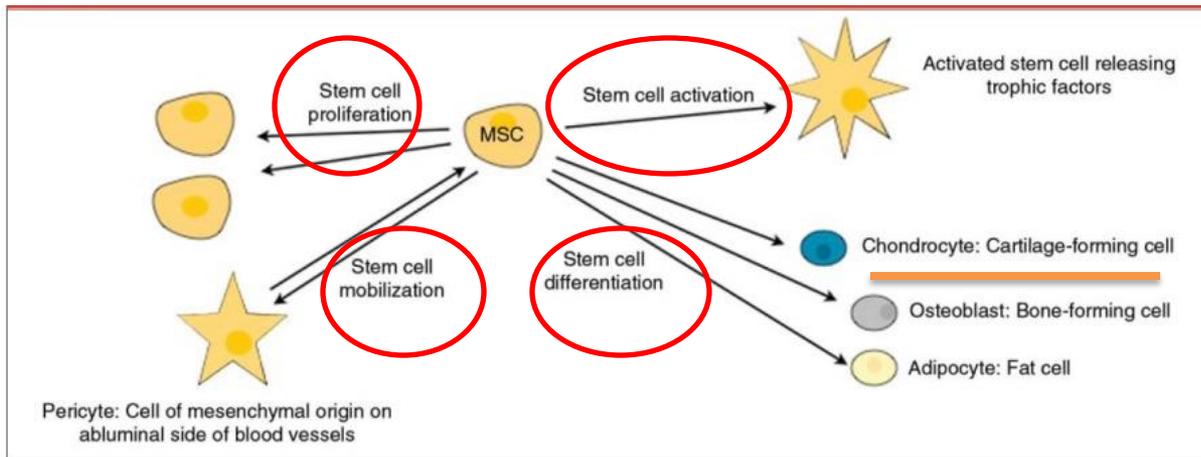


Saw, Anz, Arthroscopy 2011



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

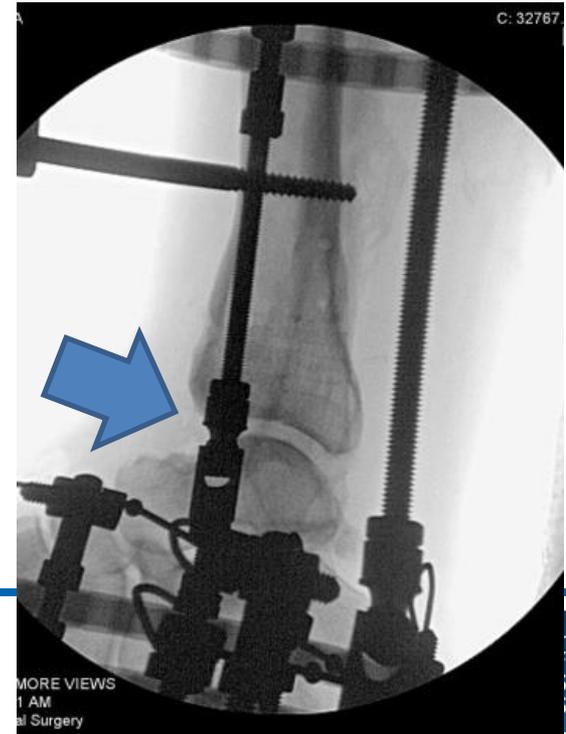
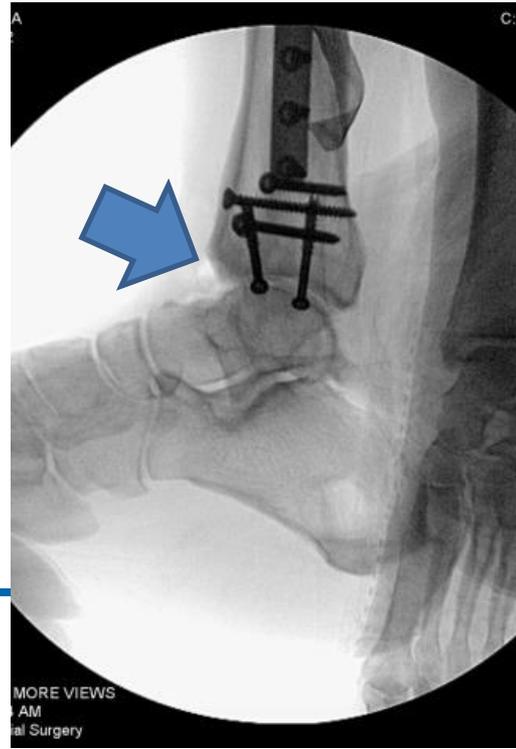
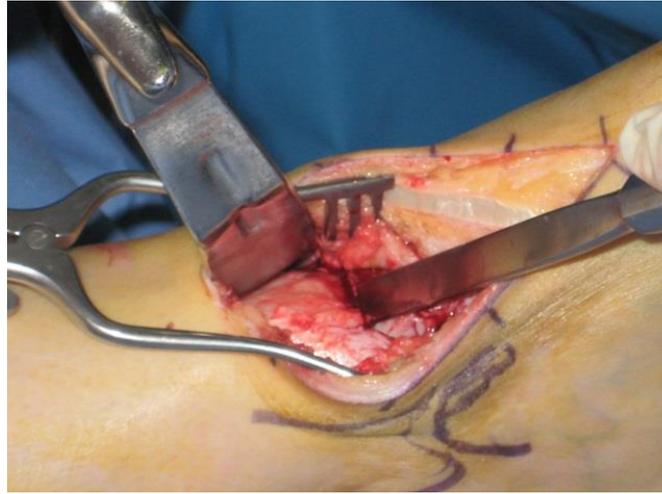




