



# 3 D TEE Acquisition of the TV,PV, LAA,Coronary sinus,Pulmonary Veins,IAS, ASD, ASD closure. Aorta

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Disclosure

# **Reference Customer Philips**

## GUIDELINES AND STANDARDS

### EAE/ASE Recommendations for Image Acquisition and Display Using Three-Dimensional Echocardiography

Roberto M. Lang, MD, FASE,<sup>\*†</sup> Luigi P. Badano, MD, FESC,<sup>†‡</sup> Wendy Tsang, MD,<sup>\*</sup> David H. Adams, MD,<sup>\*</sup> Eustachio Agricola, MD,<sup>†</sup> Thomas Buck, MD, FESC,<sup>†</sup> Francesco F. Falteria, MD,<sup>†</sup> Andreas Franke, MD, FESC,<sup>†</sup> Judy Hung, MD, FASE,<sup>\*</sup> Leopoldo Pérez de Isla, MD, PhD, FESC,<sup>†</sup> Otto Kamp, MD, PhD, FESC,<sup>†</sup> Jaroslaw D. Kasprzak, MD, FESC,<sup>†</sup> Patrizio Lancellotti, MD, PhD, FESC,<sup>†</sup> Thomas H. Marwick, MBBS, PhD,<sup>\*</sup> Marti L. McCulloch, RDCS, FASE,<sup>\*</sup> Mark J. Monaghan, PhD, FESC,<sup>†</sup> Petros Nihoyannopoulos, MD, FESC,<sup>†</sup> Natesa G. Pandian, MD,<sup>\*</sup> Patricia A. Pellikka, MD, FASE,<sup>\*</sup> Mauro Pepi, MD, FESC,<sup>†</sup> David A. Roberson, MD, FASE,<sup>\*</sup> Stanton K. Sherman, MD, FASE,<sup>\*</sup> Girish S. Shirali, MBBS, FASE,<sup>\*</sup> Lissa Sugeng, MD,<sup>\*</sup> Folkert J. Ten Cate, MD,<sup>†</sup> Mani A. Vannan, MBBS, FASE,<sup>\*</sup> Jose Luis Zamorano, MD, FESC, FASE,<sup>†</sup> and William A. Zoghbi, MD, FASE\*, Chicago and Oak Lawn, Illinois; Padua and Milan, Italy; New York, New York; Essen and Hannover, Germany; Lugano, Switzerland; Boston, Massachusetts; Madrid, Spain; Amsterdam and Rotterdam, The Netherlands; Lodz, Poland; Liege, Belgium; Cleveland, Ohio; Houston, Texas; London, United Kingdom; Rochester, Minnesota; Charleston, South Carolina; New Haven, Connecticut; Morrisville, North Carolina

(J Am Soc Echocardiogr 2012;25:3-46.)

## ASE GUIDELINES AND STANDARDS

### Guidelines for Performing a Comprehensive Transesophageal Echocardiographic Examination: Recommendations from the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists

Rebecca T. Hahn, MD, FASE, Chair, Theodore Abraham, MD, FASE, Mark S. Adams, RDCS, FASE, Charles J. Bruce, MD, FASE, Kathryn E. Glas, MD, MBA, FASE, Roberto M. Lang, MD, FASE, Scott T. Reeves, MD, MBA, FASE, Jack S. Shanewise, MD, FASE, Samuel C. Siu, MD, FASE, William Stewart, MD, FASE, and Michael H. Picard, MD, FASE, New York, New York; Baltimore, Maryland; Boston, Massachusetts; Rochester, Minnesota; Atlanta, Georgia; Chicago, Illinois; Charleston, South Carolina; London, Ontario, Canada; Cleveland, Ohio

(J Am Soc Echocardiogr 2013;26:921-64.)

# General remarks

- base of a good 3 D image is a good 2 D image!
- for structures beside LV and MV you need an excellent 2 D image
- You can not visualize all structures with 3 D in all patients
- You have to work with postprocessing modalities  
(i.e. brightness, smoothness)

# 3 D Acquisition TV / 2 D Image

## Tricuspid Valve

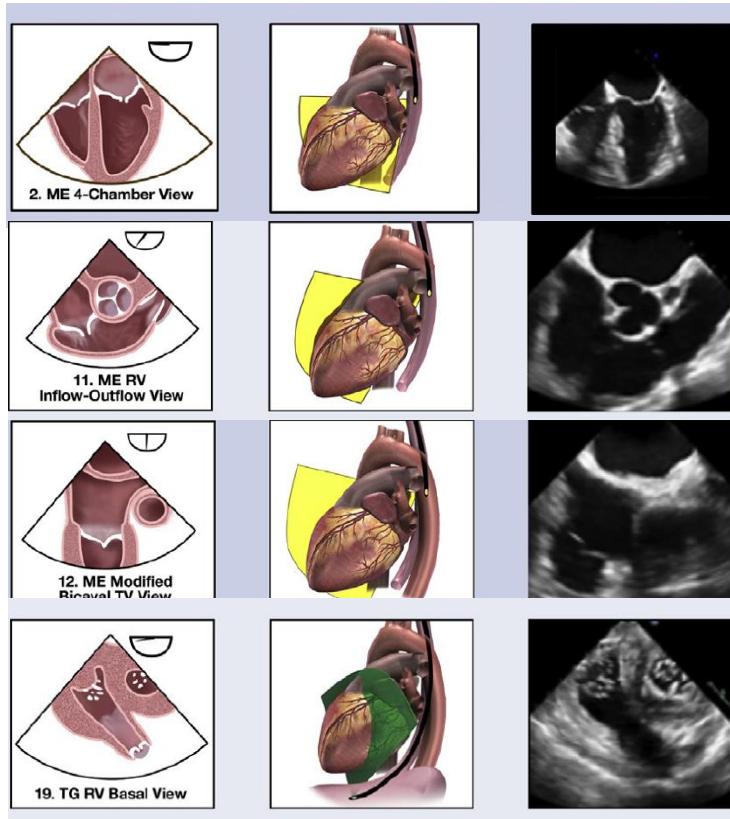
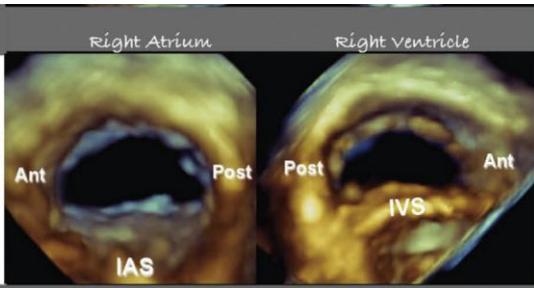
0° to 30° mid-esophageal, 4-chamber view with and without color (zoomed acquisition)

40° transgastric view with anteflexion with or without color (zoomed acquisition)

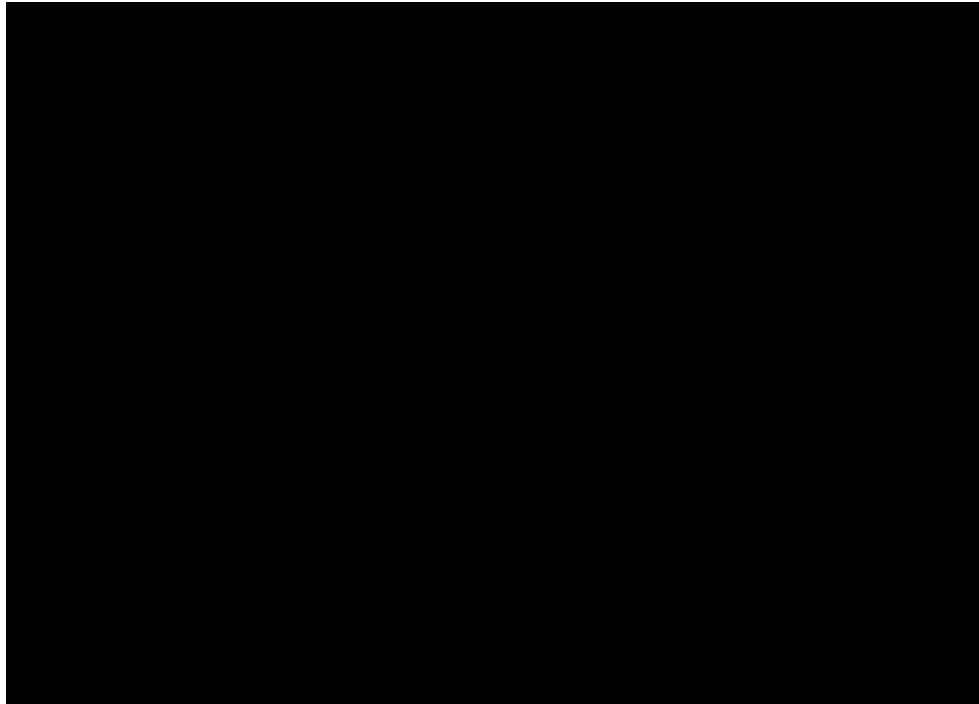
## Tricuspid Valve

Display the tricuspid valve with the septum placed inferiorly in the six o'clock position, regardless if the valve is oriented as viewed from the right atrium or the right ventricle.

