Getting the Most of Your 3DRA System: 3 Perspectives on Equipment Capabilities and Limitations

Philips Equipment

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Disclosures

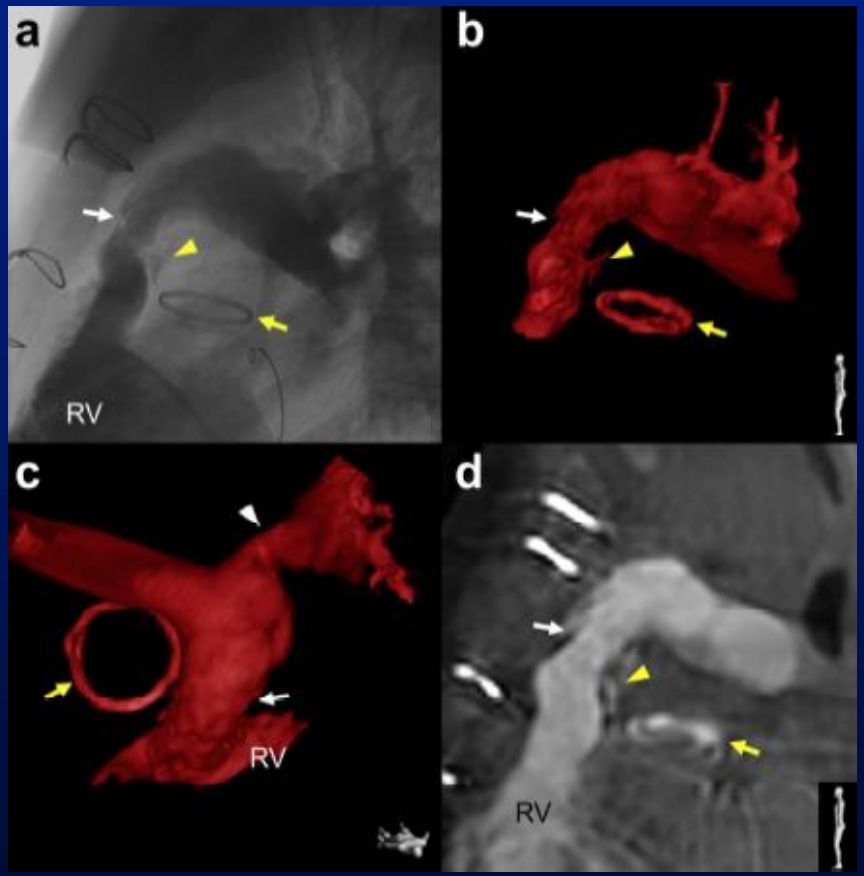
Philips Healthcare:

Grant support

Speaking Bureau / Teaching

3DRA
Diagnostic Capabilities

- Multiple reports of diagnostic utility
- Radiation exposure not increased



Glatz , *J Am Coll Cardiol Img*. 2010;3:1149-57

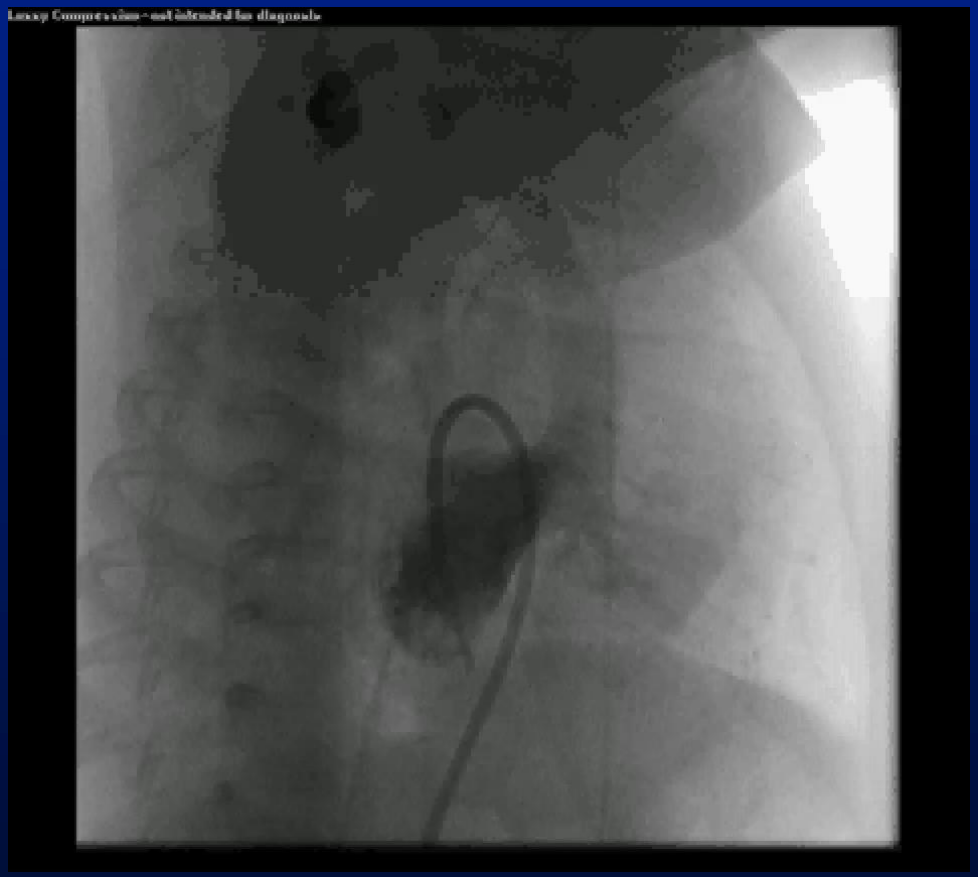
Glockler, *Eur Radiol.* 2011;21:2511-2520

Berman, *CCI.* 80:922–930

Aldoss, *Pediatr Cardiol.* 2016 Oct;37(7):1211-21

Stenger, *Pediatr Cardiol.* 2016 Mar;37(3):528-36

3D Rotational Angiography
3DRA



- 240^0 acquisition over 4 sec
  - RAO 120^0 to LAO 120^0
  - 30 fps
  - Expiratory breathhold
- Contrast Injection
  - Uniform opacification throughout
- We have not utilized RRVP

3DRA
Contrast Injection Protocols

- Uniform opacification through 4s acquisition
- Contrast diluted 2/1 with saline
- Delivered proximal to area of interest
- Contrast dose
  - Arterial structures: 2cc/kg
  - Venous structures (Glenn; Fontan): 2cc/kg
  - Shunts/Coronary/other: Varies depending on structure
    - With or without proximal balloon occlusion