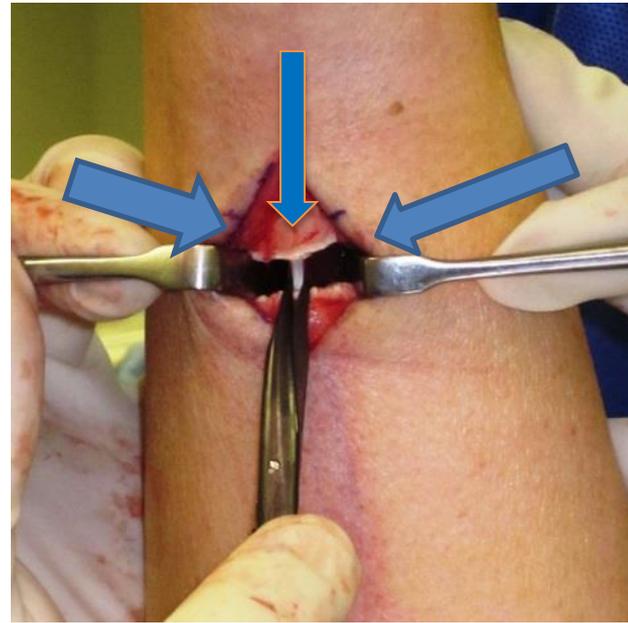
BMAC: Mesenchymal stem cells

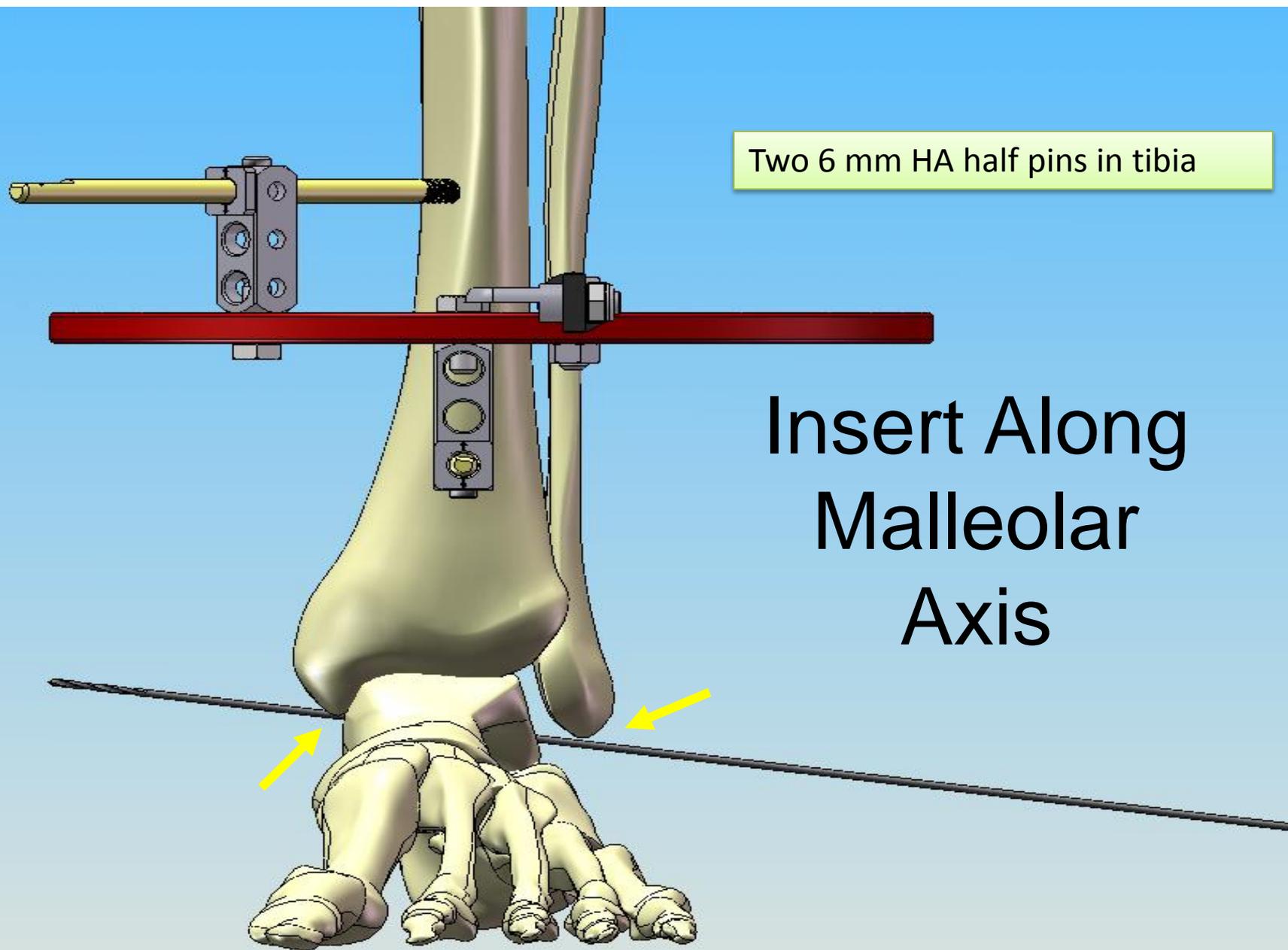


Excision of anterior osteophyte



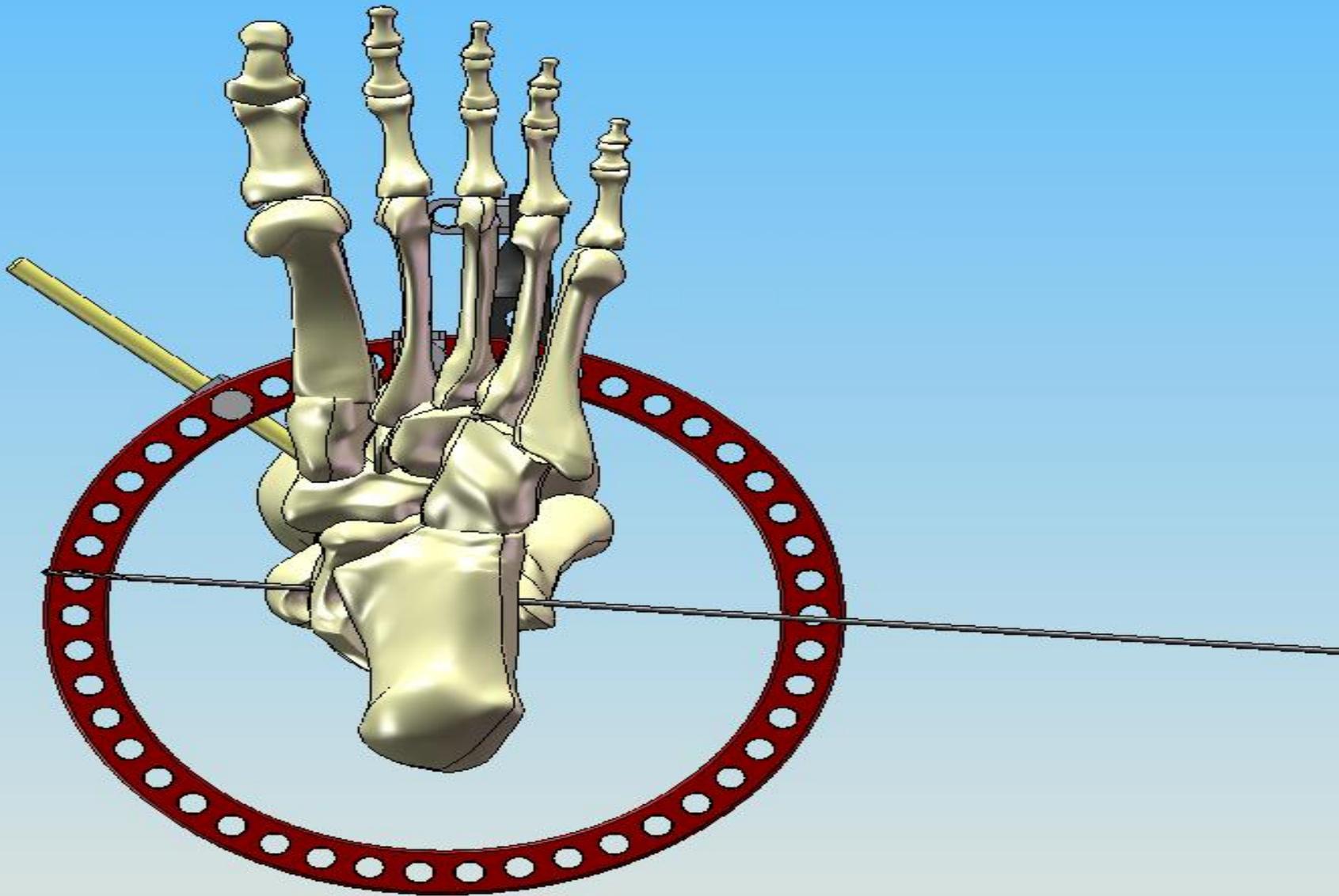