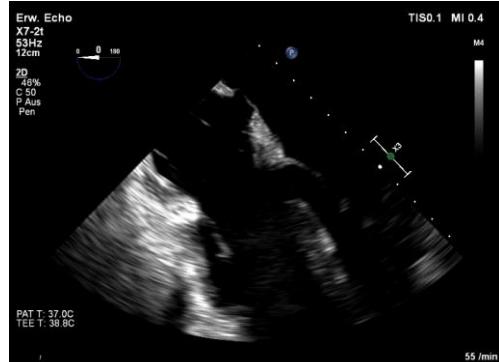
Ant=anterior, Post=posterior,  
IAS=interatrial septum,  
IVS=interventricular septum



# 3 D Acquisition TV wide sector zoom



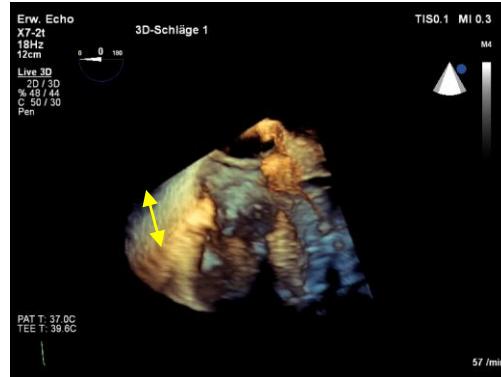
# 3 D Acquisition TV Live 3 D



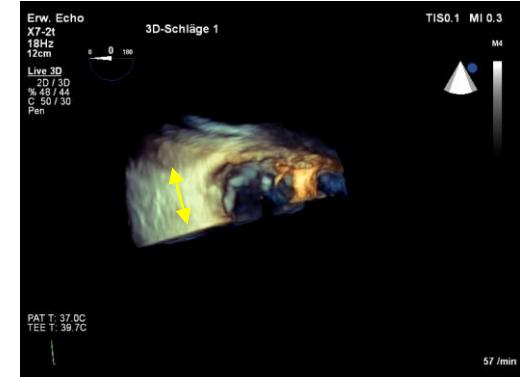
Tricuspid Valve

0° to 30° mid-esophageal, 4-chamber view with and without color (zoomed acquisition)

40° transgastric view with anteflexion with or without color (zoomed acquisition)



Elevation post  
cutting plane of 2 (D image)



# 3 D Acquisition TV iCrop



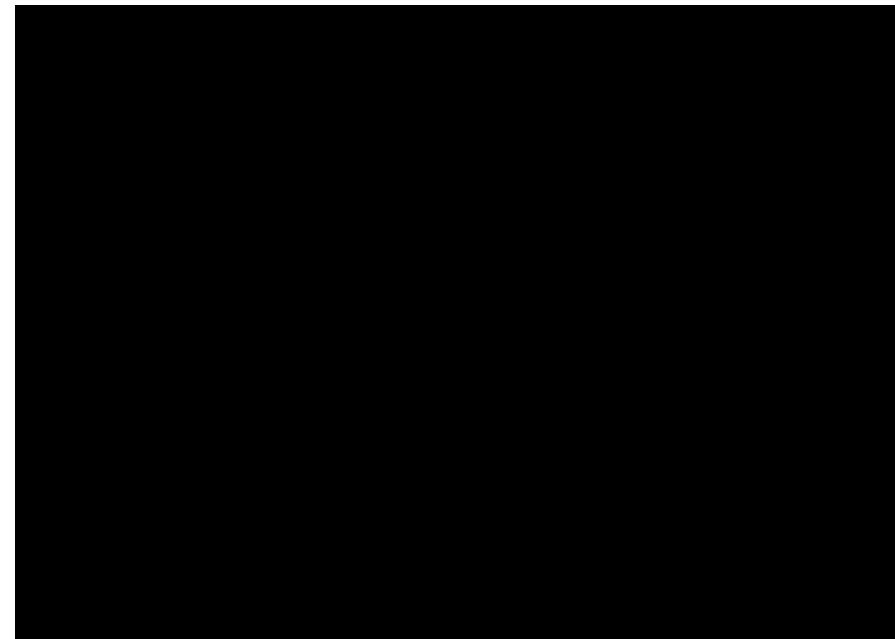
Lateral

Elevation width

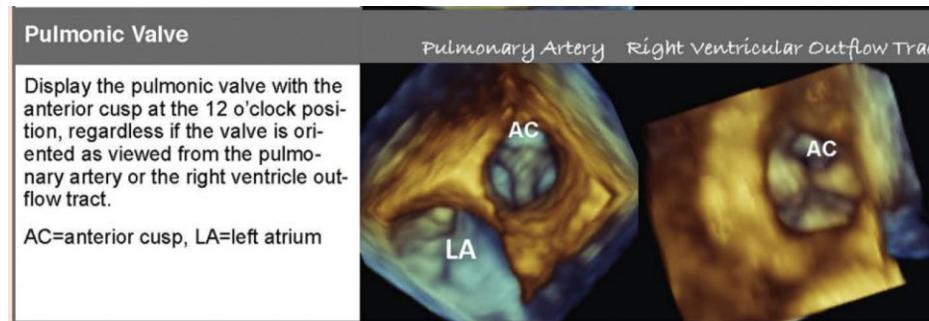
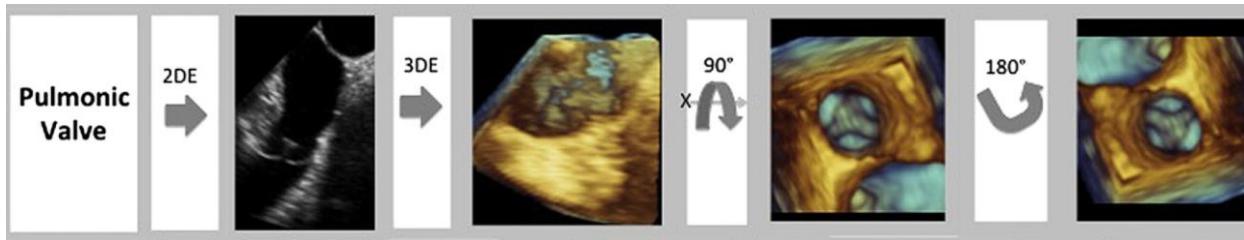


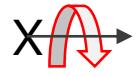
Increased elevation width

# 3 D Acquisition TV Live 3 D

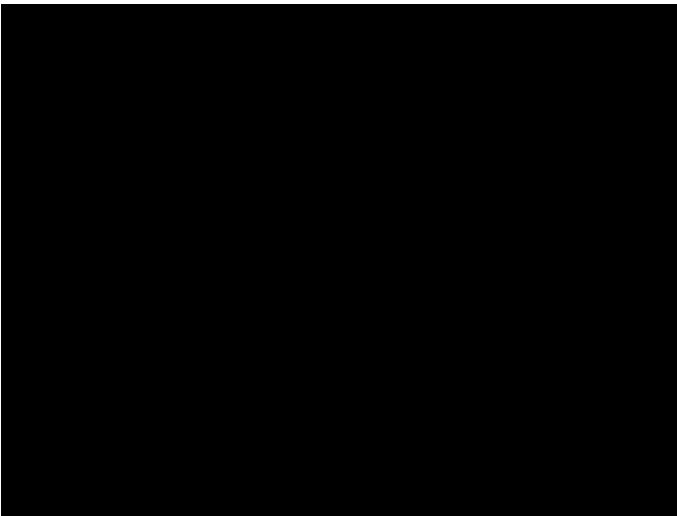
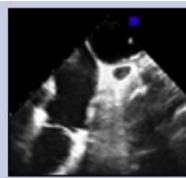
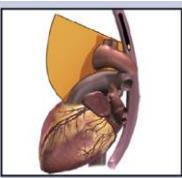
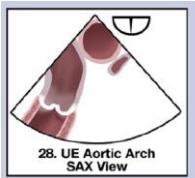


# 3 D Acquisition PV ( theory)

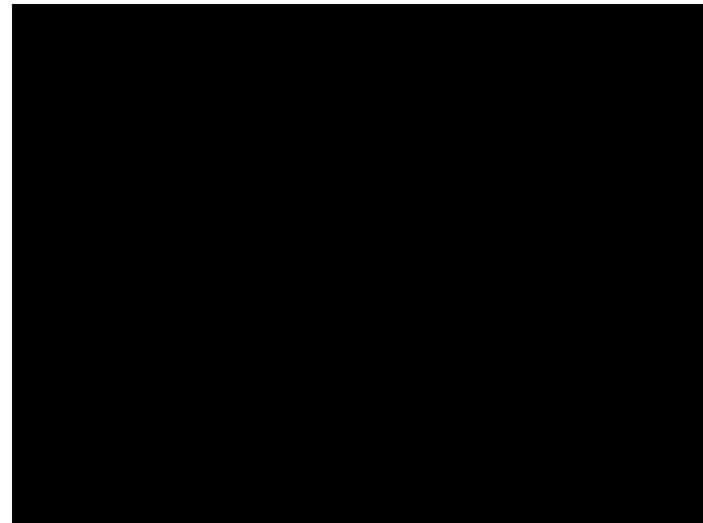
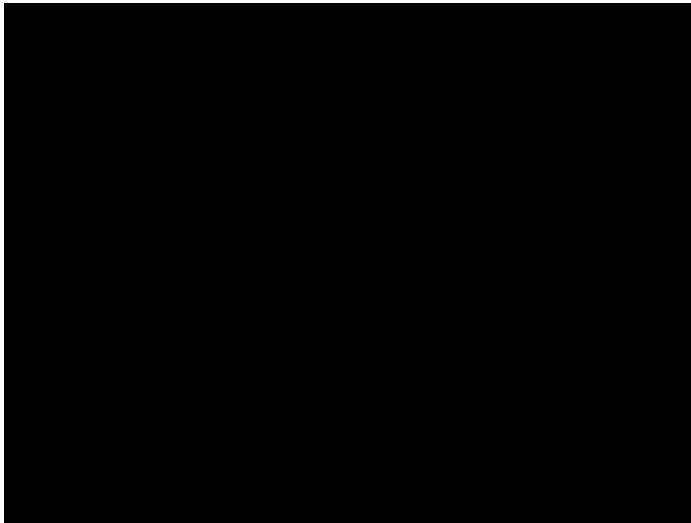
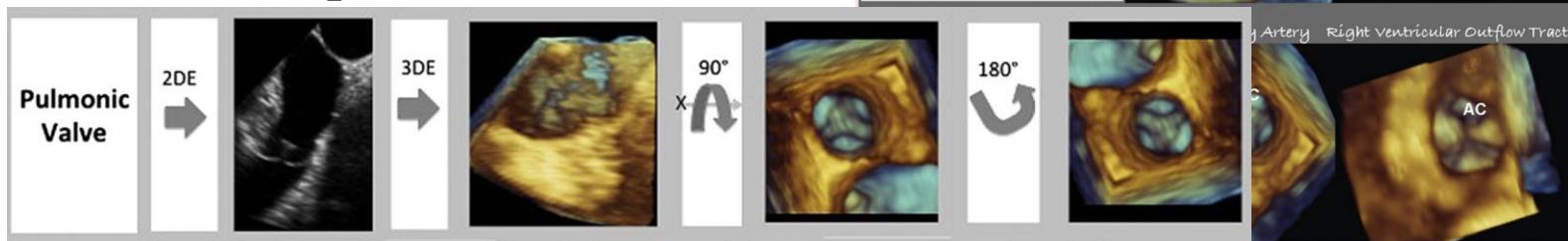