Aldoss, *Pediatr Cardiol.* 2016 Oct;37(7):1211-21

3DRA
Rotation

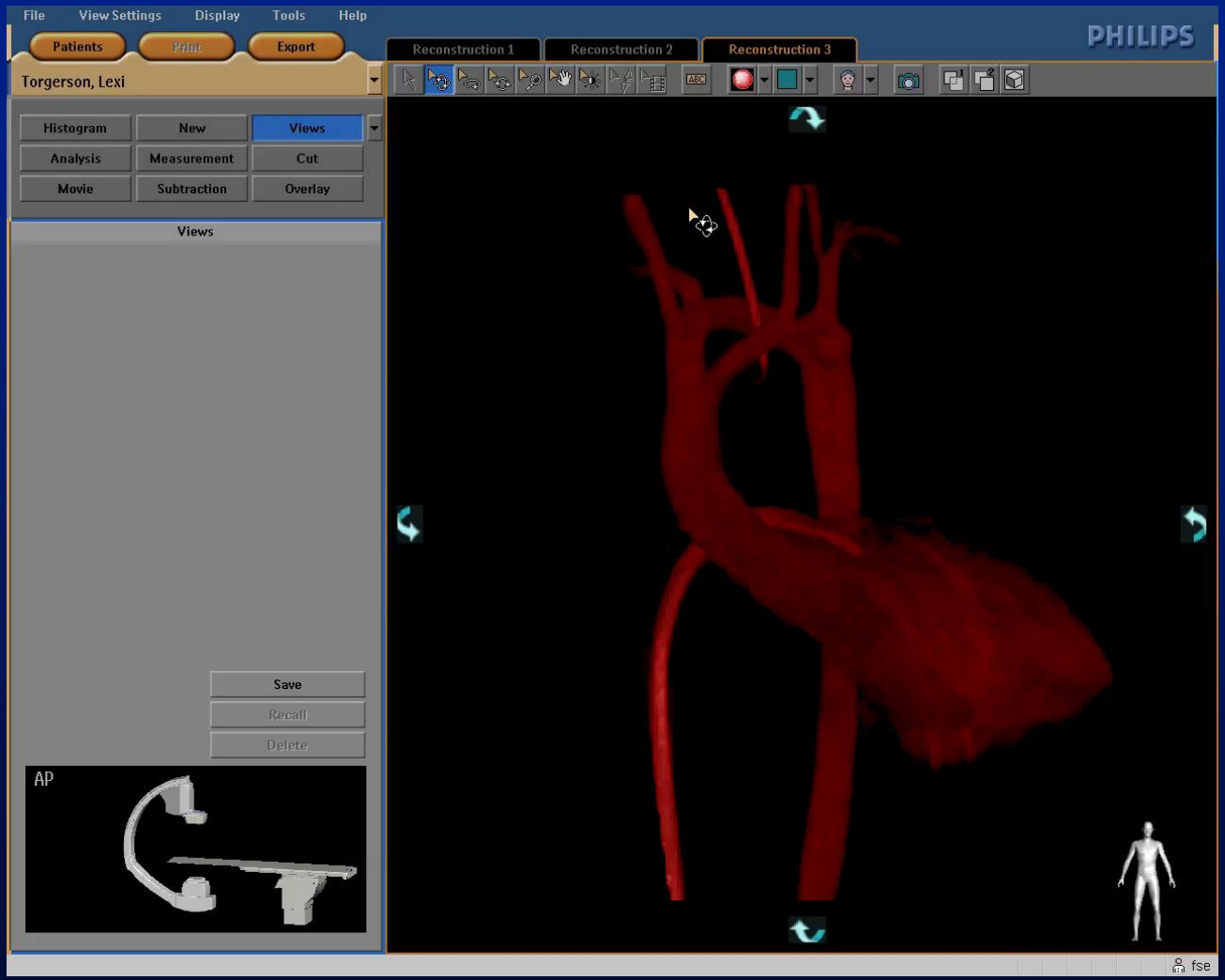
3DRA
3-Dimensional Reconstruction

- CT-like reconstruction algorithms applied
- Workstation or bedside controls

3-Dimensional Reconstruction
Window Leveling / Cropping

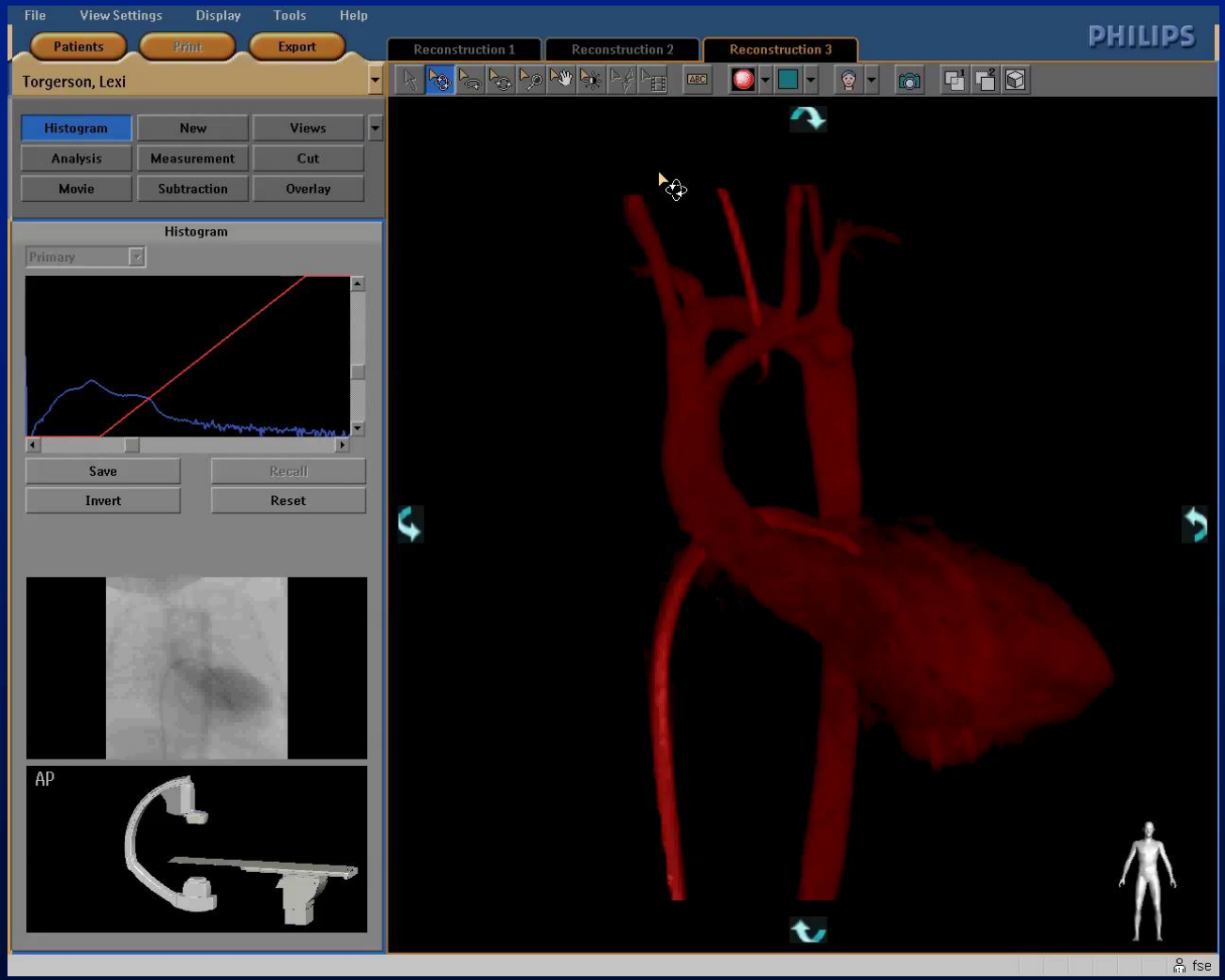
- Workstation or bedside controls

3-Dimensional Reconstruction
Orientation Windows



