


Orthopaedica Belgica – Back to Basics
Lower extremity instructional course

Update on medical imaging in Foot and Ankle Surgery


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IT TAKES 2 MINUTES TO MAKE A PLAN ON THE X-RAY, BUT...

15 MINUTES TO FIT THAT PLAN TO THE PATIENT



BRUCE SANGEORZAN, UW, SEATTLE

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INTRODUCTION FOOT AND ANKLE IMAGING

▶ **WEIGHTBEARING X-RAY** is our first line modality in non traumatic disorders

▶ **ANATOMY:**

- ▶ 28 bones
- ▶ 33 Joints

→ Superposition on X-RAY




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RADIOGRAPHIC WORK UP

▶ First line imaging: four cliches

▶ Ankle: Anterior posterior (Meary, AP view) Posterior- AnteriorPA

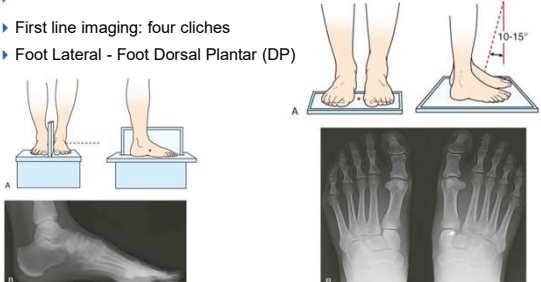


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RADIOGRAPHIC WORK UP

▶ First line imaging: four cliches

▶ Foot Lateral - Foot Dorsal Plantar (DP)



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ULTRASONOGRAPHY

▶ Can be part of first line imaging

▶ Guide injections

▶ Dynamic investigation

▶ Conflict metal ware

▶ Guide Surgery?



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Nuclear imaging

- ▶ SPECT CT
- ▶ White bloodcell scan
- ▶ PET CT (MRI!)

Occult fracture visible within 72h

Diabetic foot ulcers

Activity osteomyelitis

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Magnetic Resonance Imaging

- ▶ Syndesmotic ligament injury, OCD laesions, tendinopathy,...
- ▶ Currently 3T MRI --> Coming soon 7T MRI

▶ 3T MRI Ankle

▶ 7T MRI Ankle

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Weightbearing Cone beam CT imaging

- ▶ New generation imaging devices are able to scan the entire lower limb

- ▶ Radiation dose 6 foot radiographs and lower then classic full leg imaging

Characteristic	Dose, mSv	Radiograph	Radiation dose (mSv)
Average US background radioactivity	3.0		
Single transatlantic flight	0.04	Knee set	0.005
Radiograph: chest (A-P)	0.02	Full leg low dose	5.78
Radiograph: foot (single exposure)	0.001	Full leg cone beam	1.514
Conventional computed tomography: pelvis	15	Foot/Ankle set	0.006
Conventional computed tomography: ankle	0.01		
Cone-beam weightbearing computed tomography: foot/ankle	0.01-0.03		
Isotope (99m-Tc-MDP) bone scan	6.3		

Barg M, Bailey T, Walsh W, Richter M, Cesar N, Lintz F, Burssems A, Phinit P, Hanrahan C, Saltzman C. Weightbearing Computed Tomography of the Foot and Ankle: Emerging Technology. Topical Review. Foot Ankle Int. 2018;39(3):376-386.

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Weightbearing Cone beam CT imaging

- ▶ Overcomes superposition of weightbearing X-rays
- ▶ Allows 3D rendering of osseous structures
 - Manual segmentation --> Automated segmentation
 - Manual measurements --> Automated measurements

Burssems A, Susdorf R, Peterhans U, Ruiz R, Barg A, Hintermann B. Supramalleolar Osteotomy Alters the Subtalar Joint Alignment. Weightbearing CT Scans. Foot Ankle Int. 2022;43(9):1194-1201.

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Weightbearing Cone beam CT imaging

- ▶ Allows construction of patient specific guides: dr Buedts and dr Van Oevelen
- ▶ Allows dynamic testing of ankle syndesmosis with dr Peiffer and dr Tampere

¹¹⁴ Faict S, Burssems A, Van Oevelen A, Maackelberg L, Buedts K. Correction of Ankle Varus Deformity using Patient Specific Dome Shaped Osteotomy Guides designed on Weight Bearing CT: A Pilot Study. Archives of Orthopaedics and Traumatology 2021

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Conclusion


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Volg ons op

Thank you for your attention!

Questions?