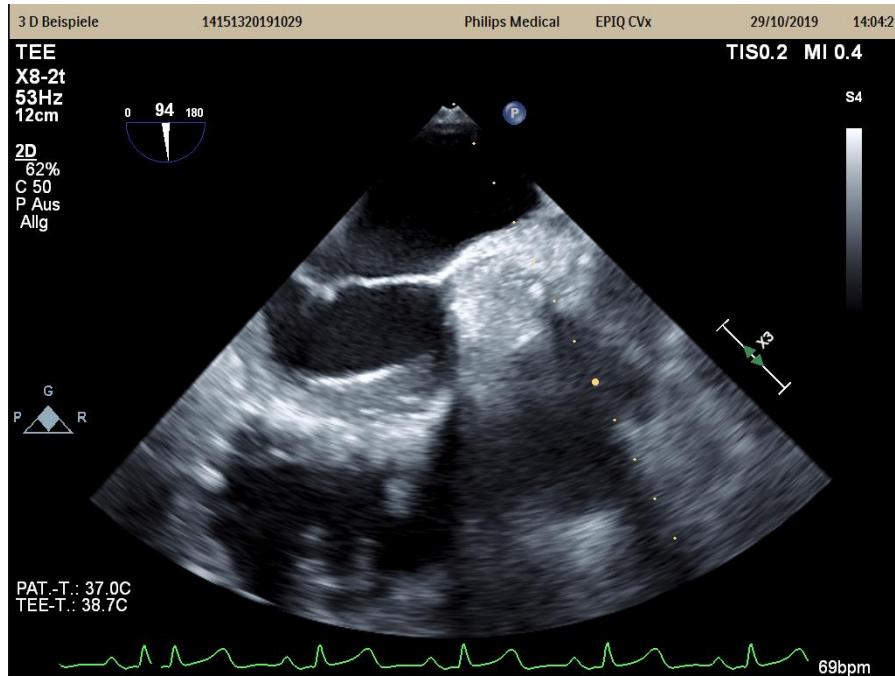
# 3 D Acquisition PV



# 3 D Acquisition PV (when you are really lucky)

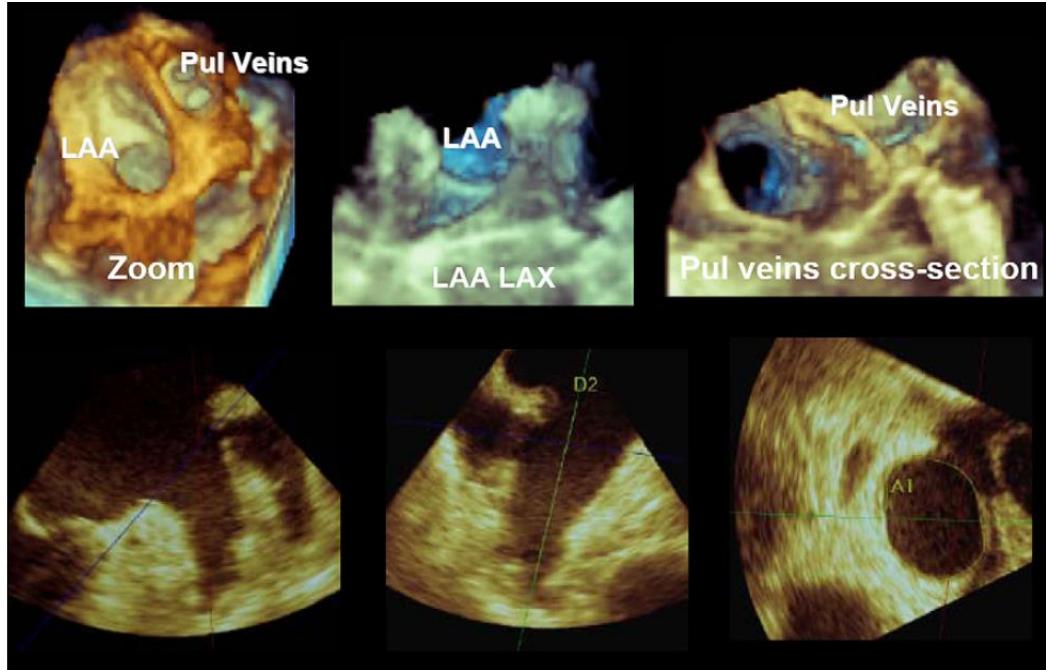


# 3 D Acquisition PV ( daily live)



Currently no evidence  
for 3D imaging of PV!

# 3 D display of left atrial appendage

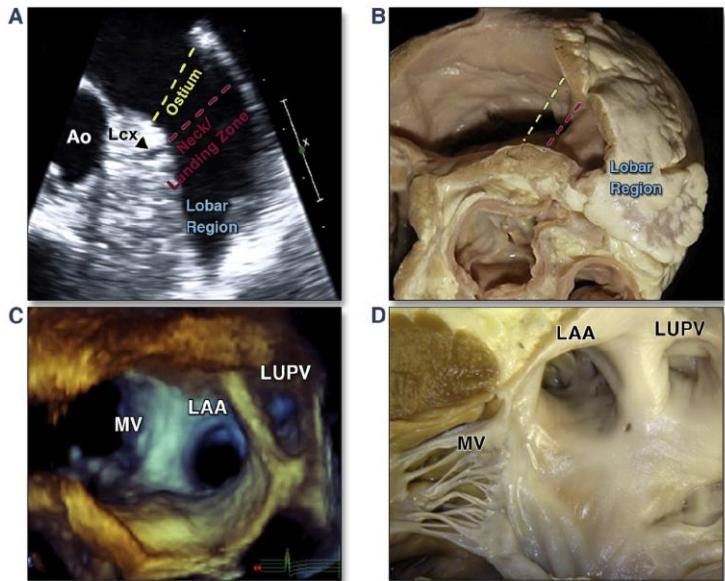


Lang J Am Soc Echocardiogr 2012



# 3 D Acquisition LAA

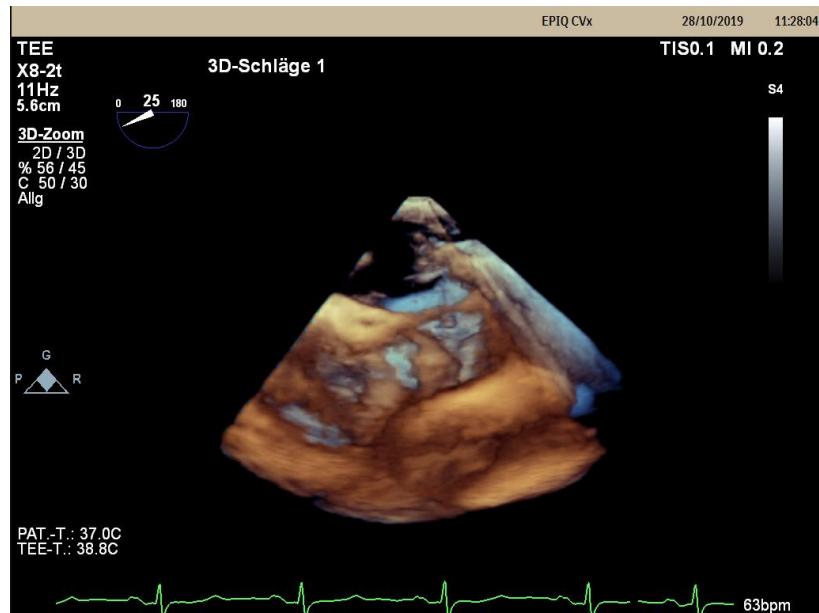
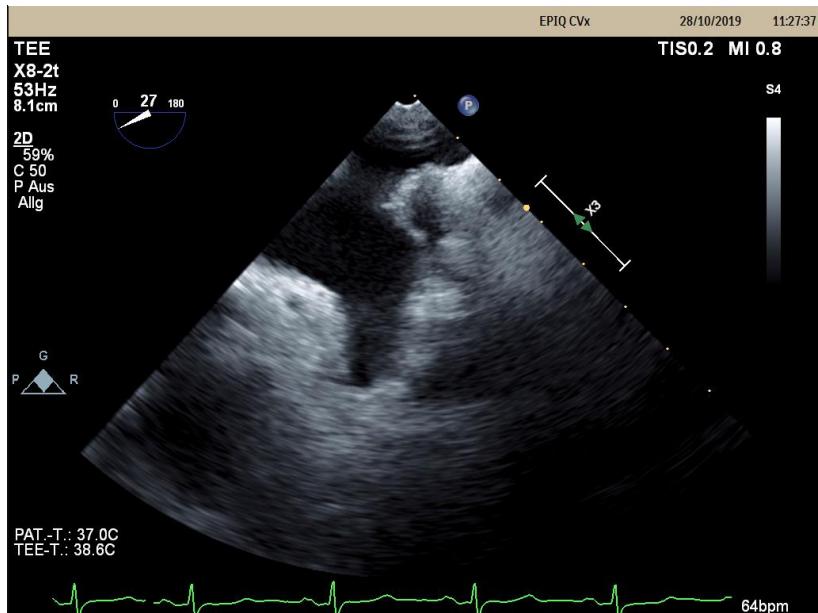
Echo-Anatomy of the LAA