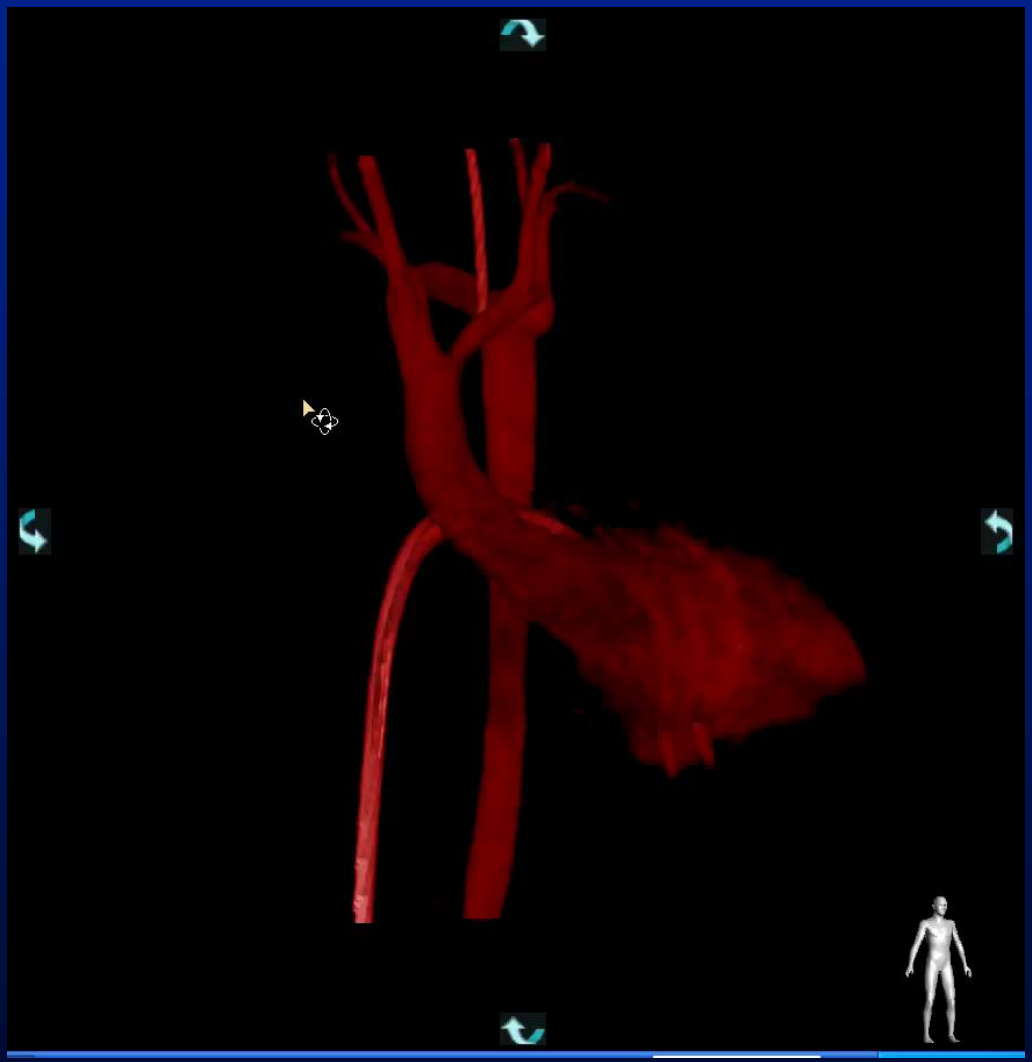
- Workstation or bedside controls

3-Dimensional Reconstruction
Render Modes



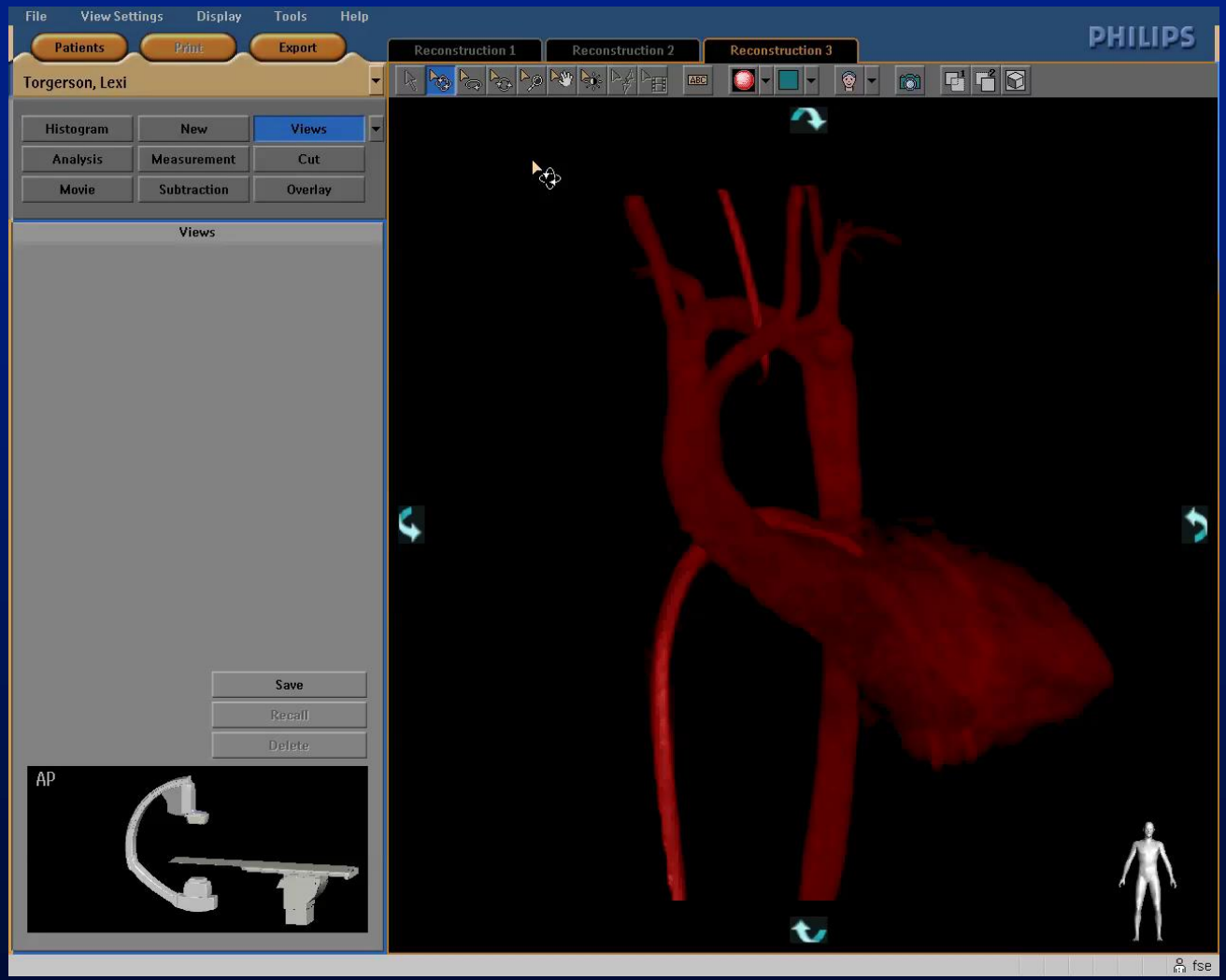
- Workstation or bedside controls

3-Dimensional Reconstruction
Cut Planes



- Workstation or bedside controls

3-Dimensional Reconstruction
Create Videos



- Workstation or bedside controls

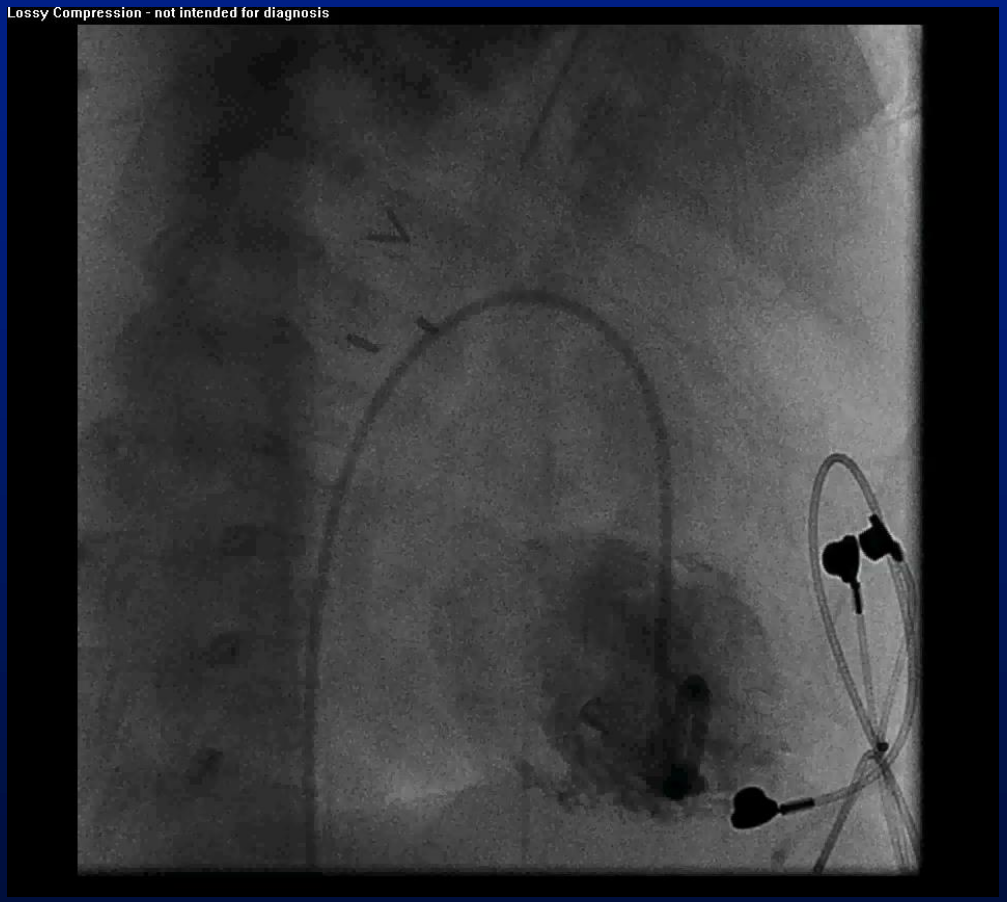
3-Dimensional Reconstruction
Export Files