Gastrocsoleus recession

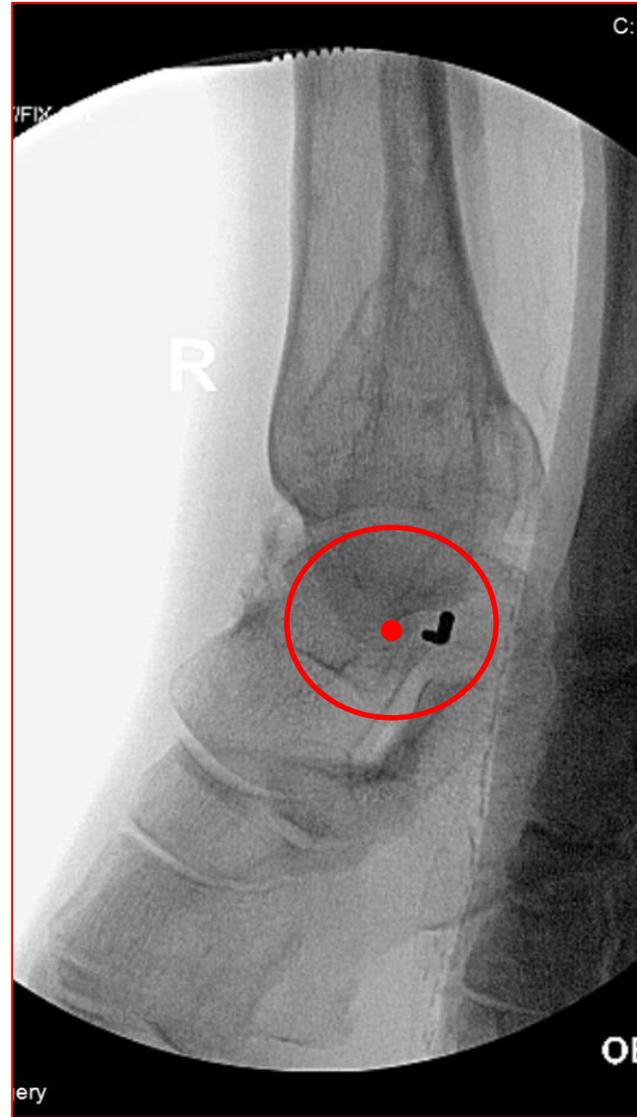


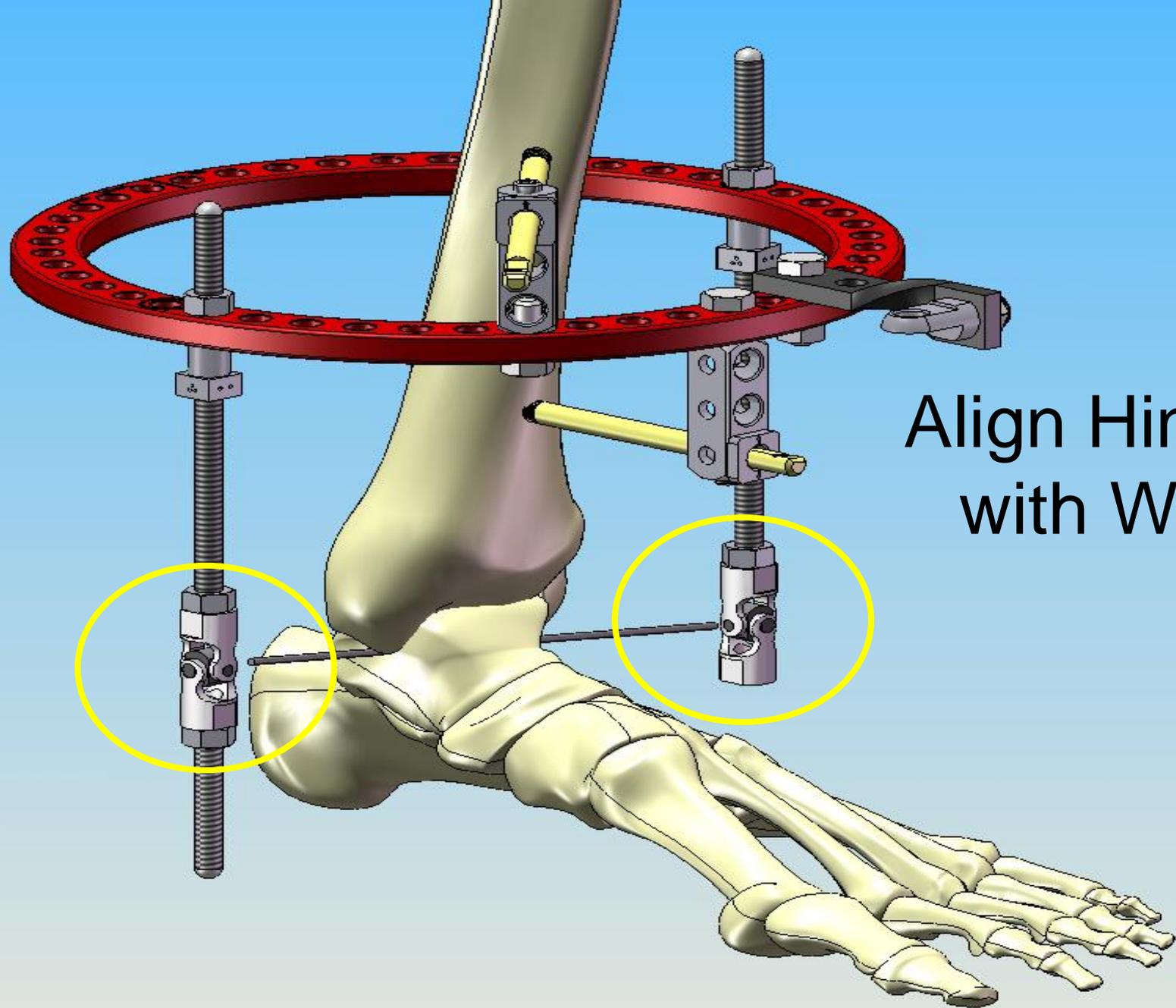


Two 6 mm HA half pins in tibia

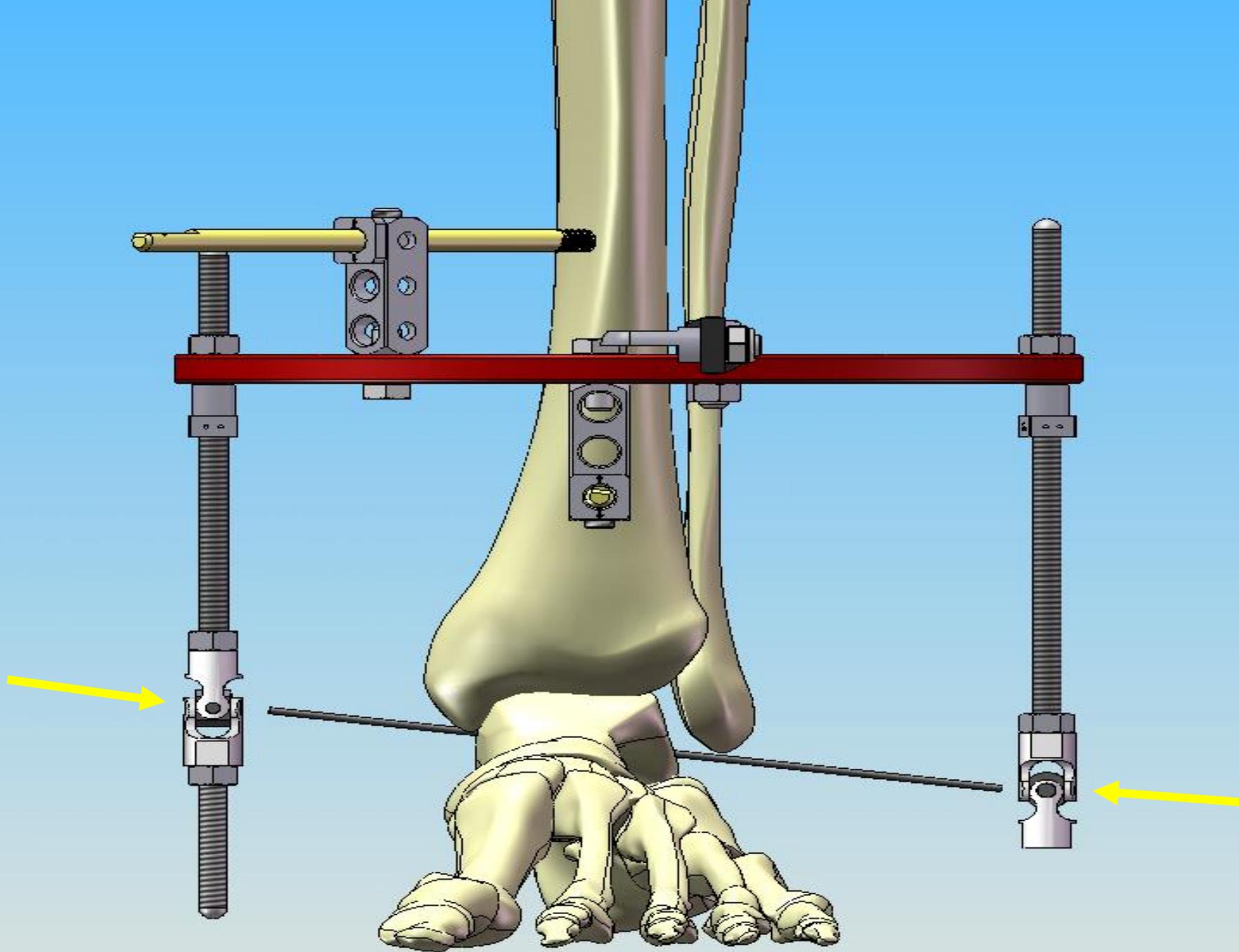
Insert Along
Malleolar