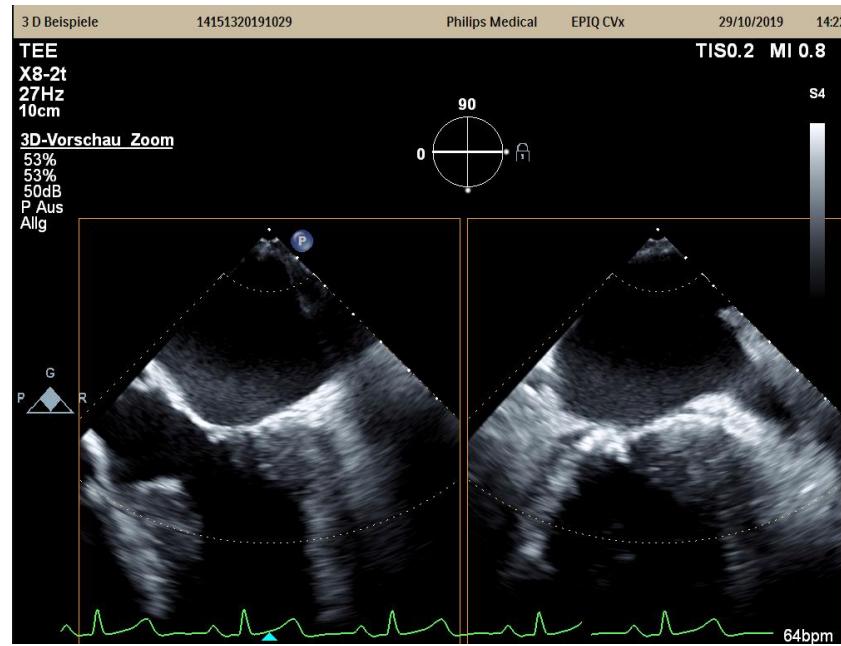
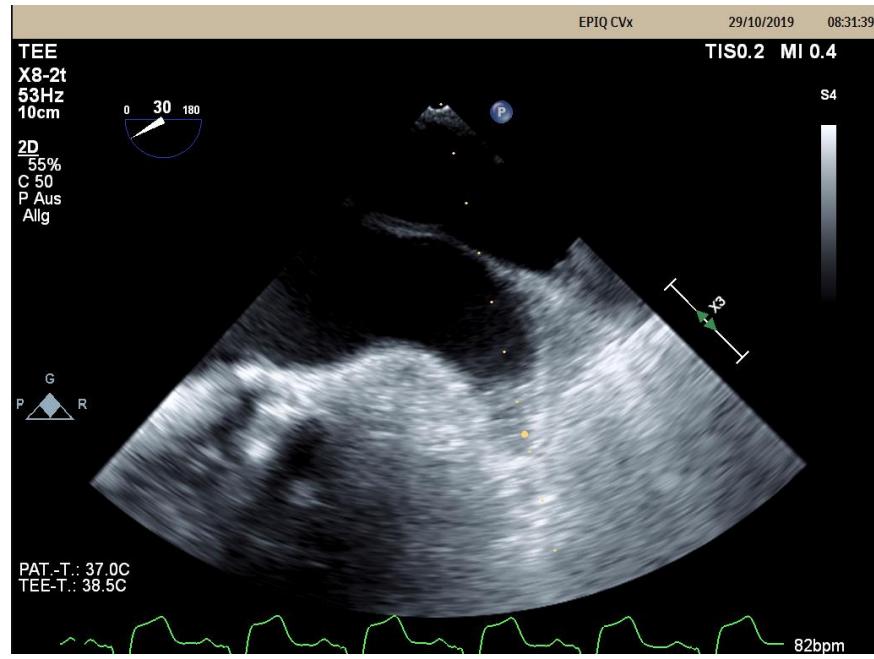
## Percutaneous Interventions for Left Atrial Appendage Exclusion Options, Assessment, and Imaging Using 2D and 3D Echocardiography

Nina C. Wunderlich, MD,\* Roy Beigel, MD,† Martin J. Swaans, MD, PhD,‡ Siew Yen Ho, MD,|| Robert J. Siegel, MD||

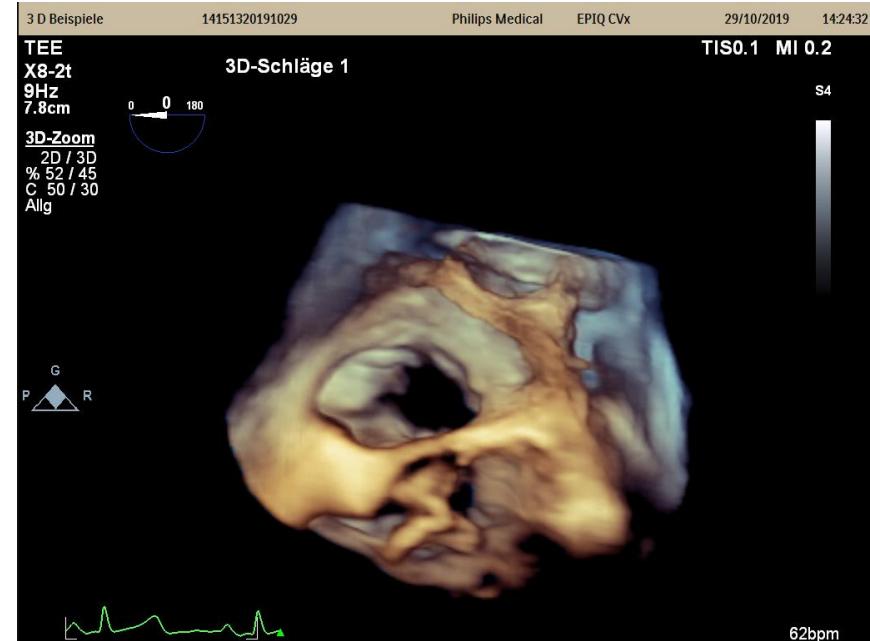
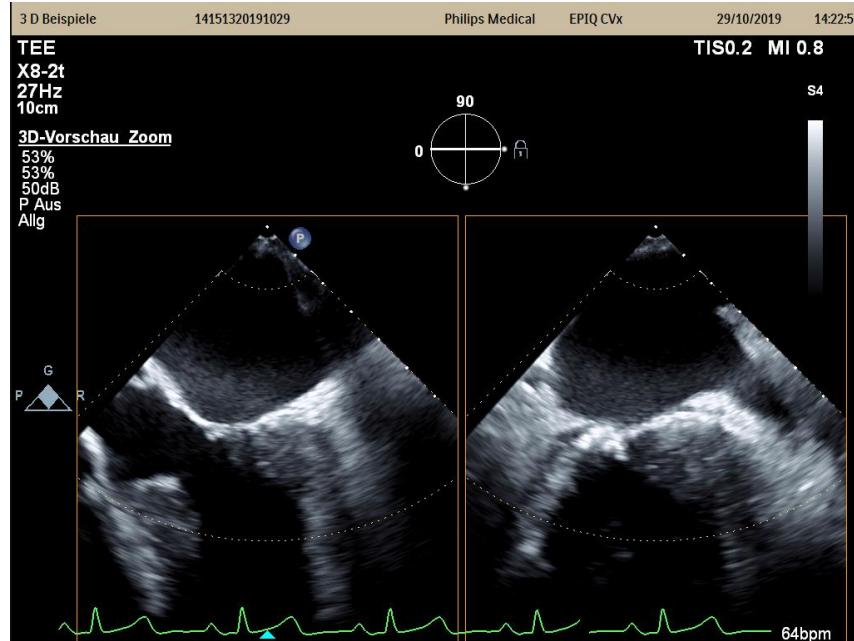
# 3 D Acquisition LAA