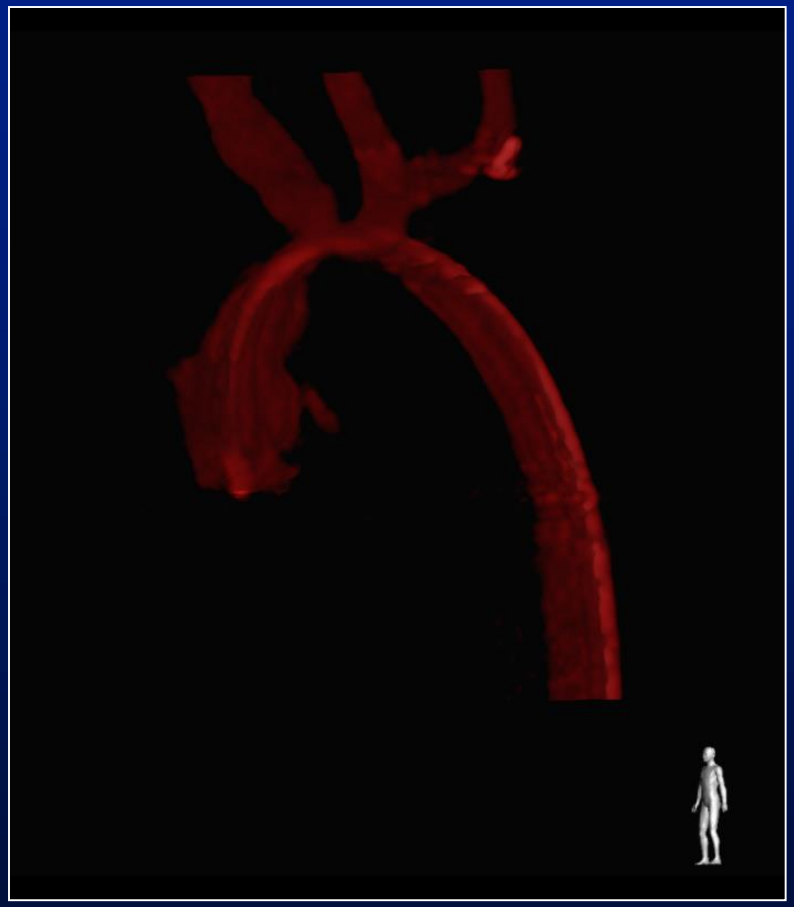
- Workstation or bedside controls

3DRA
Multiplanar Reformat

- Workstation or bedside controls

3DRA
Registration





- All coordinates of gantry and table known

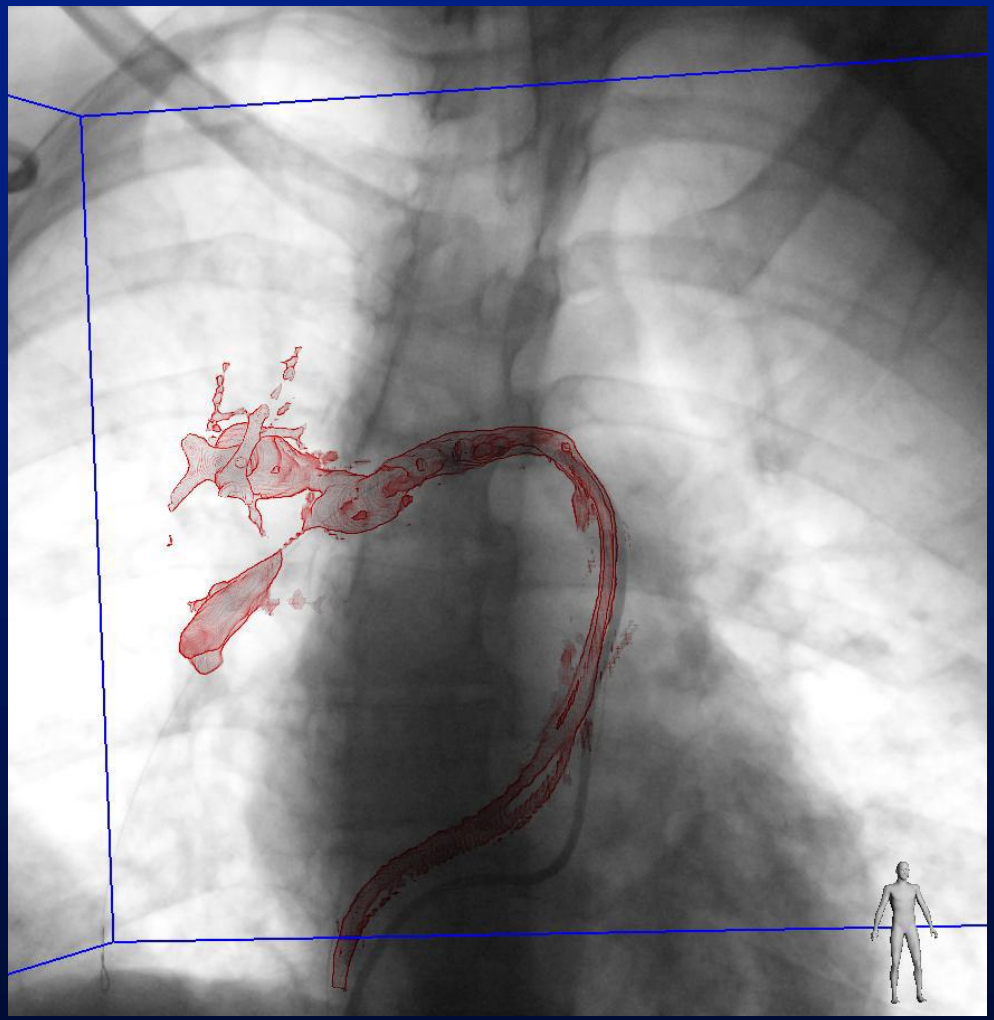
3DRA
Registration

Interventional Guidance
3DRA Overlay