Axis



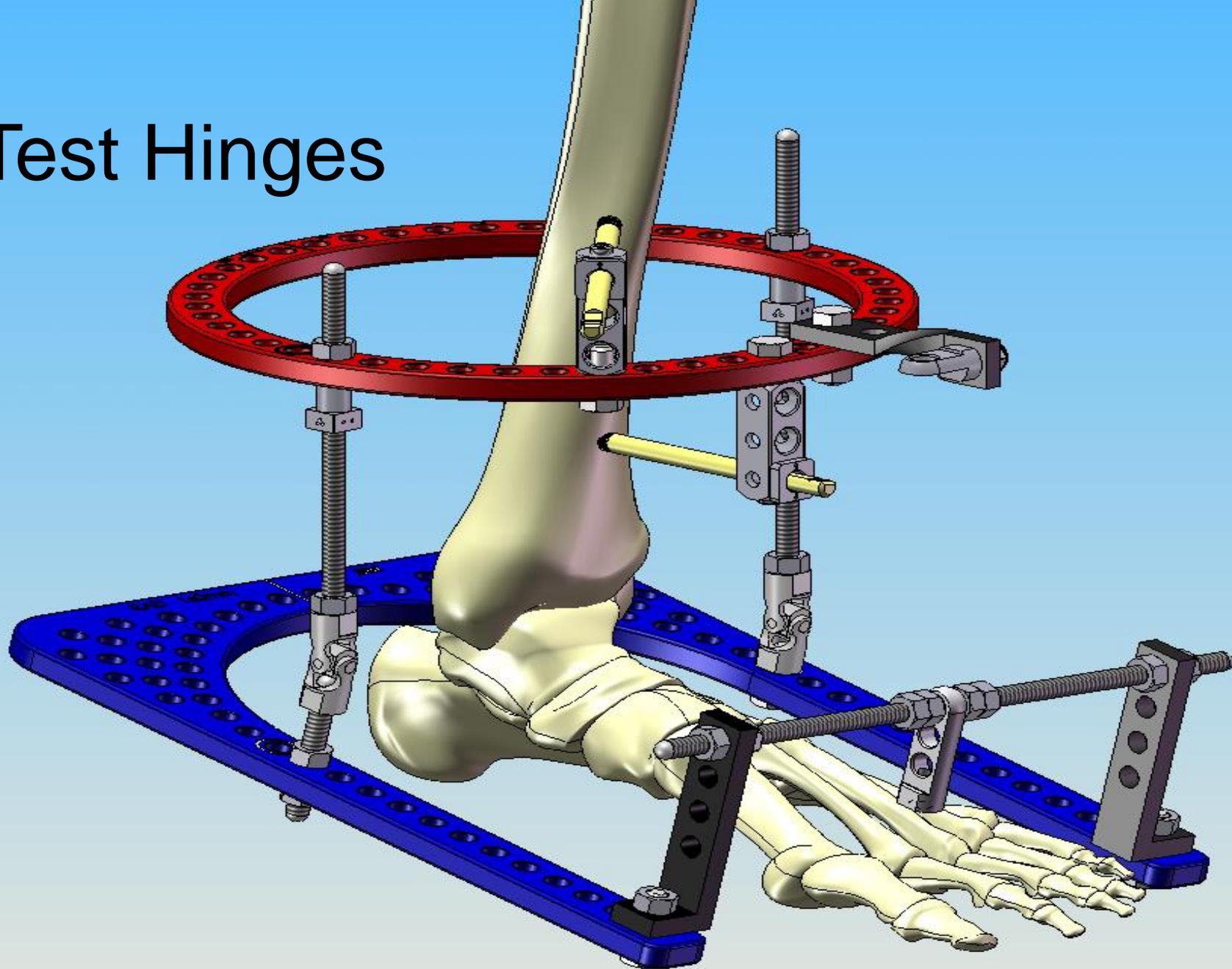


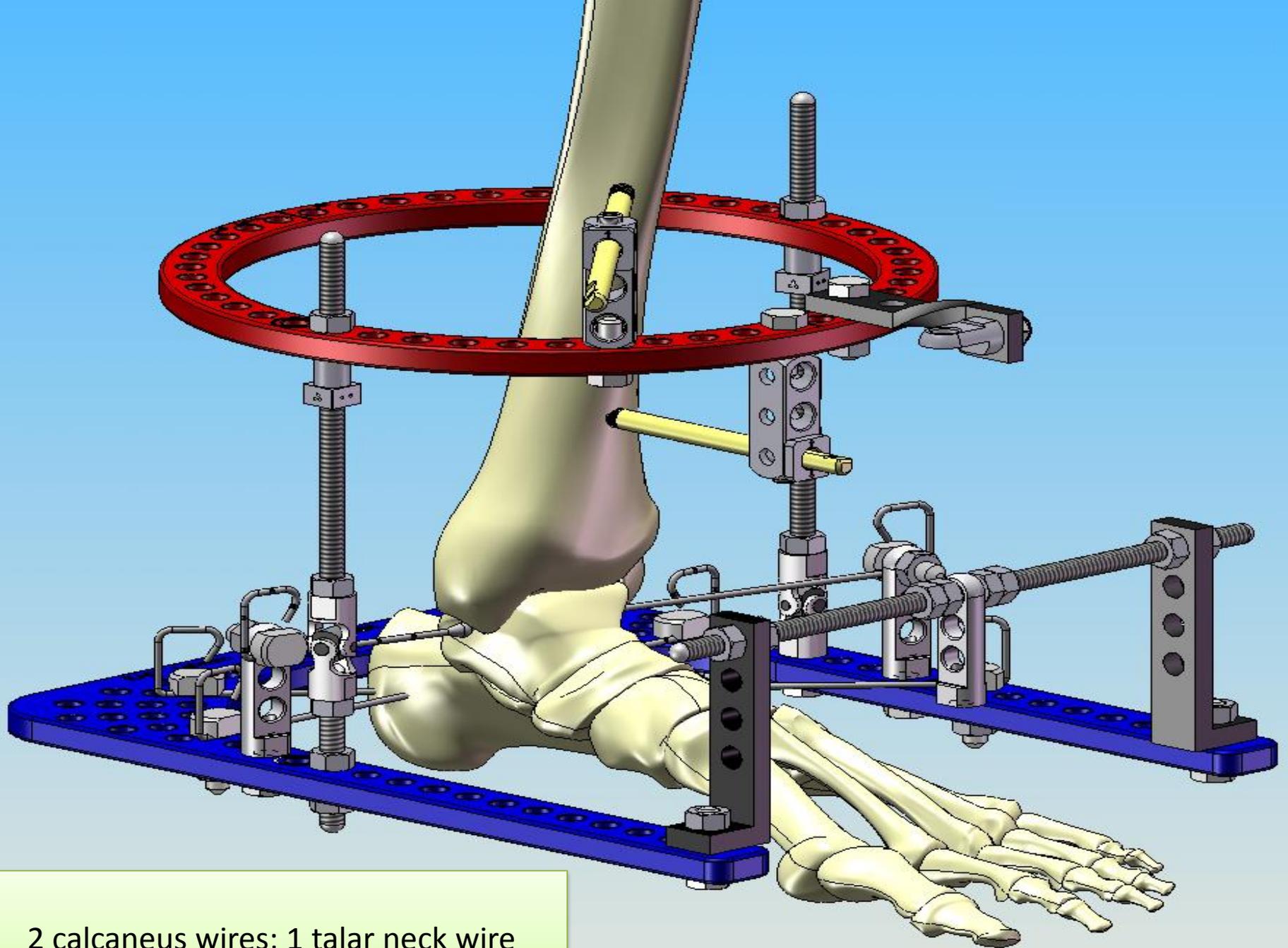


Align Hinges
with Wire

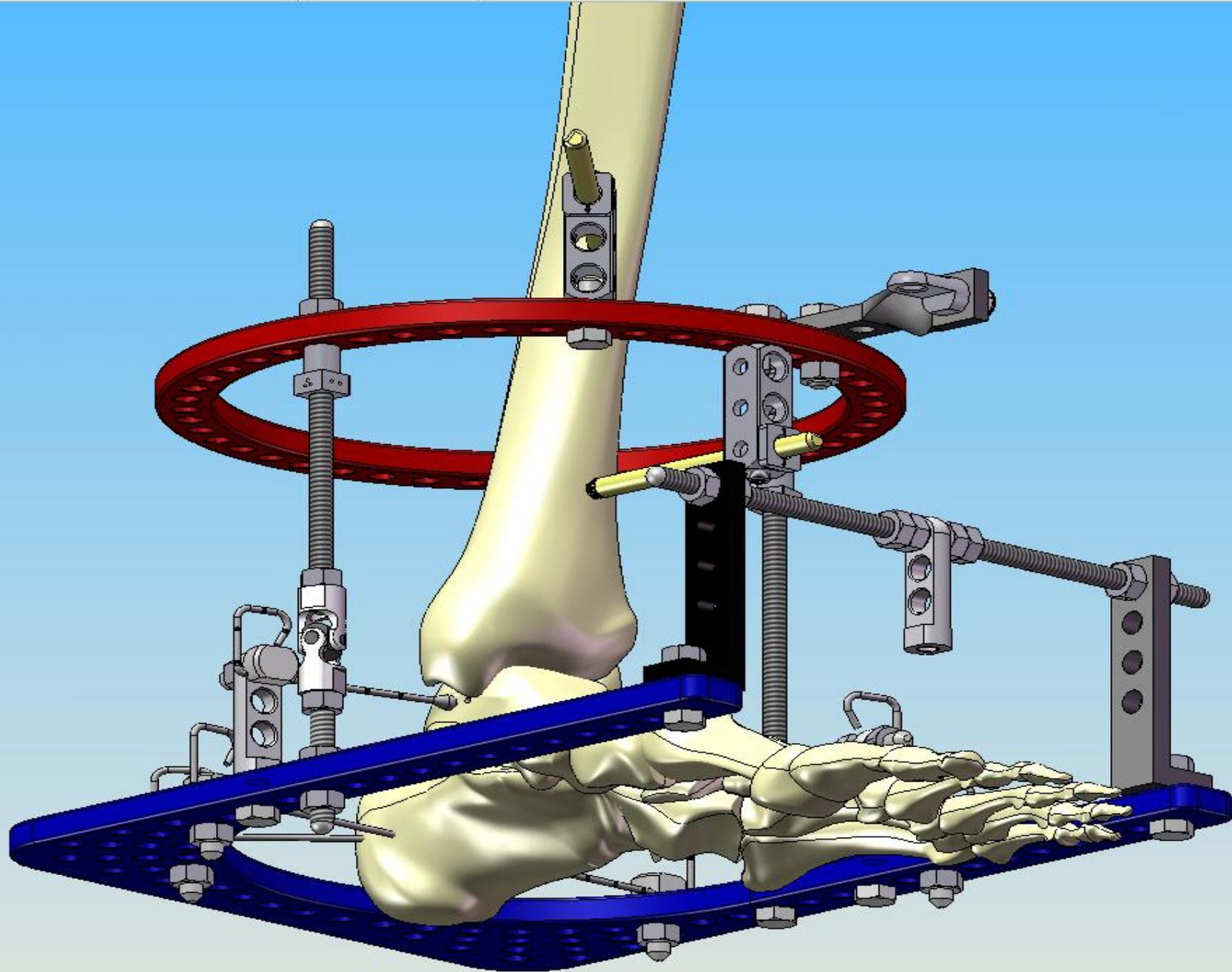


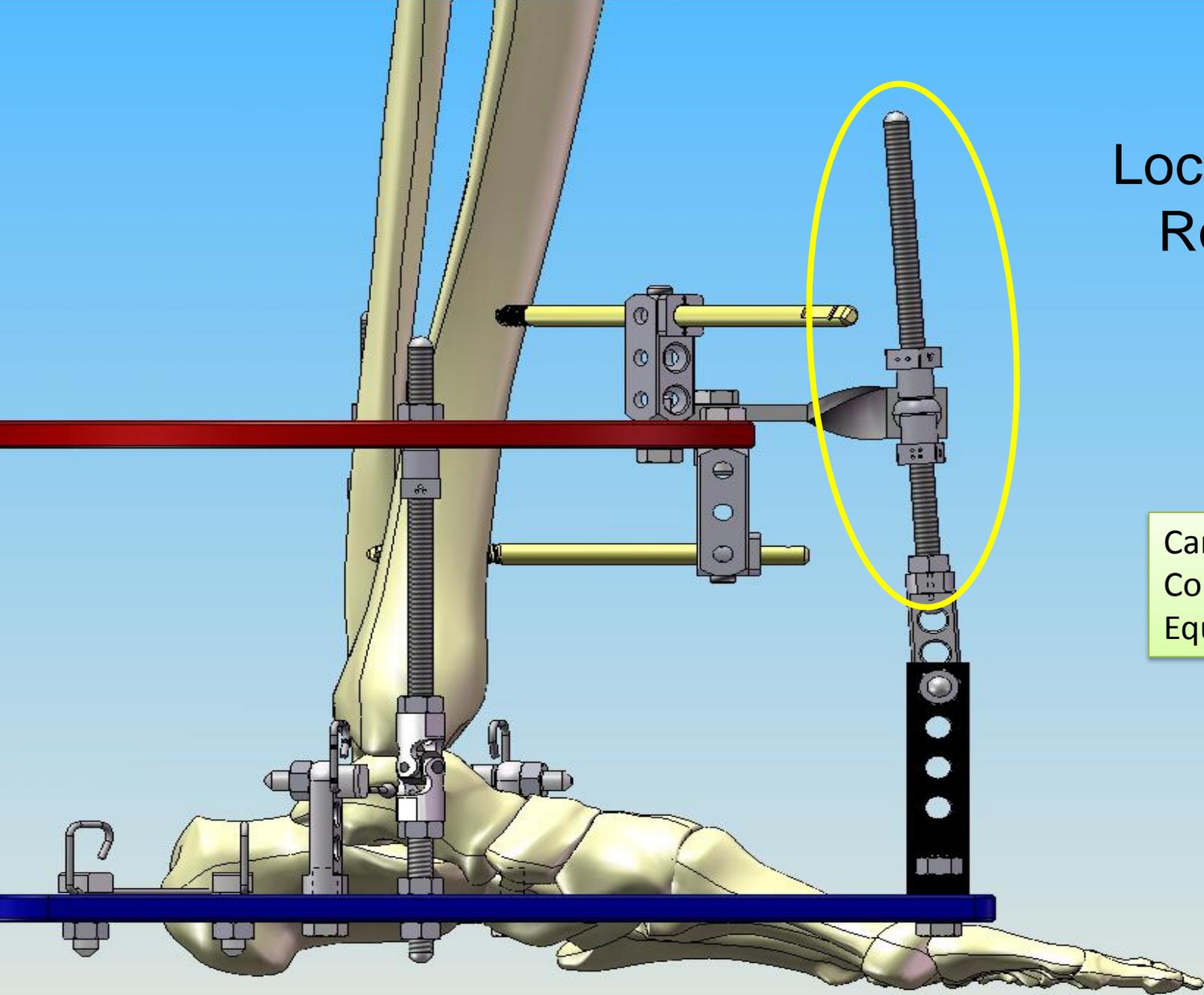