# 3 D Acquisition LAA

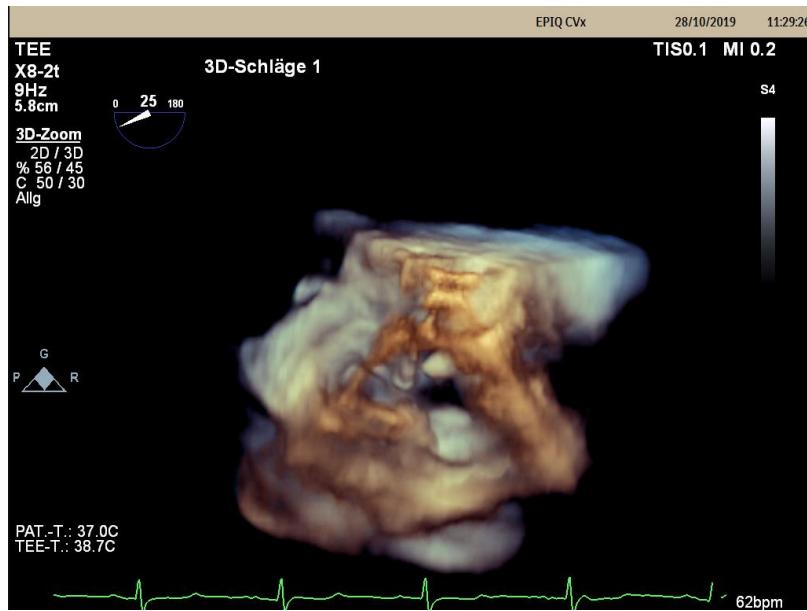


# 3 D Acquisition LAA /2

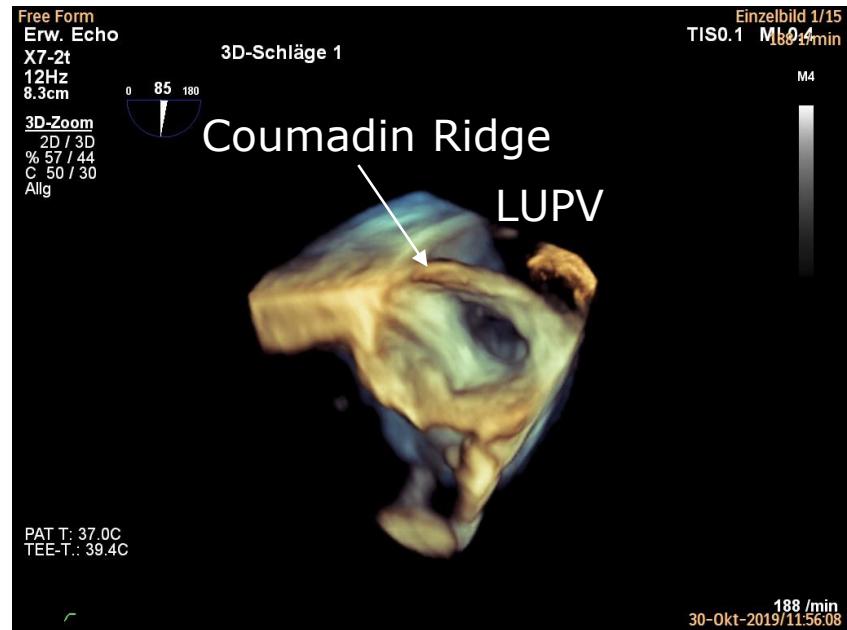
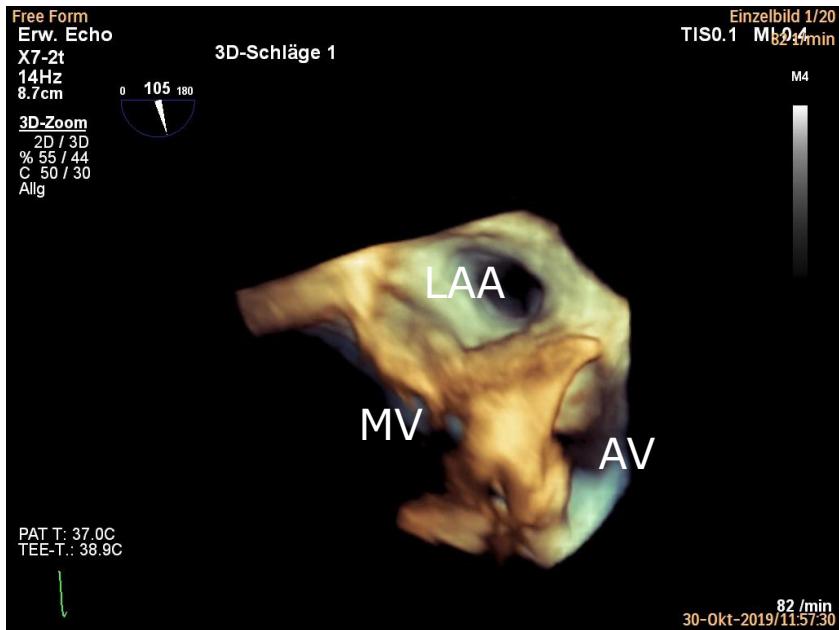


Cropping

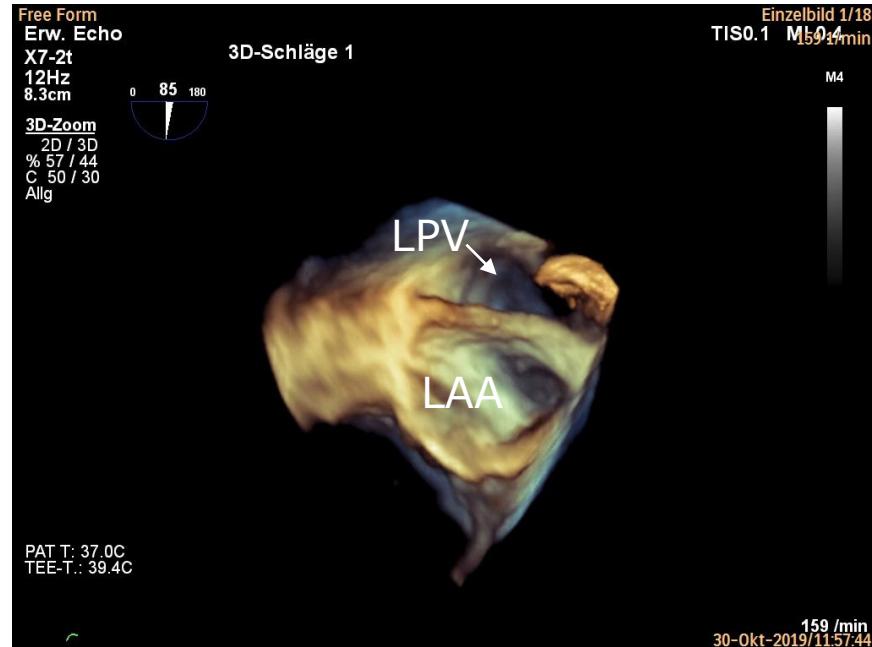
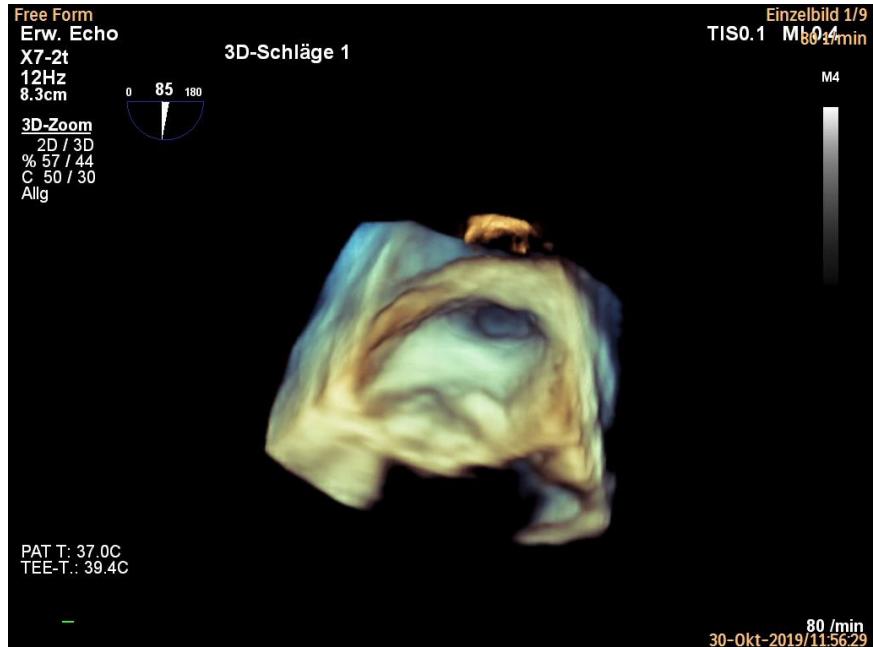
# 3 D Acquisition LAA