- 31 yo Isolated PA post 6 mm conduit

Fagan , *Catheter Cardiovasc Interv*. 2012 Feb 15;79(3):414-21

Interventional Guidance
3DRA Overlay



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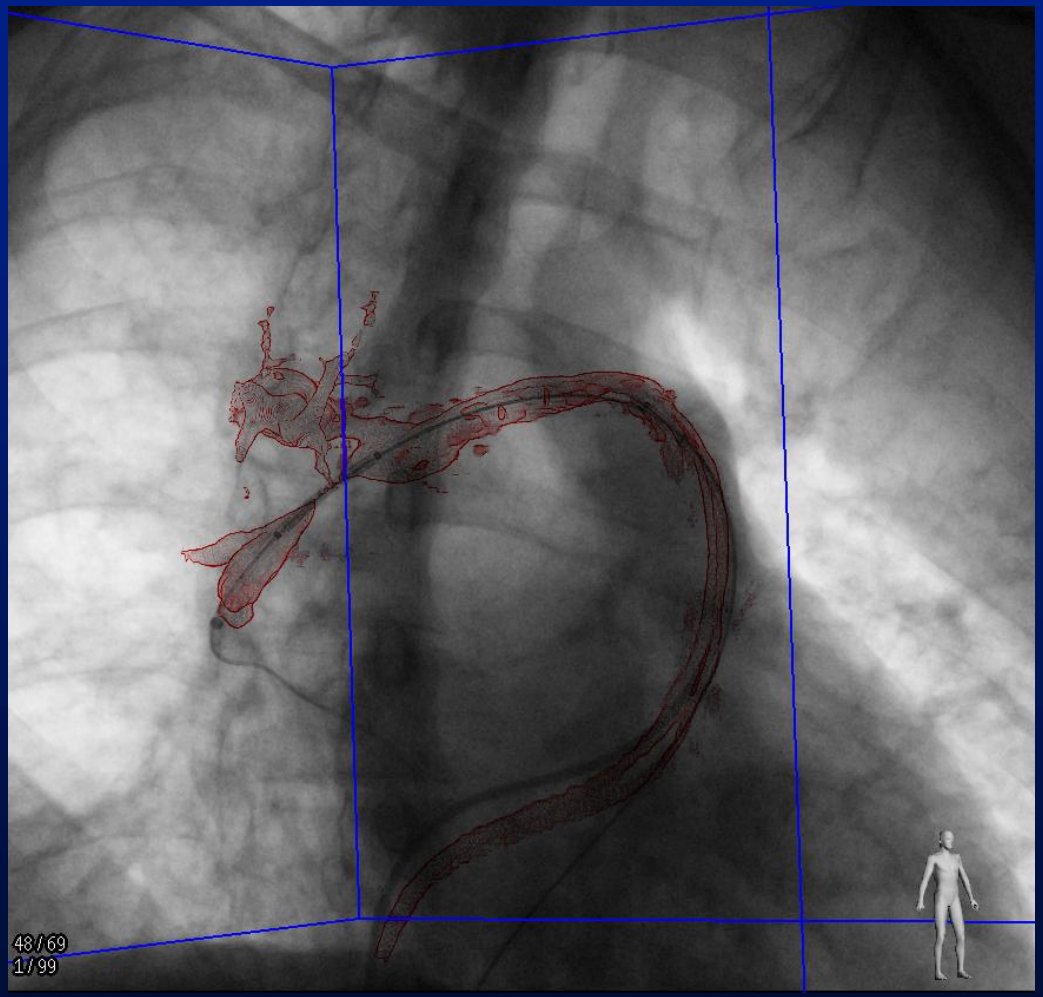
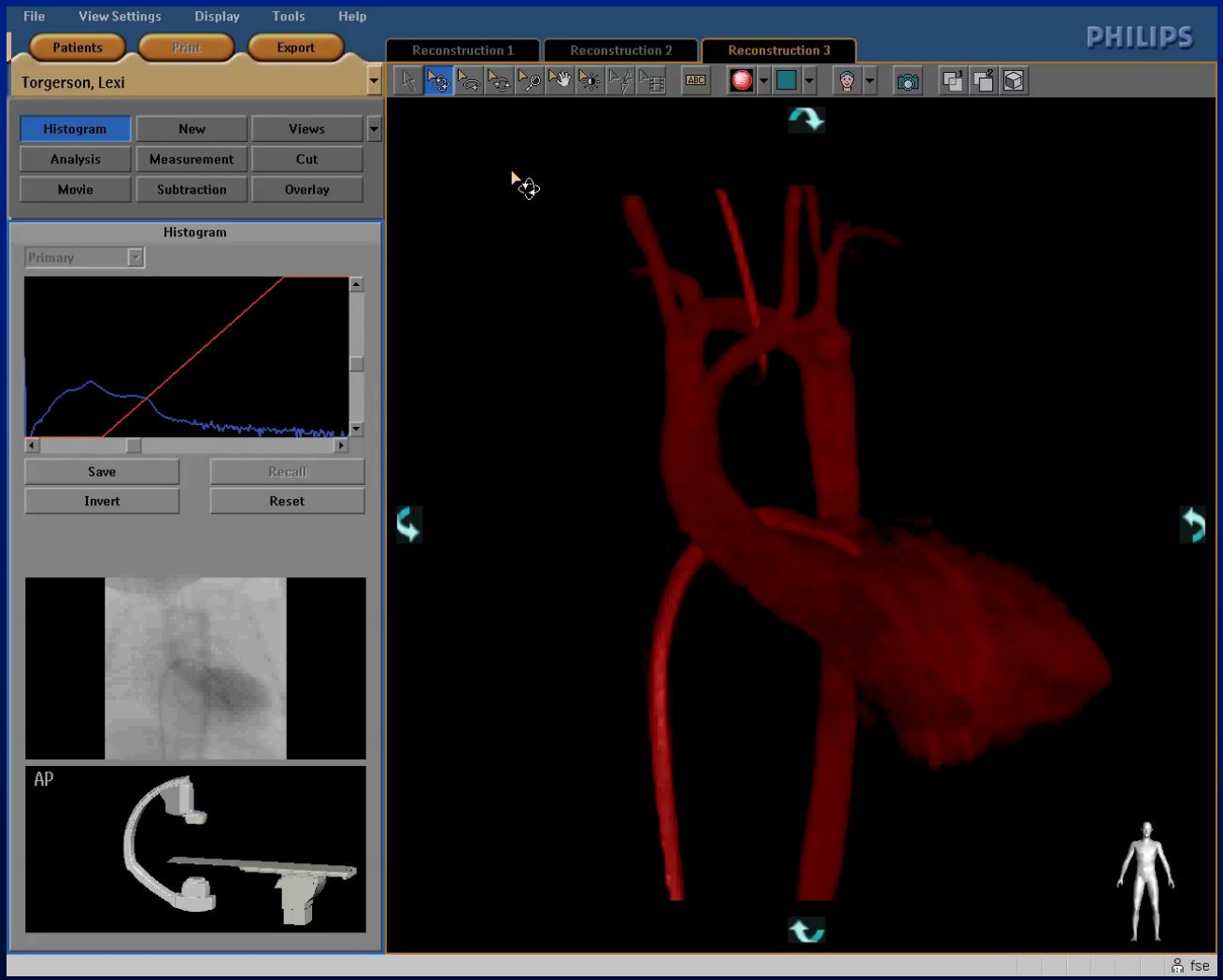
Interventional Guidance
3DRA Overlay