Test Hinges





2 calcaneus wires; 1 talar neck wire



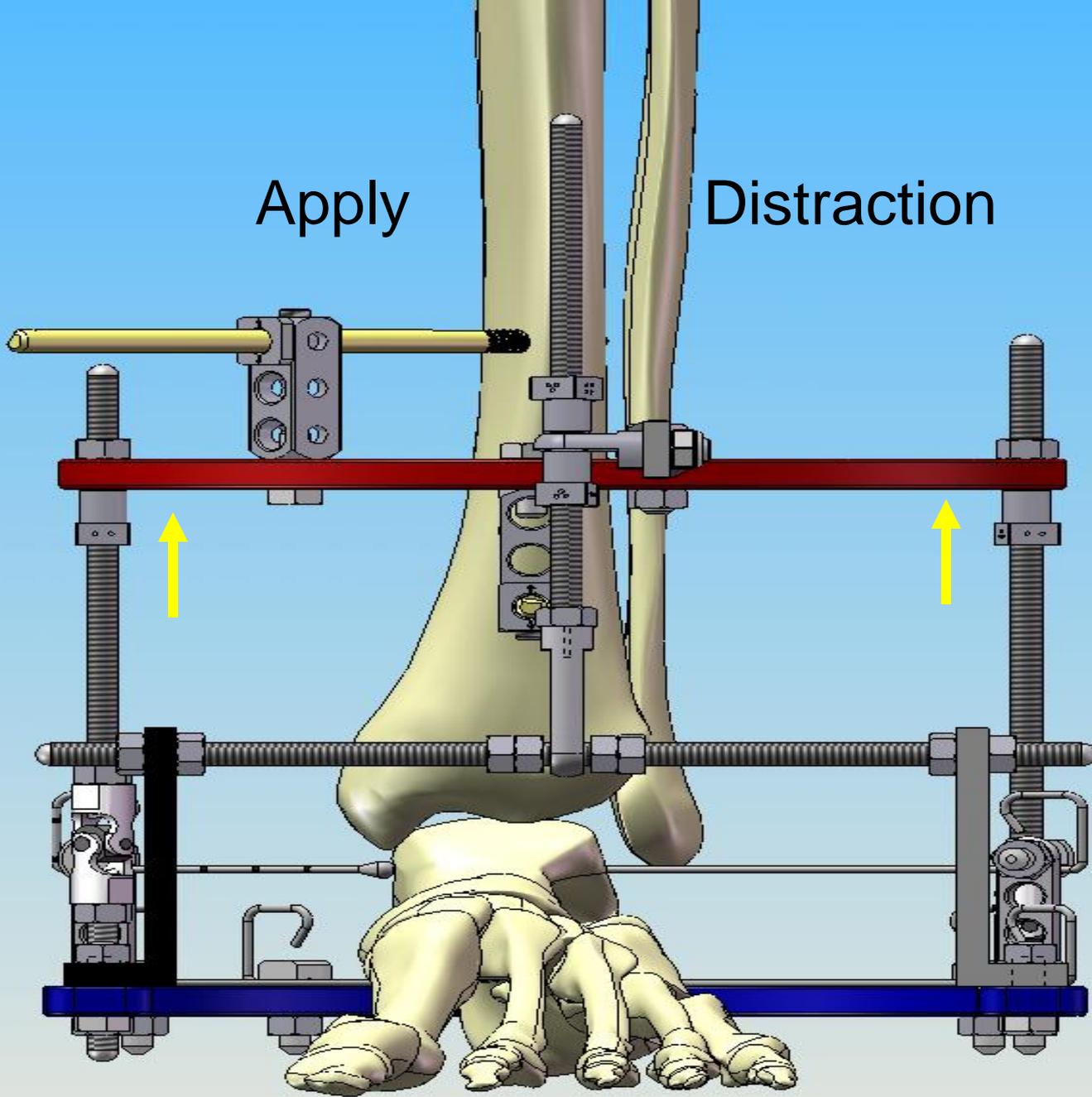


Locking
Rod

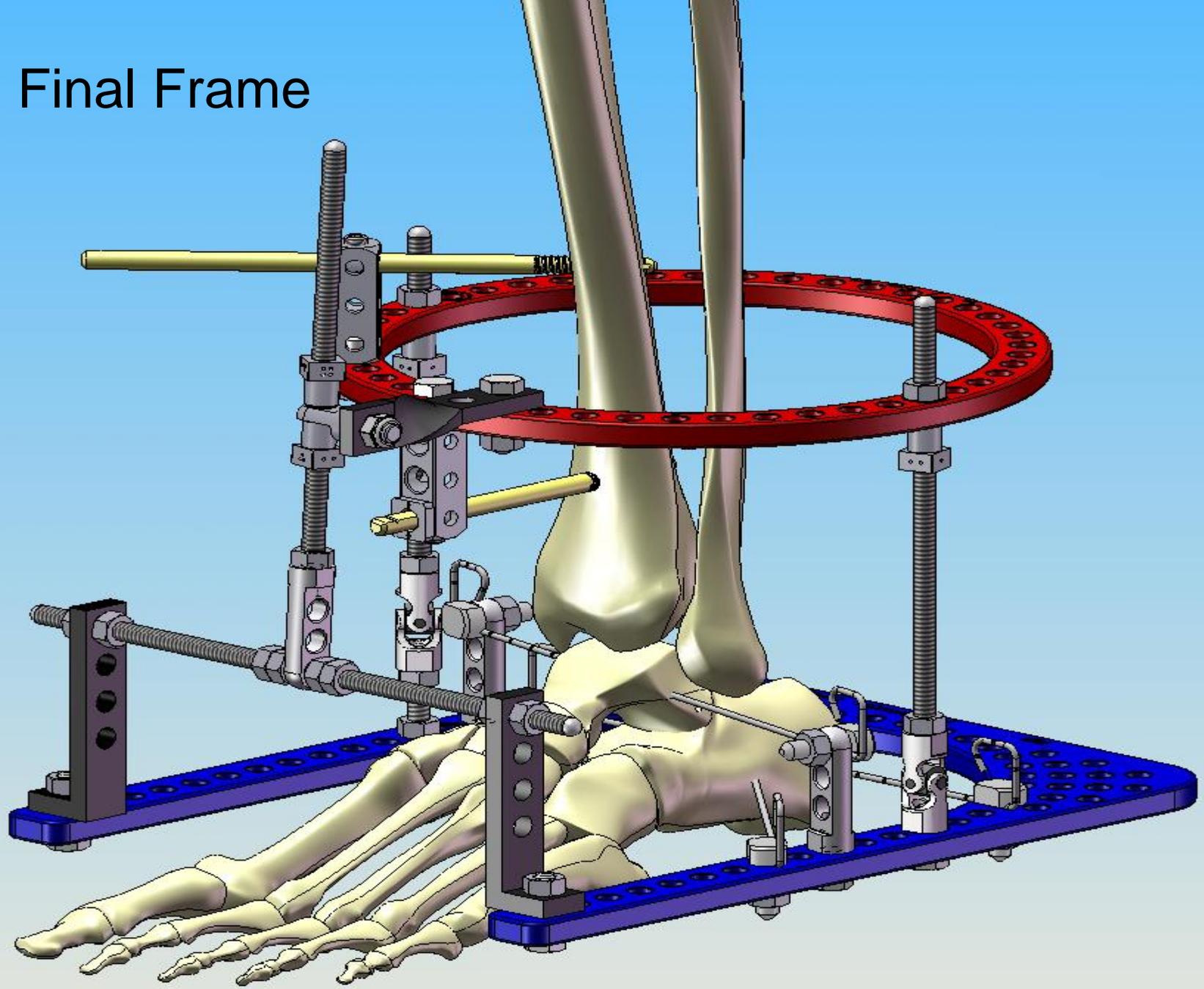
Can do gradual
Correction of
Equinus contx