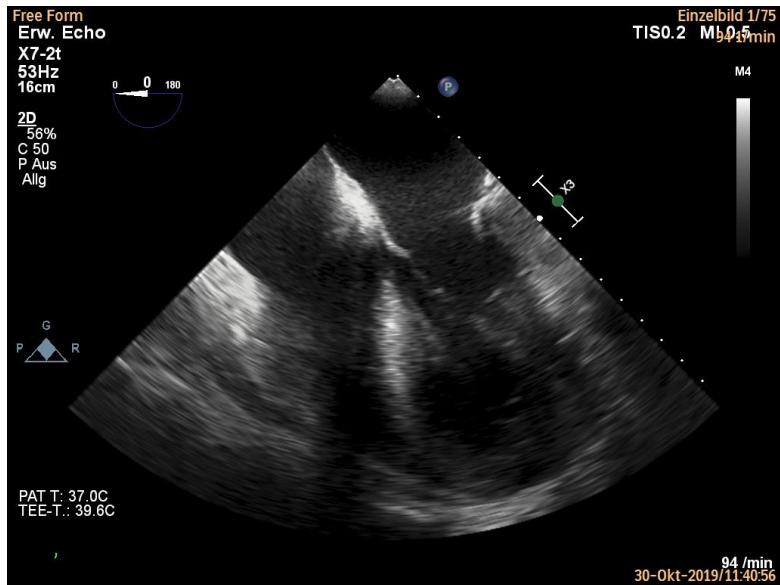
# 3 D Acquisition LAA



# 3 D Acquisition LAA to LUPV



# 3 D Acquisition Coronary Sinus



Live 3 d

# 3 D Acquisition Coronary Sinus



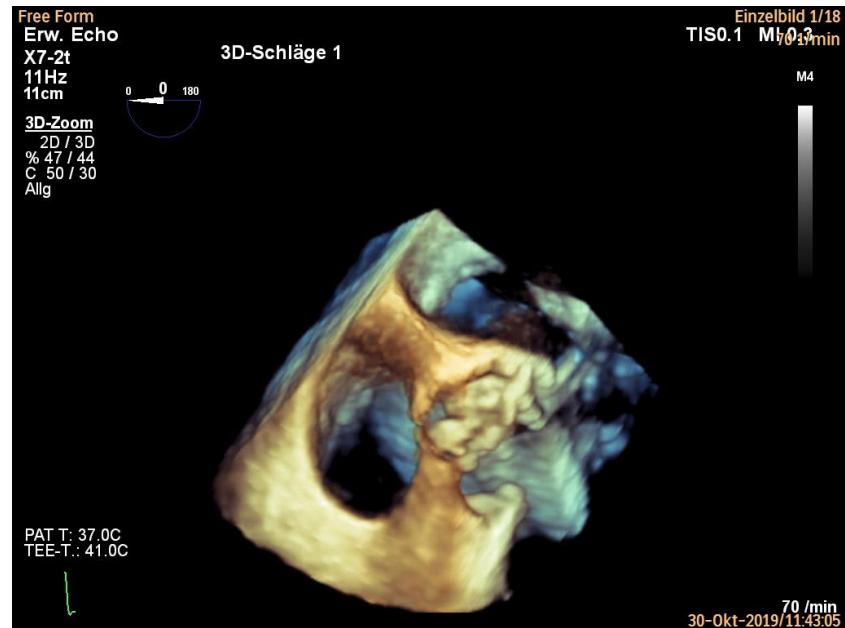
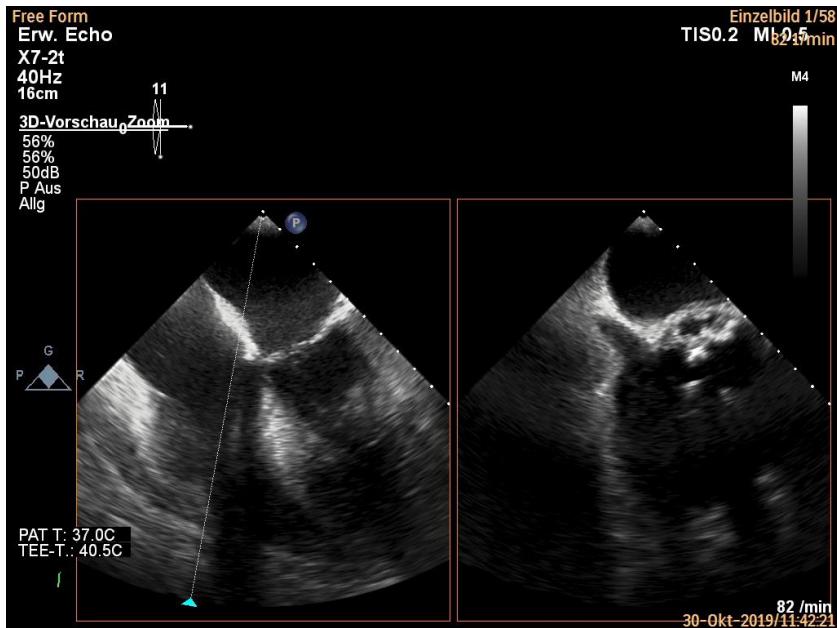
Adjust brigthness and smoothness

# 3 D Acquisition Coronary Sinus



Rotate along z- axis clockwise

# 3 D Acquisition Coronary Sinus 3 D zoom

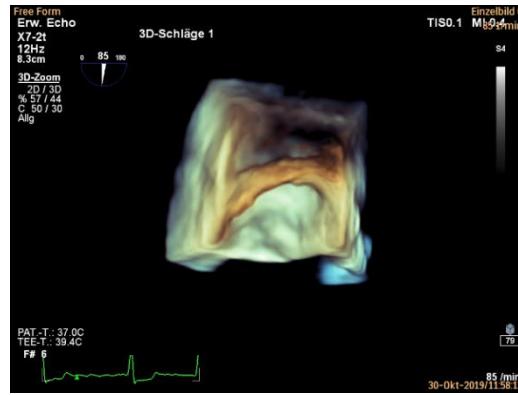
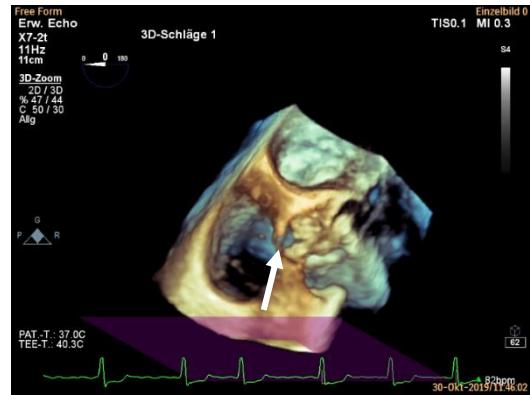


3 D Zoom

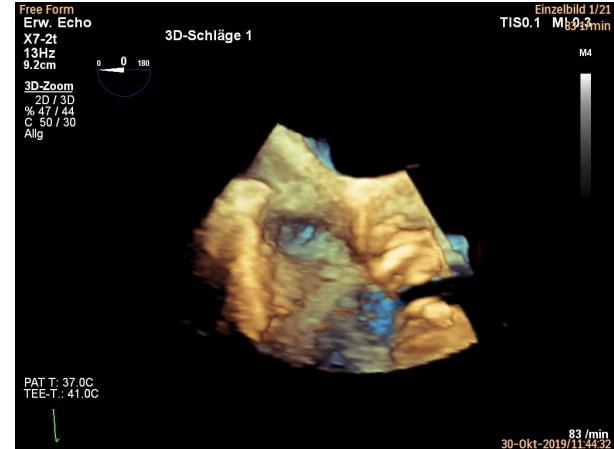
J. Ender

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LEIPZIG

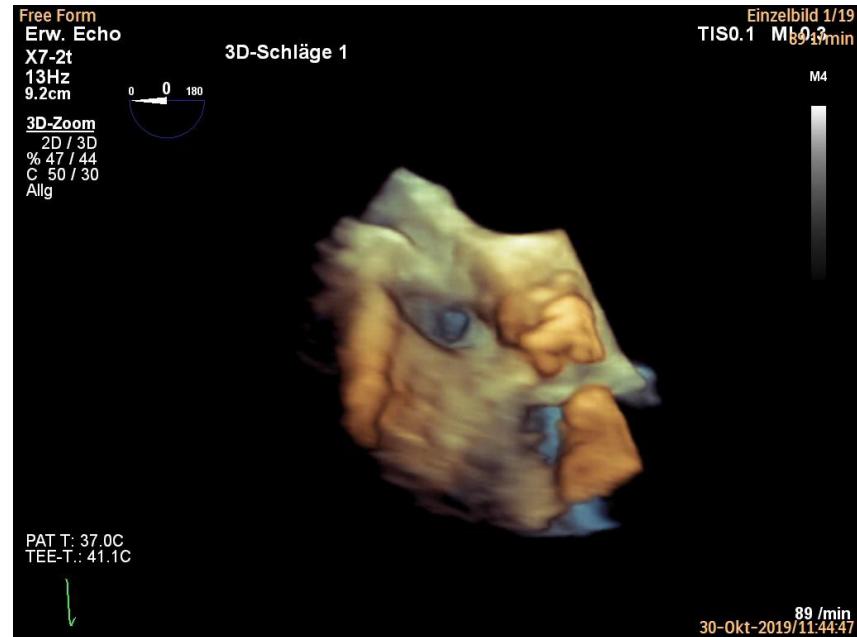
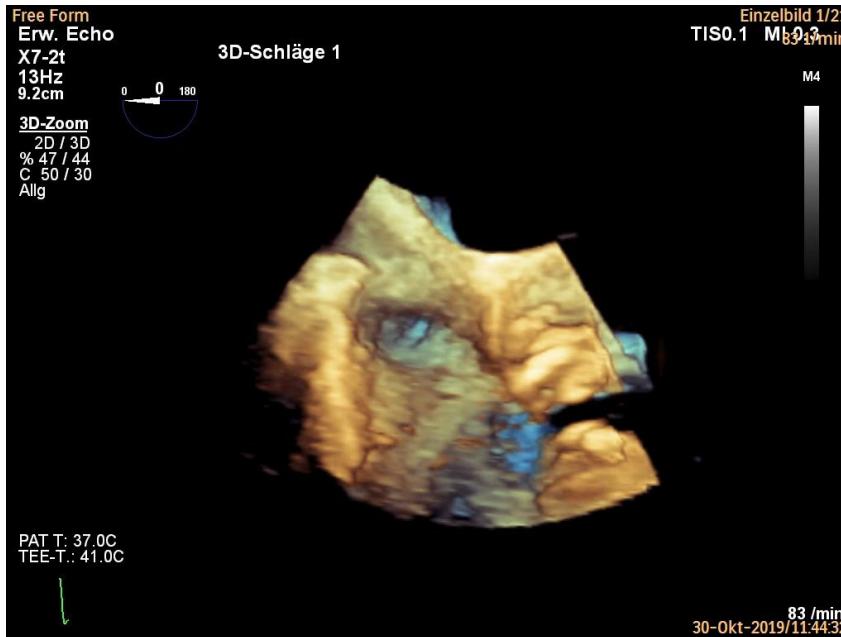
# 3 D Acquisition Coronary Sinus