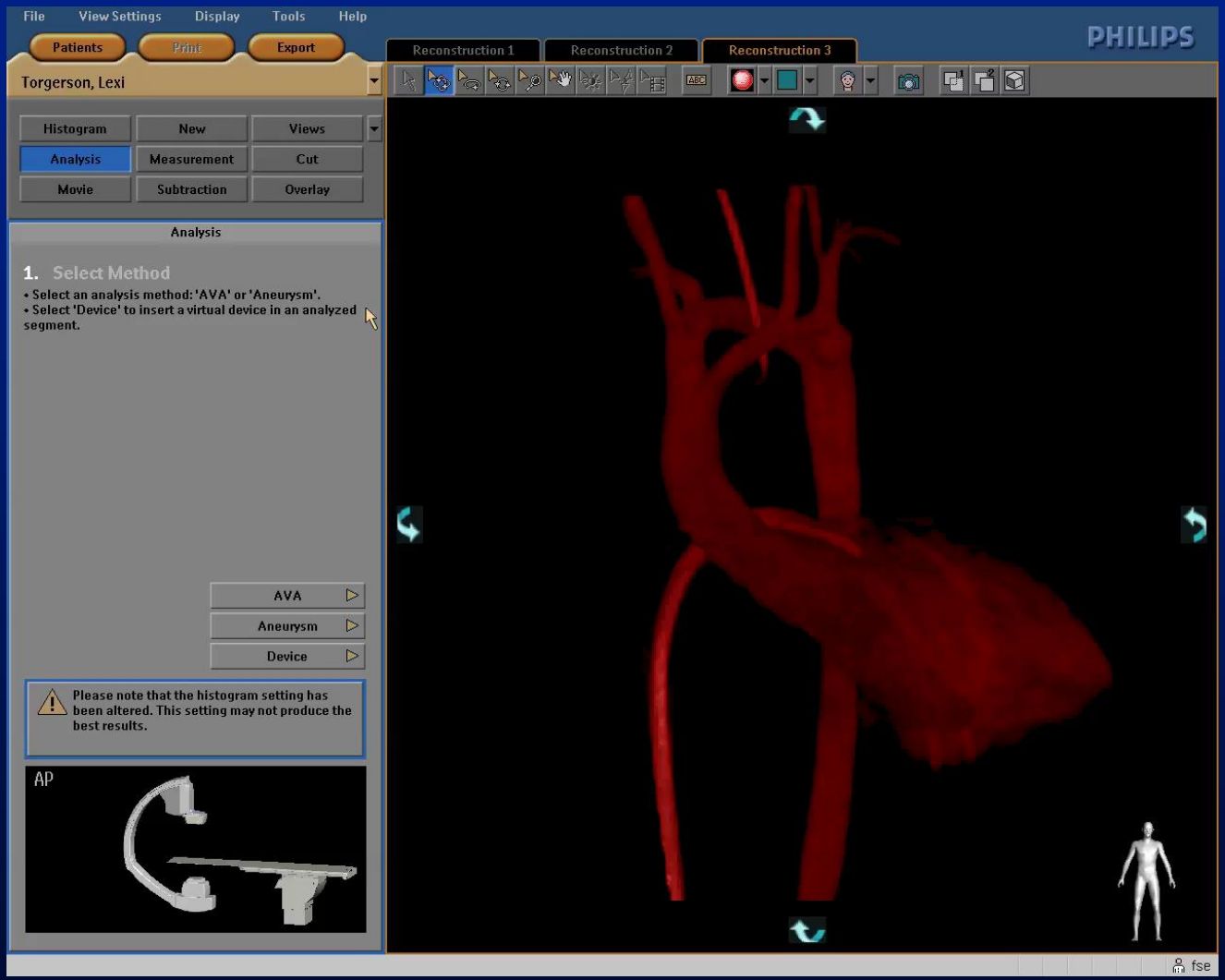


- 31 yo Isolated PA post 6 mm conduit

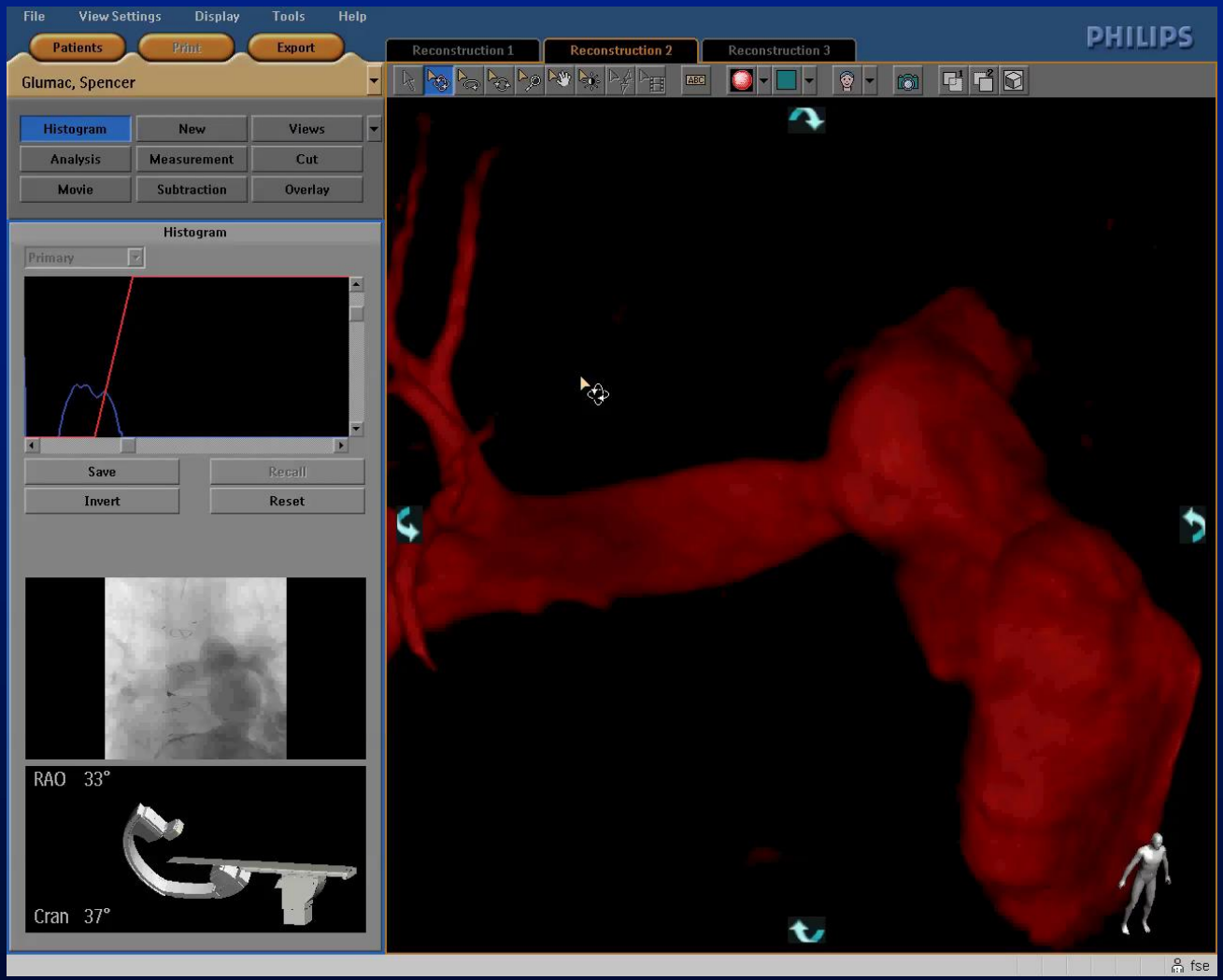
3-Dimensional Reconstruction
Cross Sectional Area / Fly Through