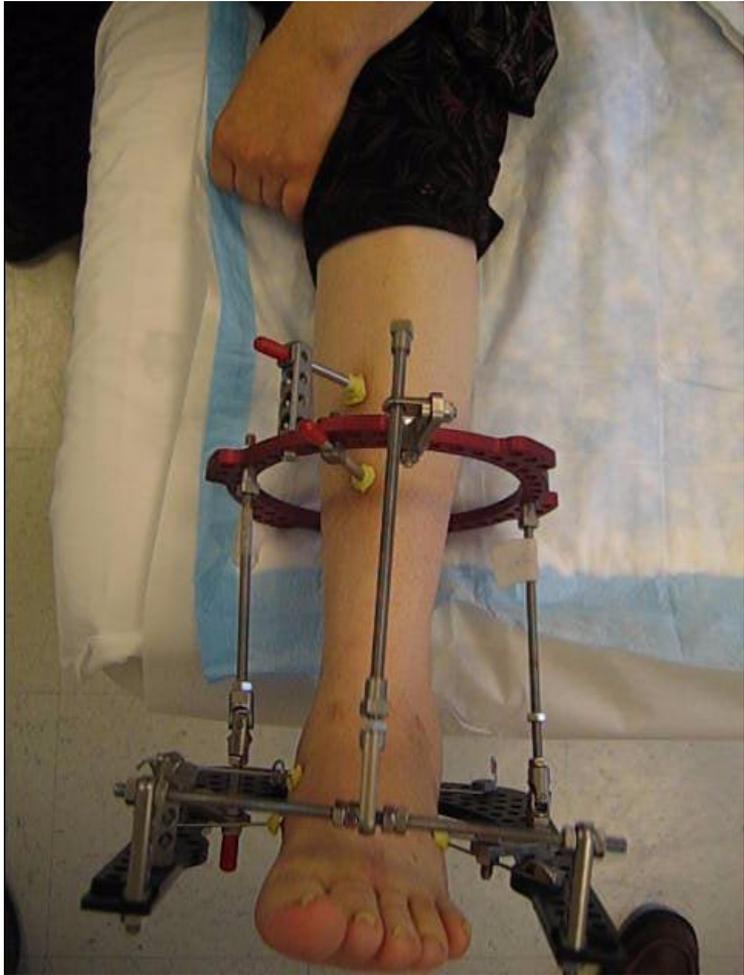
Apply

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

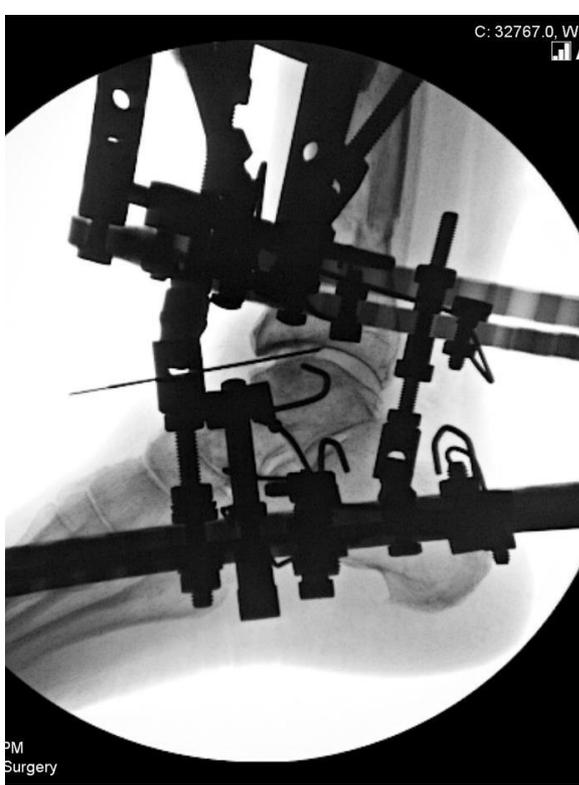
- AOFAS score improved from 55 to 74 *
- 91% of patients report improved pain
 - Best noted with increased follow-up
- Age not significant factor
 - Older patients tended to have better results
- Arc of motion maintained (38 deg.)
 - Improved DF in patients with equinus
- This was first 25 patients (f/u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

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

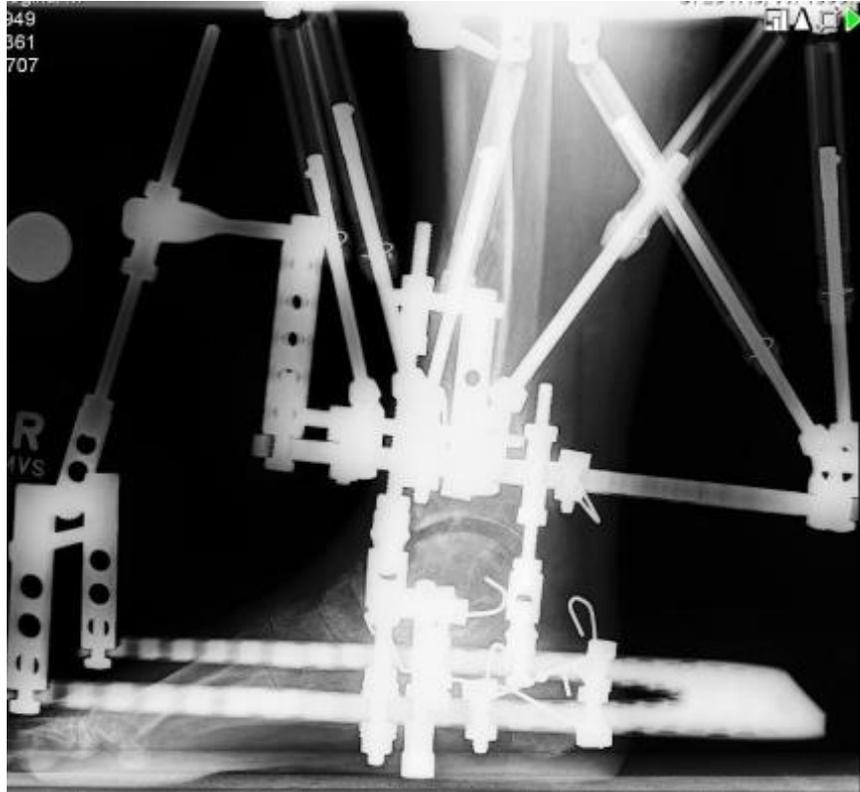
Author (Year)	Level of Evidence	Control Population	Diagnostic Groups Included	Length of Minimum Followup	Good and Excellent Outcome Rate	Study Type
van Valburg <i>et al</i> (1999)	II	None	Severe OA who were considered for arthrodesis	2 years	13/17 (76%)	Prospective
Marijnissen <i>et al</i> (2002)	II	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