# Cropping

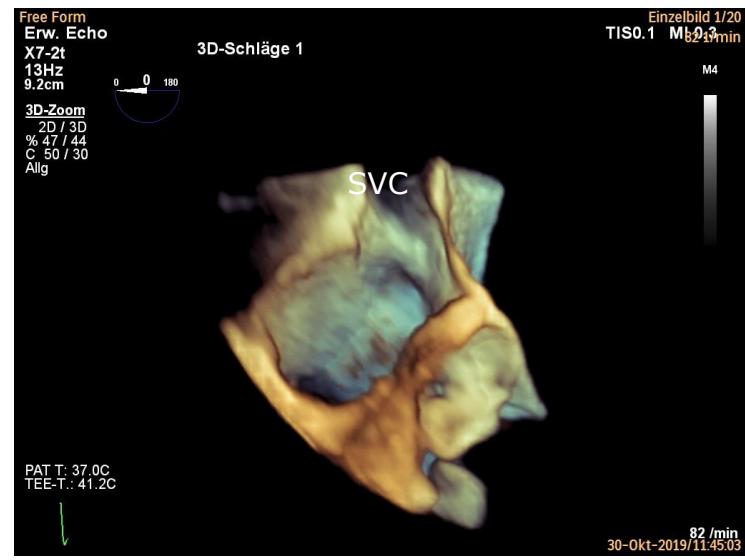
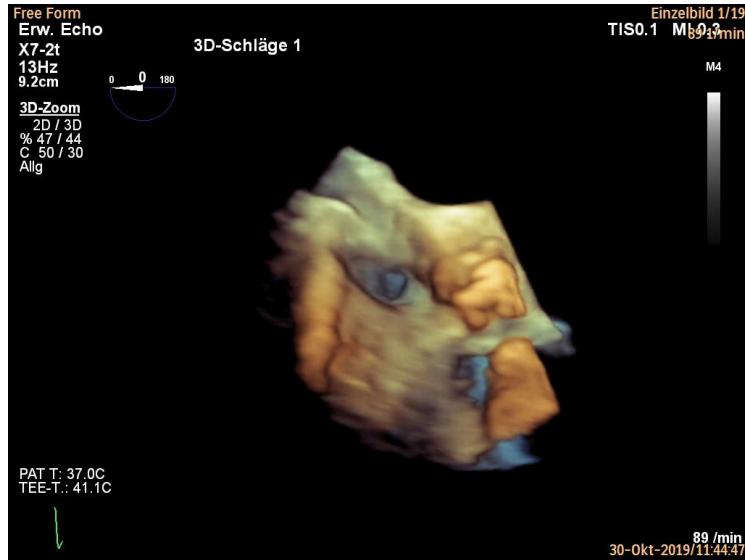


# 3 D Acquisition Coronary Sinus



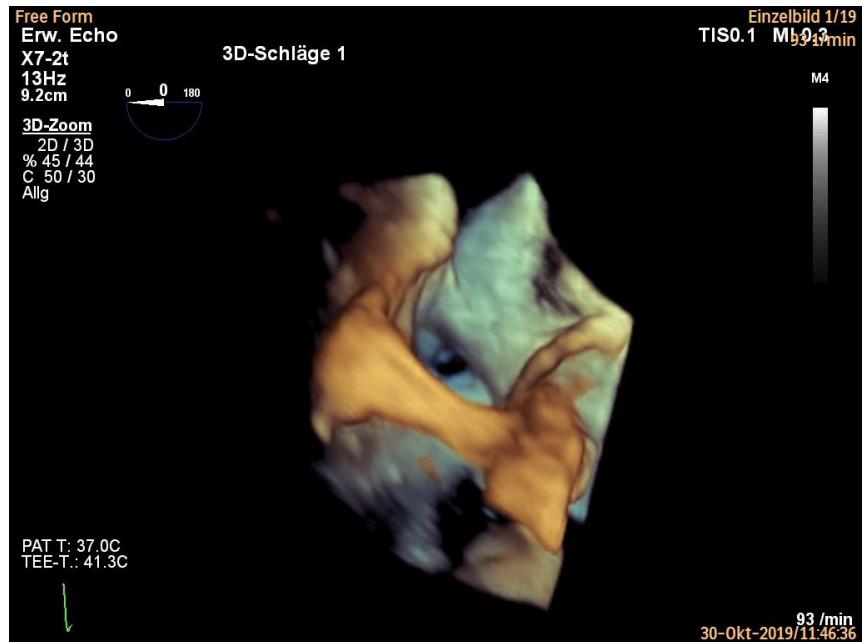
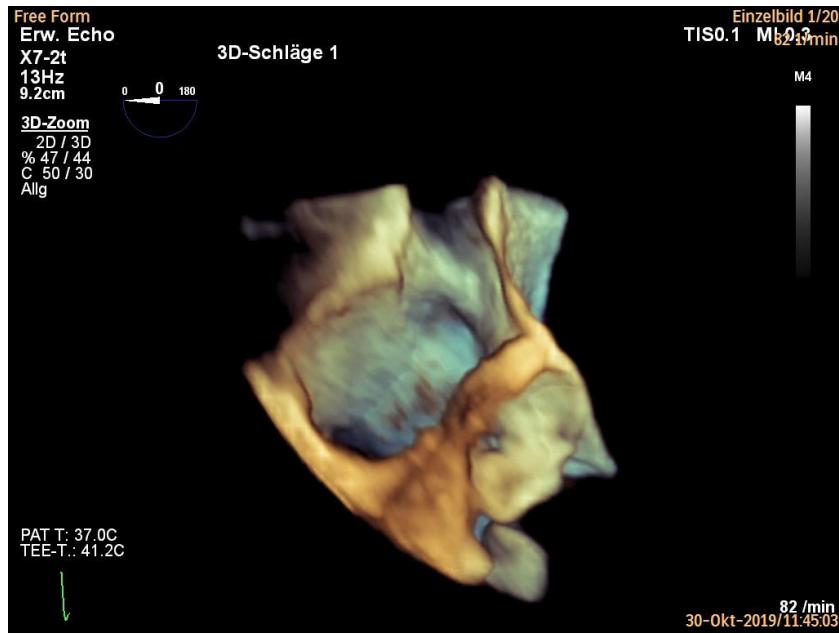
Adjust brightness and smoothing

# 3 D Acquisition Coronary Sinus

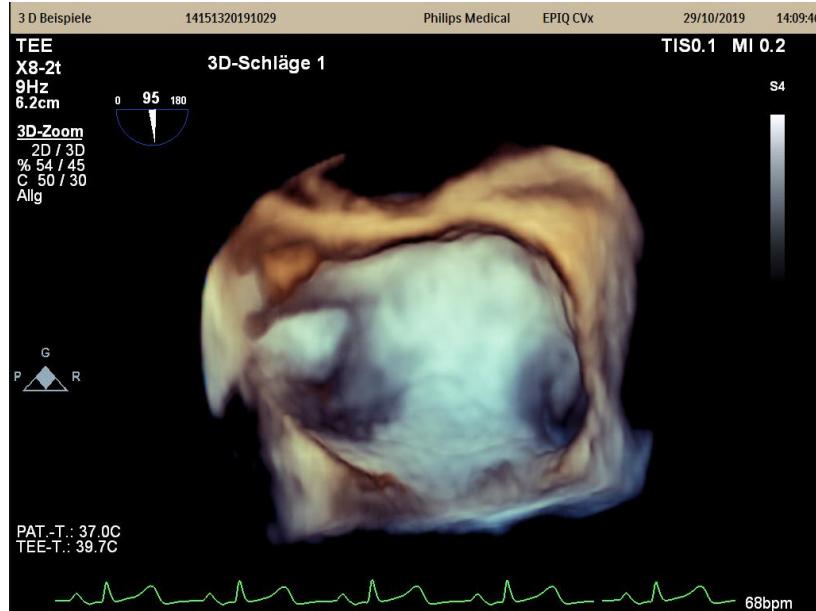
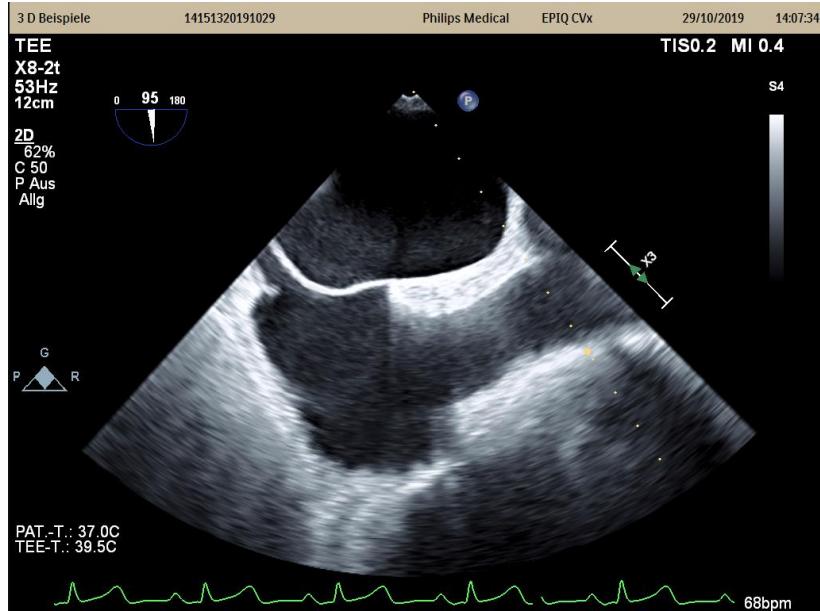