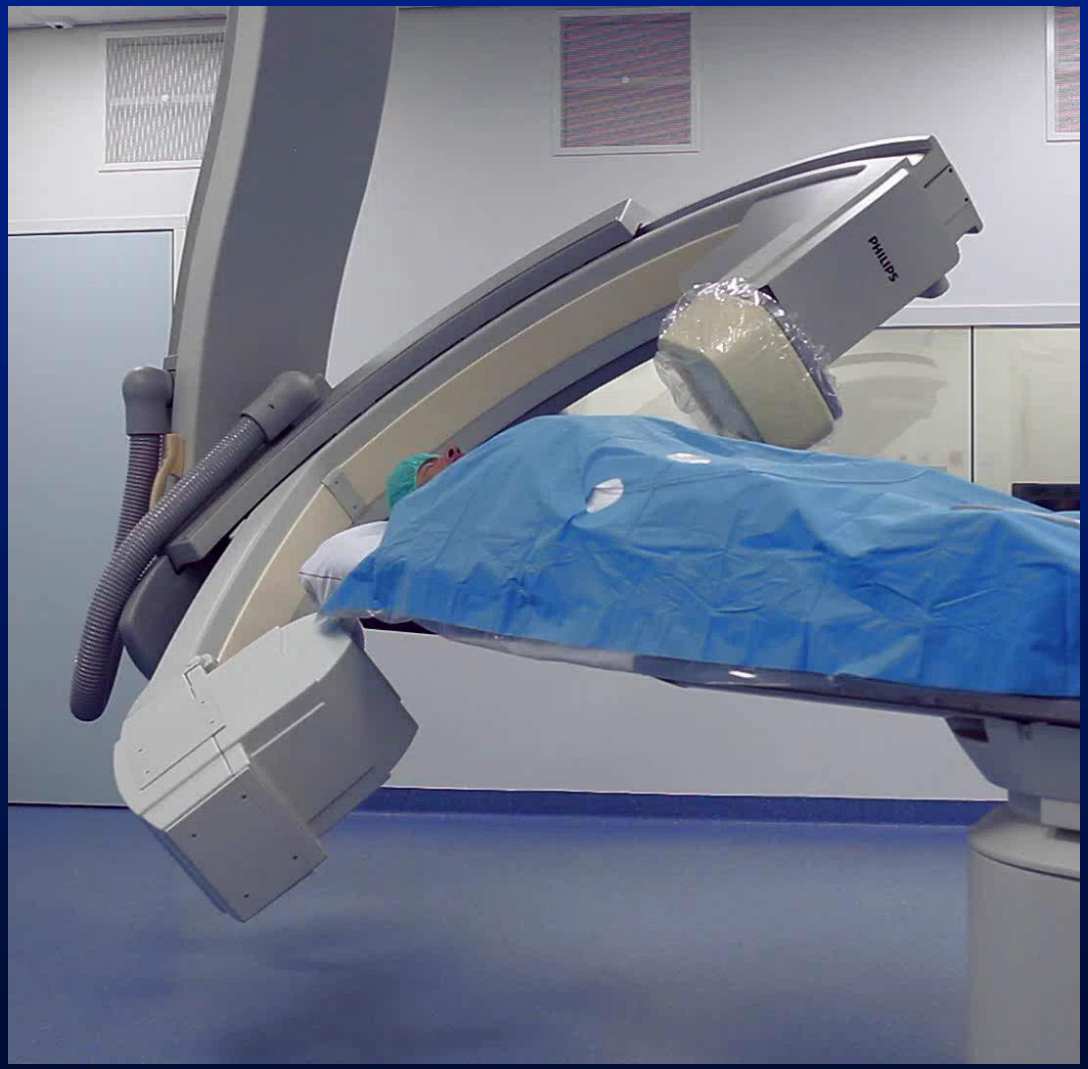
3-Dimensional Reconstruction
Quantification



3-Dimensional Reconstruction
Device Simulation



Xper Swing
Left Coronary Artery



Courtesy of Drs. John Messenger, Michael Kim and Philips Healthcare

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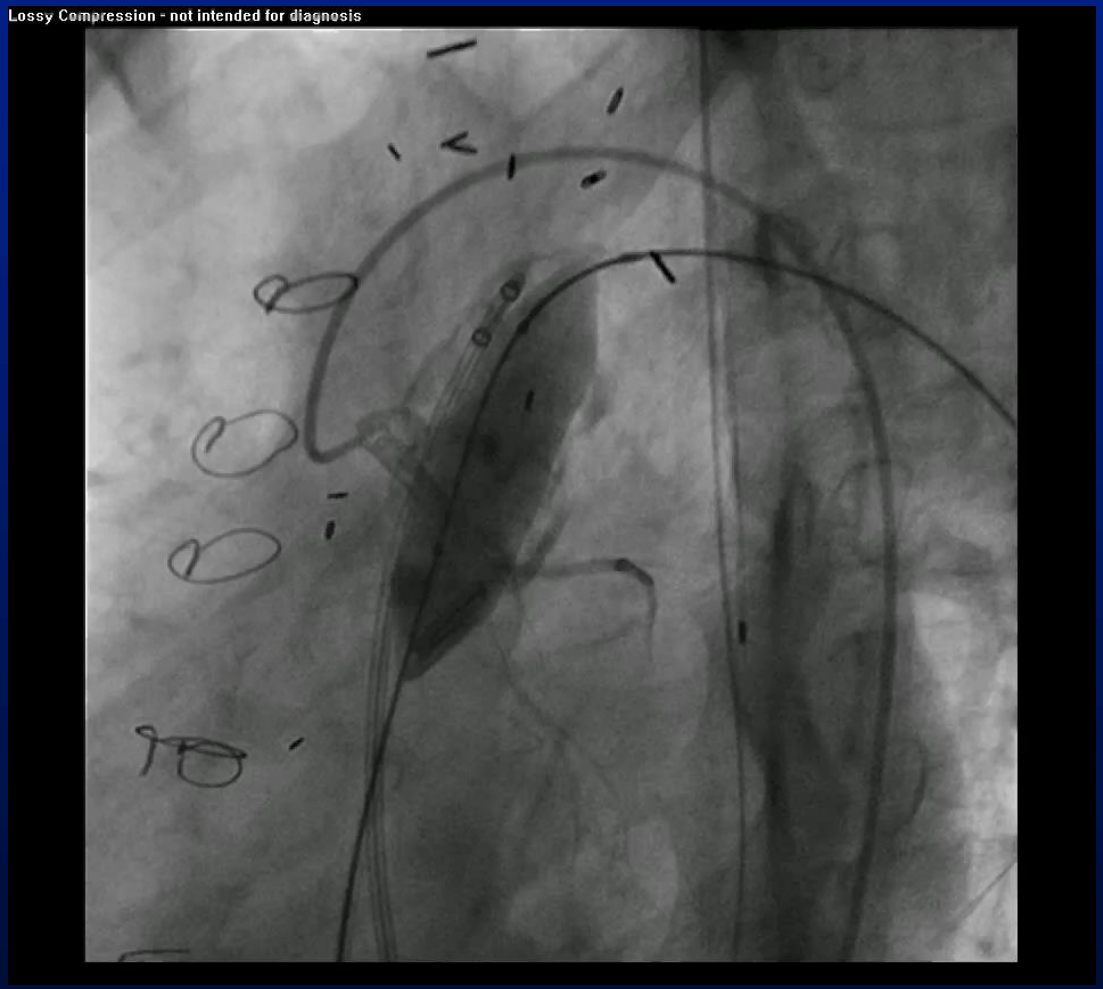
Left Coronary Artery



Provided by Michael Ross

Garcia, *Catheter Cardiovasc Interv* 73:753–761

3DRA
Limitations

- Differential anatomic coloring coding
- Quantitative measures (3DRA)
  - XperCT
- Airway 3-D Reconstruction (3DRA)
  - EP Navigator
  - XperCT