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PM
Surgery



949
361
707



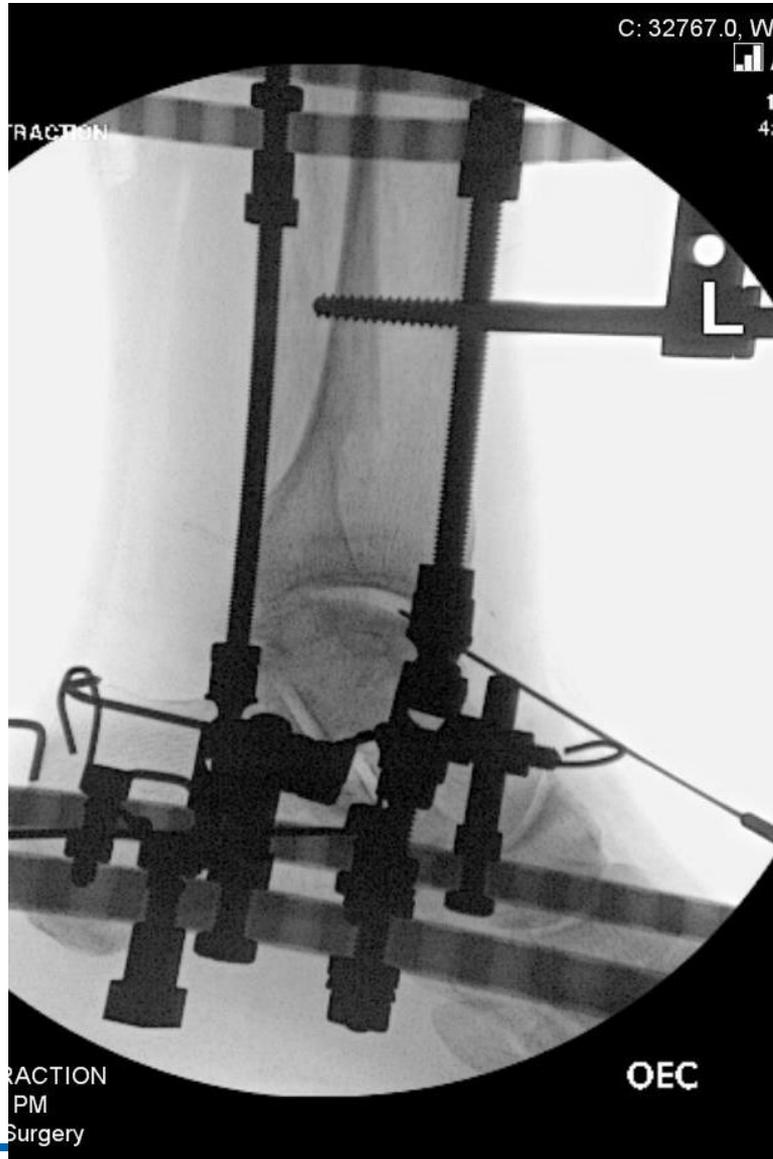




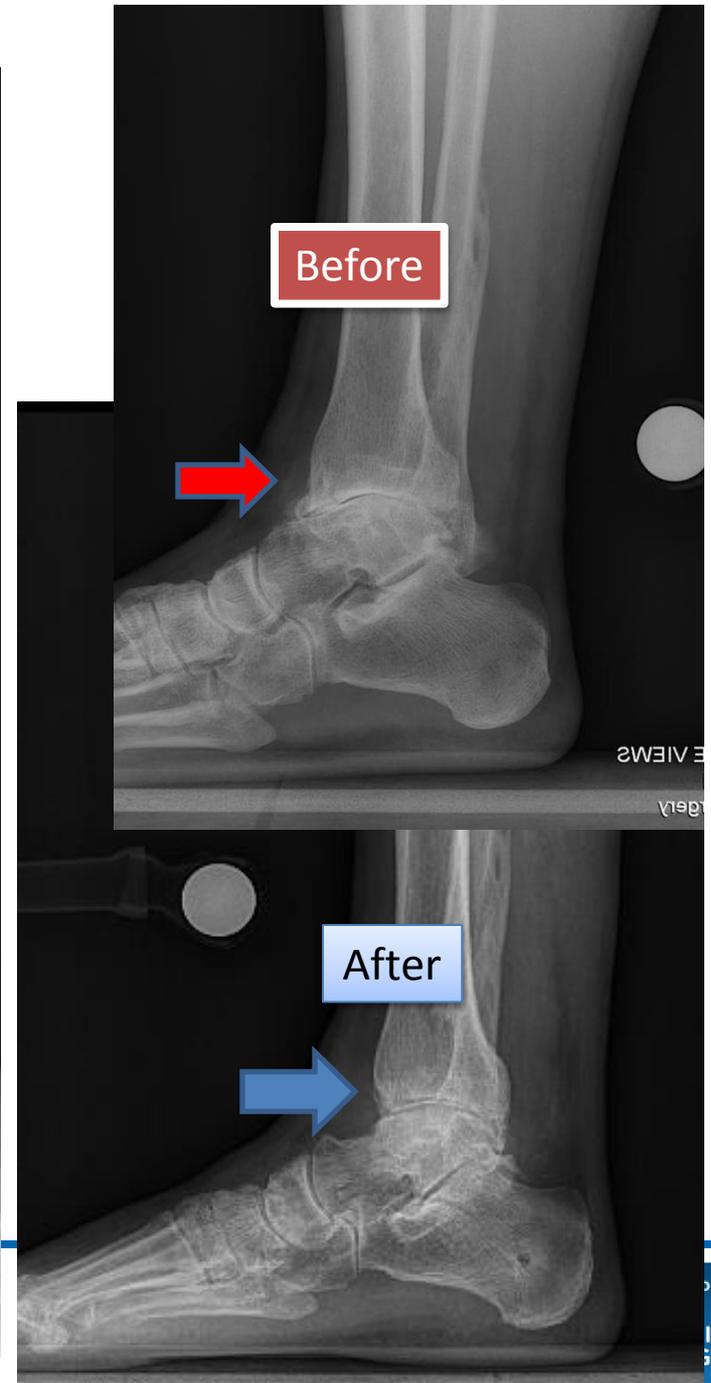
After Distraction +
SMO









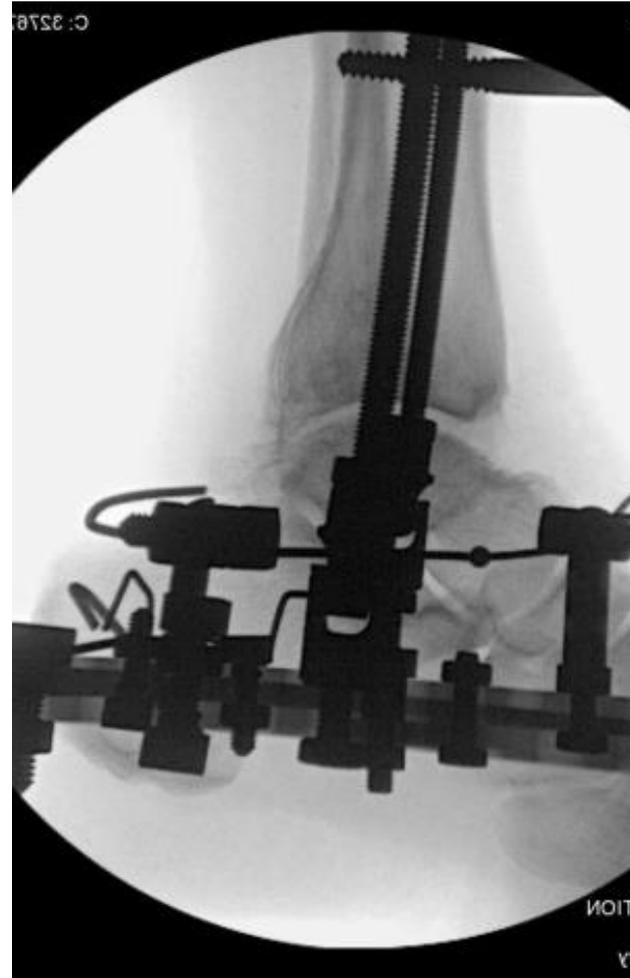




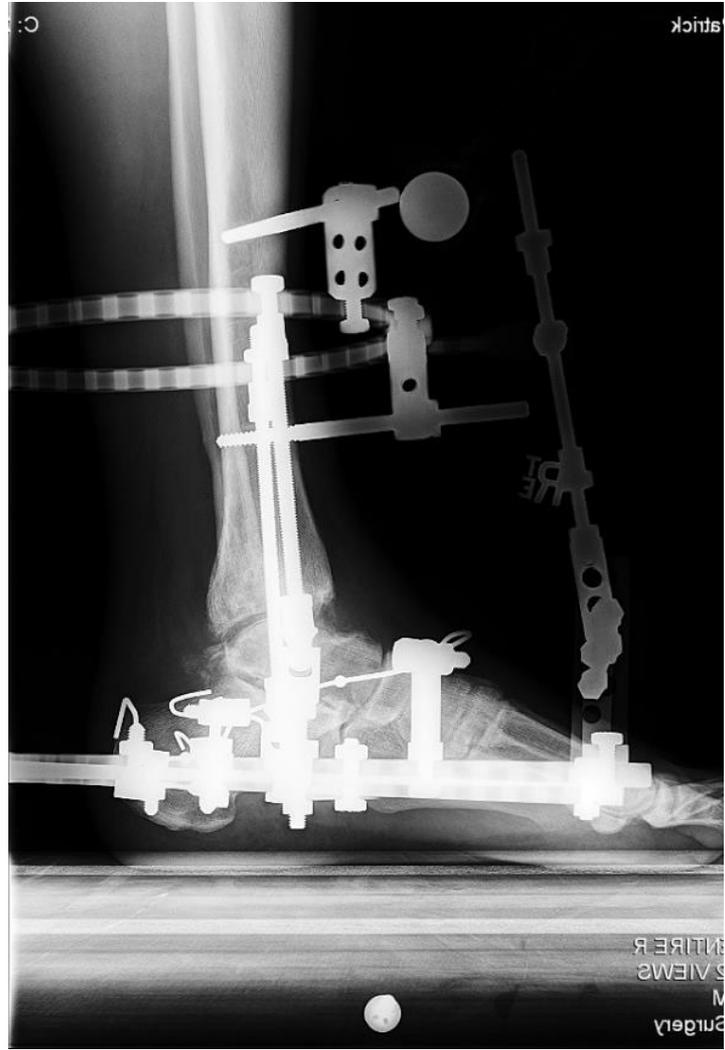
40 year old
Active man

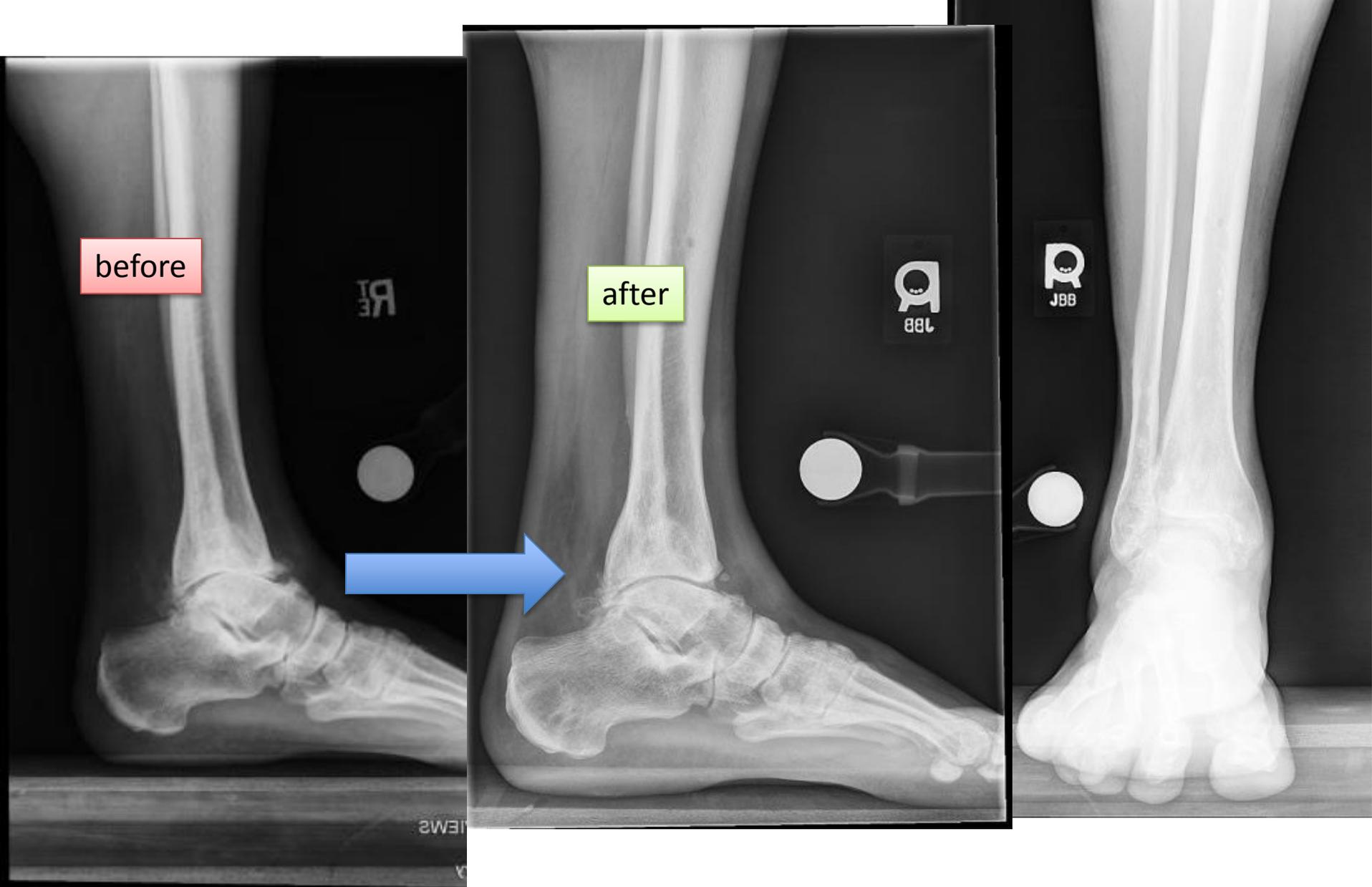
Played D1
College football

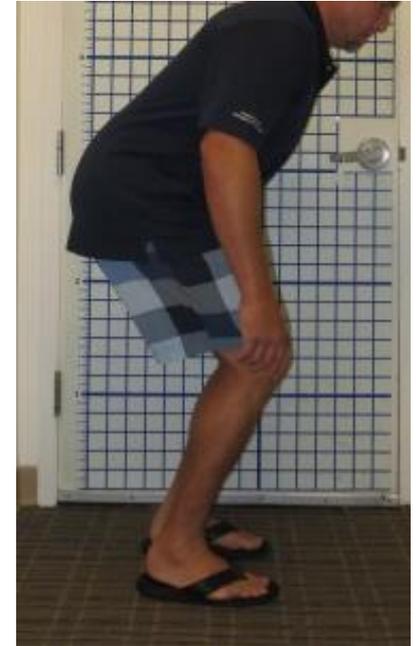
Joint space narrowing
Anterior osteophytes

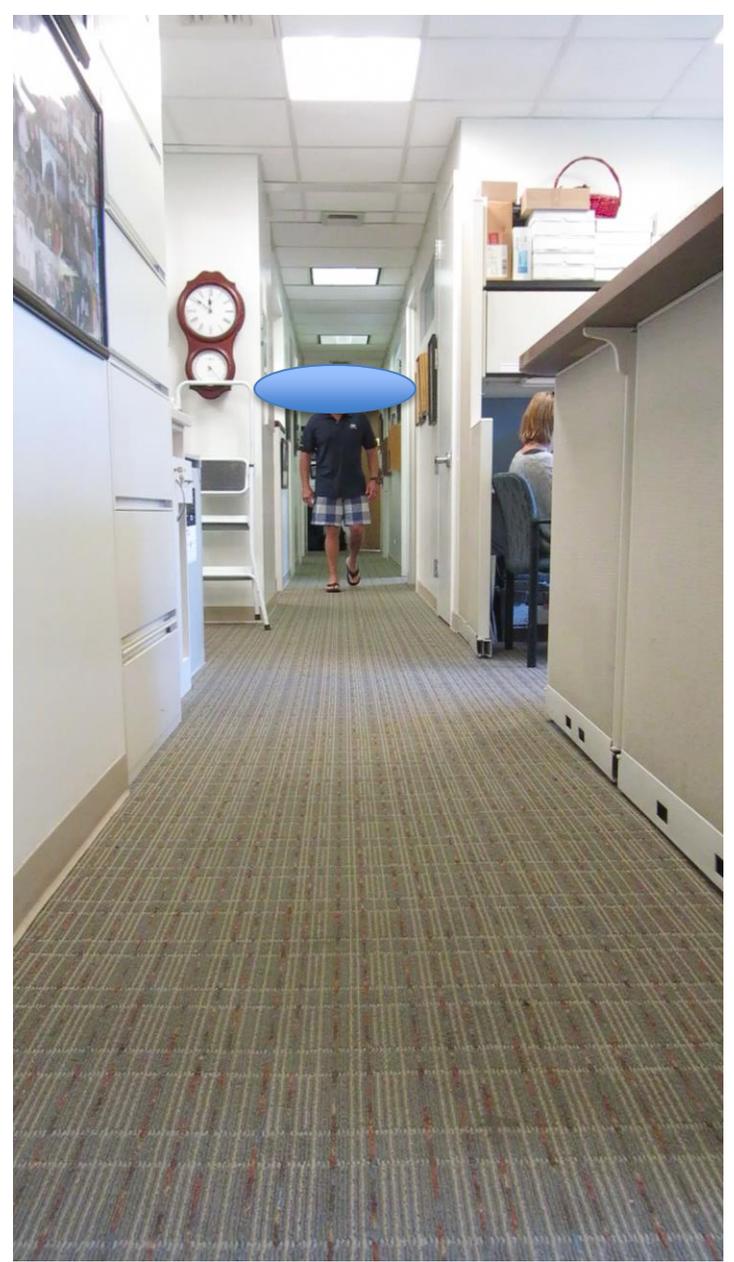


Joint distracted, anterior osteophytes removed, microfracture, BMAC











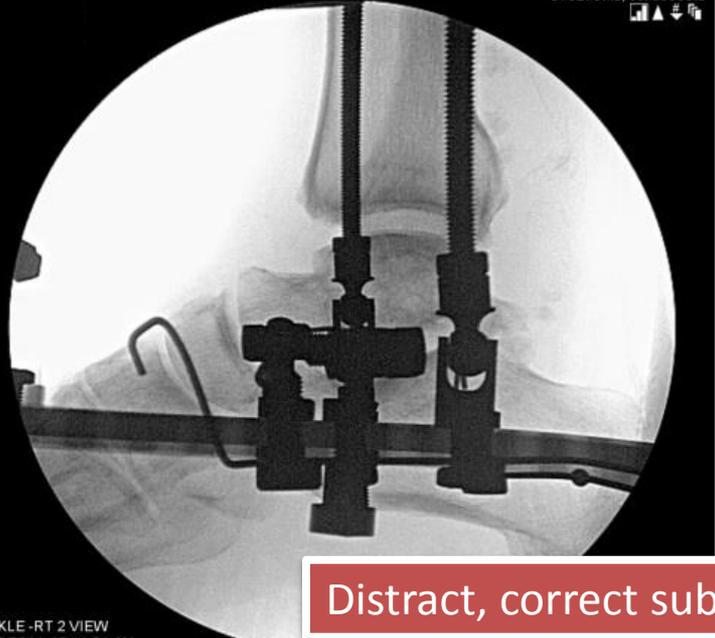
35 y/o male, post-traumatic OA, bone on bone, anterior subluxation of talus

C: 32767.0, W: 65535.0



ANKLE-RT 2 VIEW
8/20/2014, 10:44:00 AM