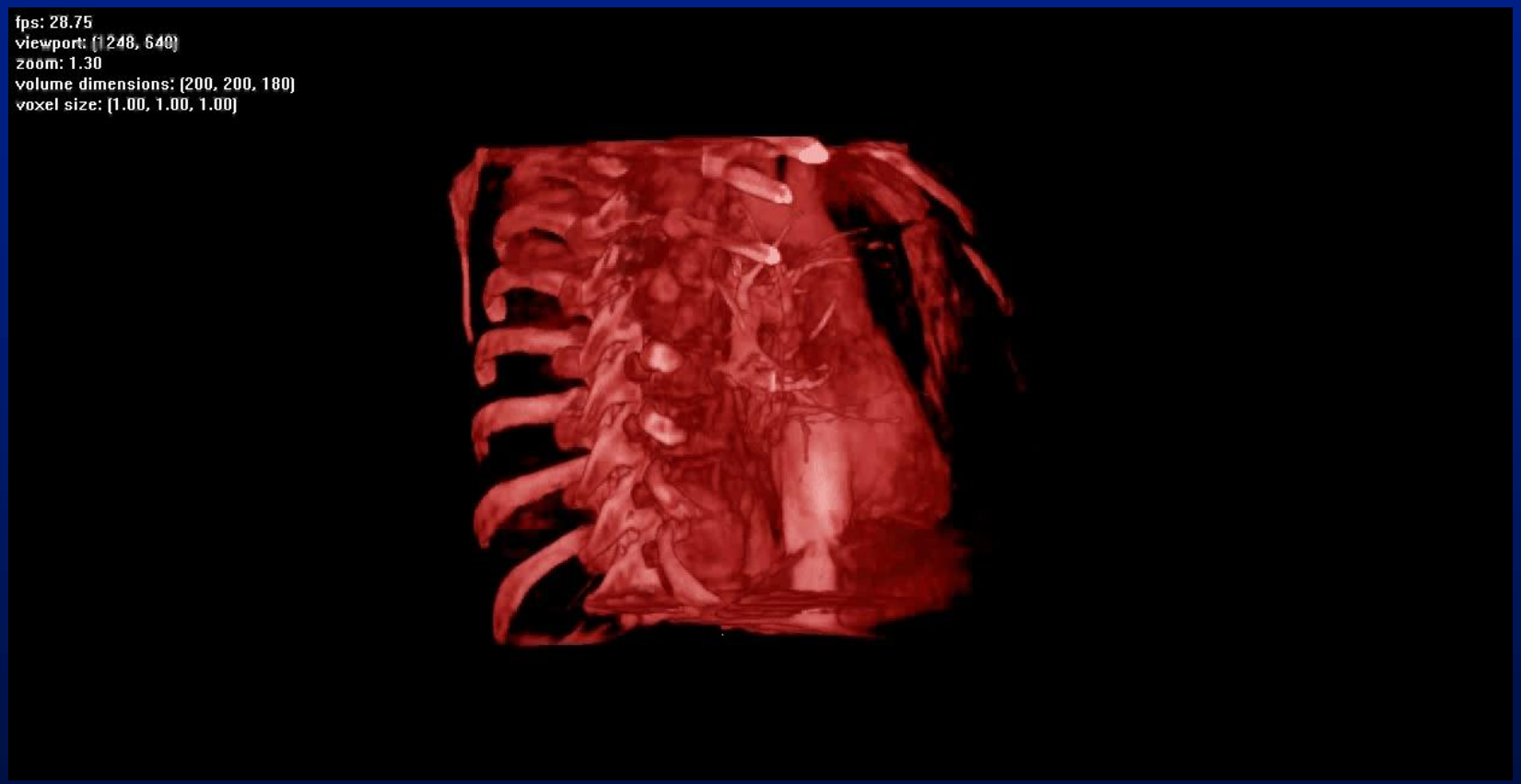
3DRA
The Future

- Cardiac angiography; limited to rotational angiograms
  - Improved imaging with less contrast
  - Continued reduction in radiation exposure
  - Prove quantitative measurements
- Workflow improvements
  - Workstation display / commands
  - Reduced manual reconstruction steps
- Biplane acquisition
  - Reduction acquisition time
  - Reduction in contrast
  - Reduced preparation
  - Biplane display

3DRA
The Future

- Gating / Sparse sampling
  - ECG
  - Image based (Sparce sampling)
- 3-D modeling / Visualization
  - 3-D Holography (RealView)
- Soft tissue / Functional assessment
  - Whole Heart imaging

Xper CT
Whole Heart Imaging



- Soft tissue cardiac structures
- Surrounding tissue
- Airway visualization / reconstruction

Courtesy of John Carroll, MD

Acknowledgements

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  - Brian Fonseca, MD
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Thank you

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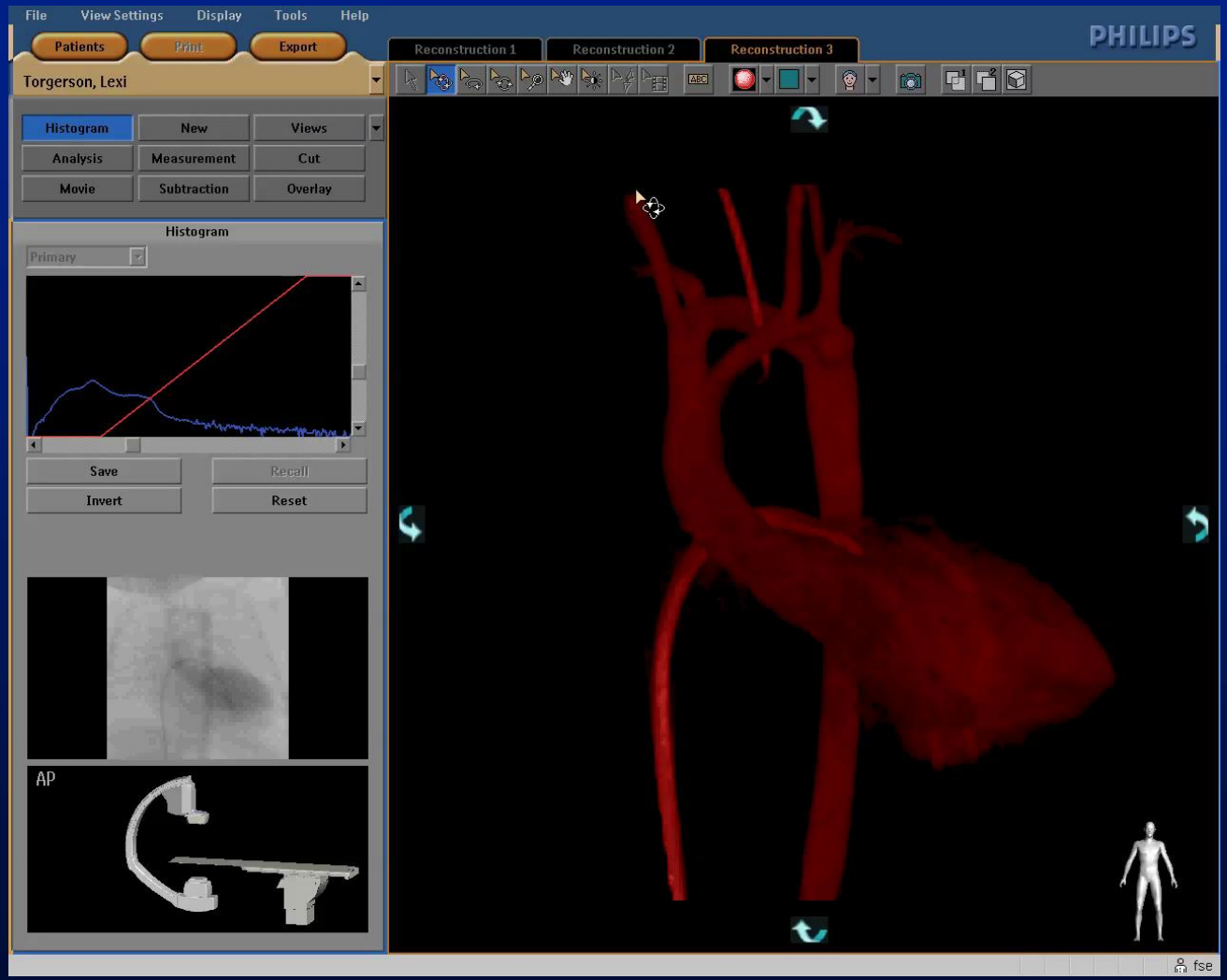
3-Dimensional Reconstruction

Orientation Pre-sets



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