Hospital for Special Surgery

C: 32767.0, W: 65535.0



ANKLE-RT 2 VIEW
8/20/2014, 10:44:54 AM

Distract, correct subluation

C: 32767.0, W: 65535.0

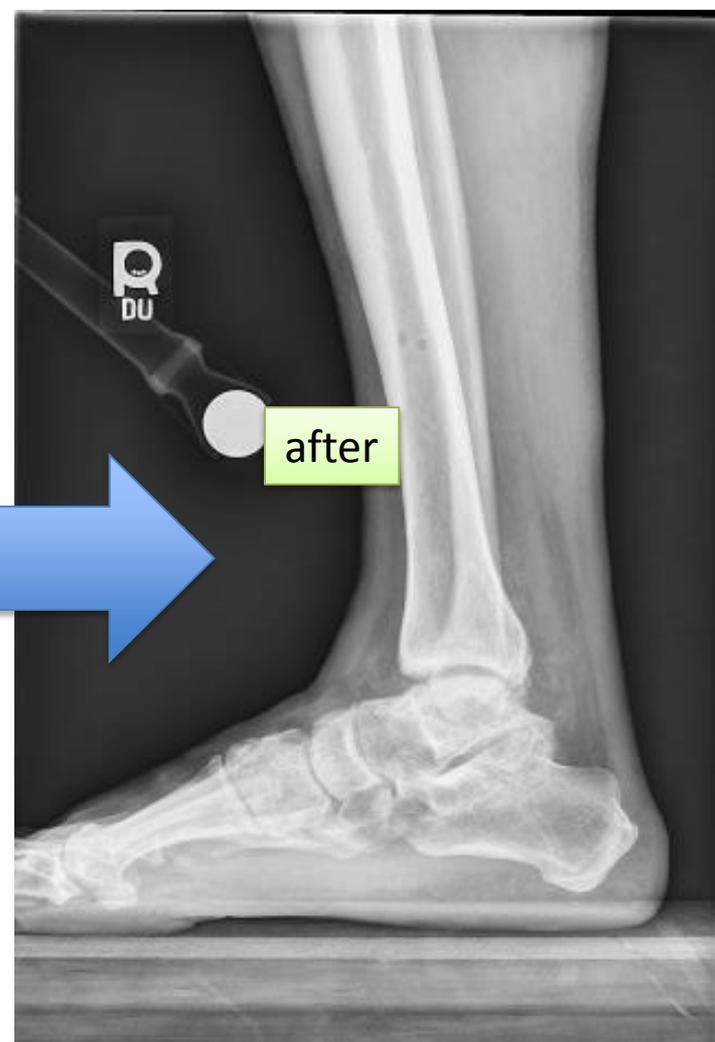
EI_s:



ANKLE-RT 2 VIEW
8/20/2014, 10:45:57 AM
Hospital for Special Surgery

EI_s:

BMAC, stem cell injection





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

RAD set is more manageable and less intimidating



Full lego set 1000 pieces
Full circular ex fix set



Specialized set, 28 pieces
More manageable

RAD tray

Marketing ideas

- Courses
 - Incorporate with STAR
 - Joint preservation for now
 - labs
- Case studies
- AOFAS, AAOS, LLRS meetings
- Visiting surgeon programs
- Relook at quality of components

Thank You



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