Rotate clockwise

# 3 D Acquisition Coronary Sinus

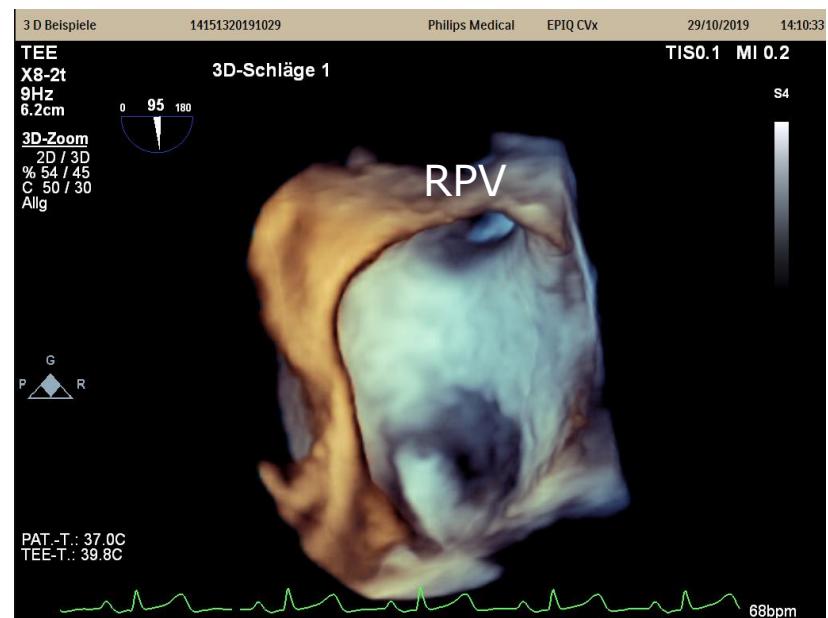
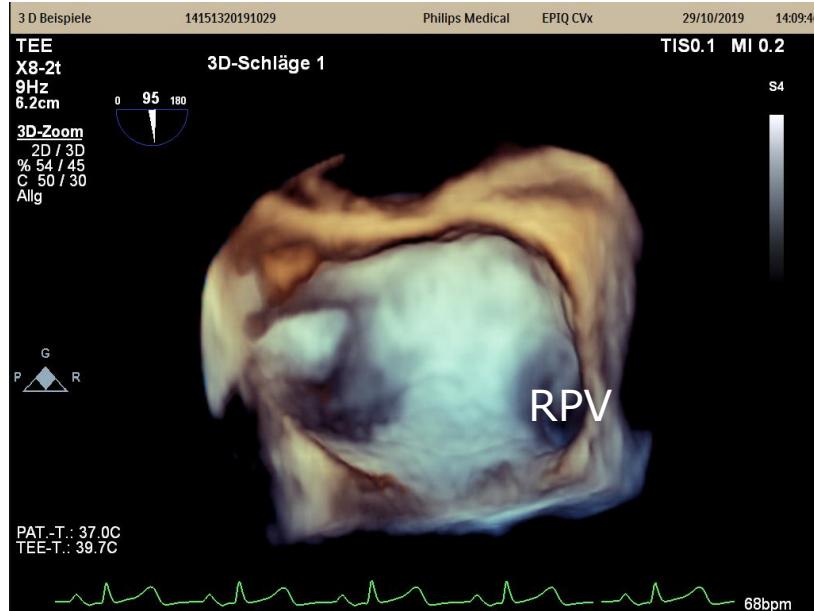


# 3 D Intratrial Septum RPV



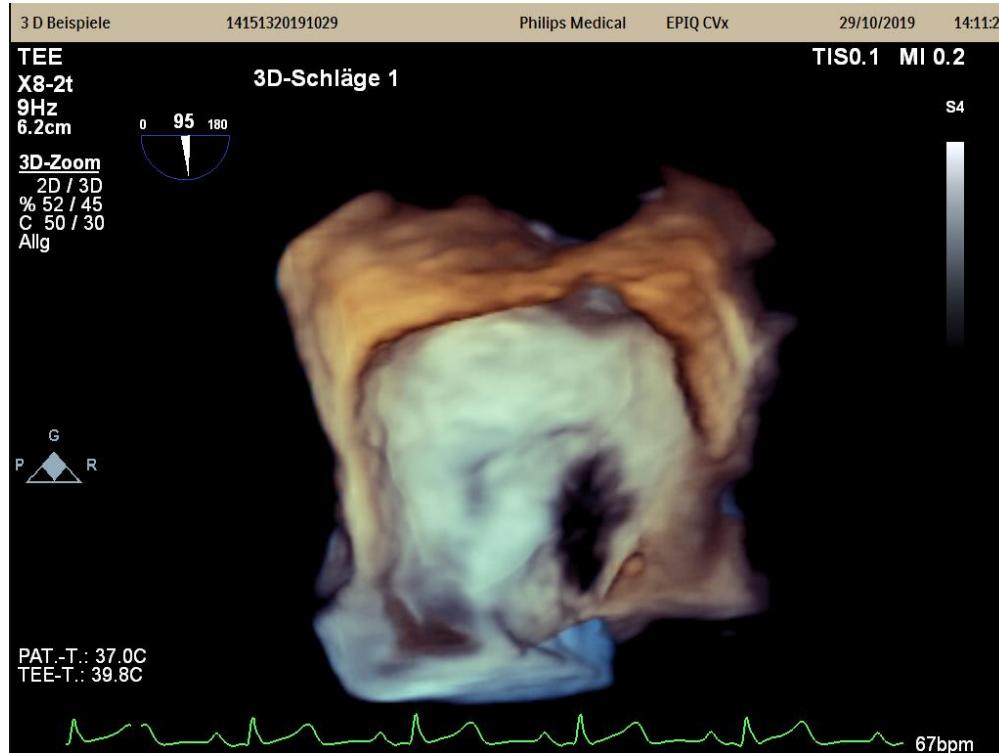
RPV at 1` clock position

# 3 D Intratrial Septum/left atrial



Rotate counterclockwise to  
get a right atrial view

# 3 D Intratrial Septum/turn SVC

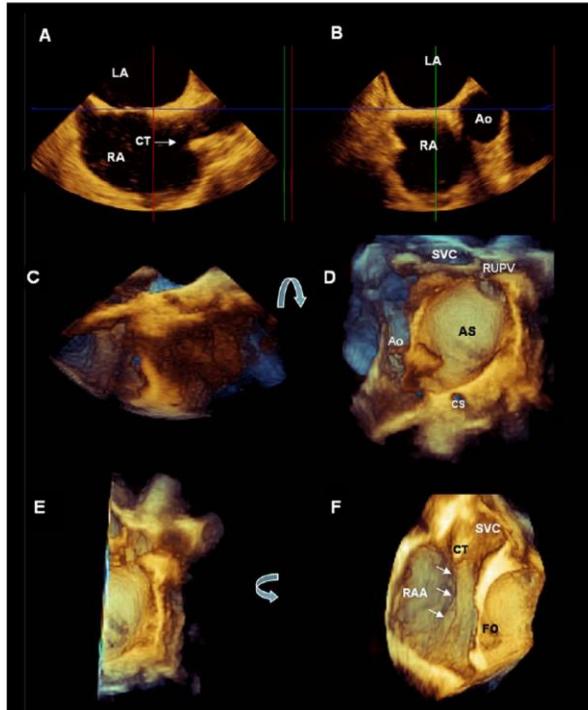
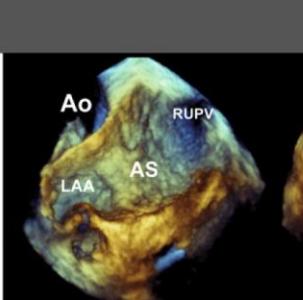


# 3 D Acquisition TEE

## Interatrial Septum

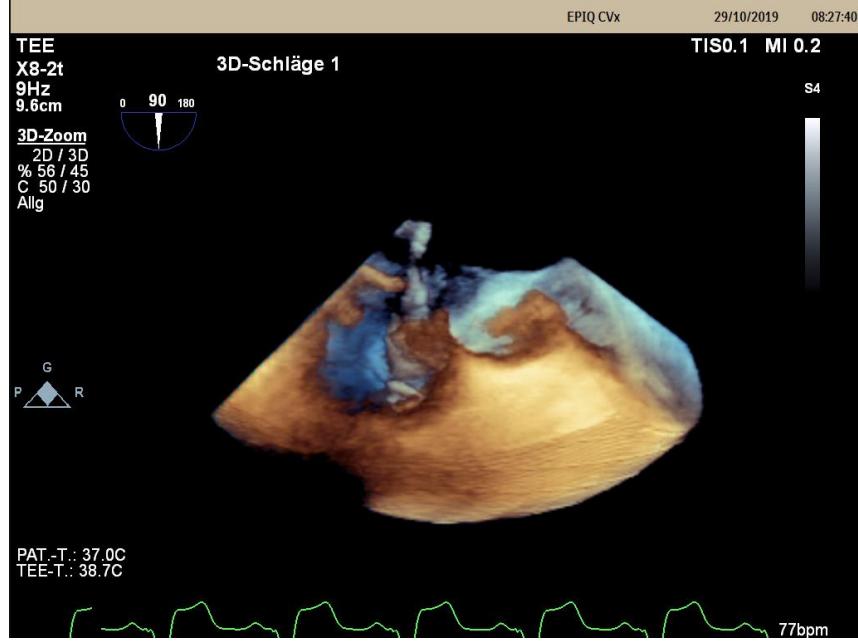
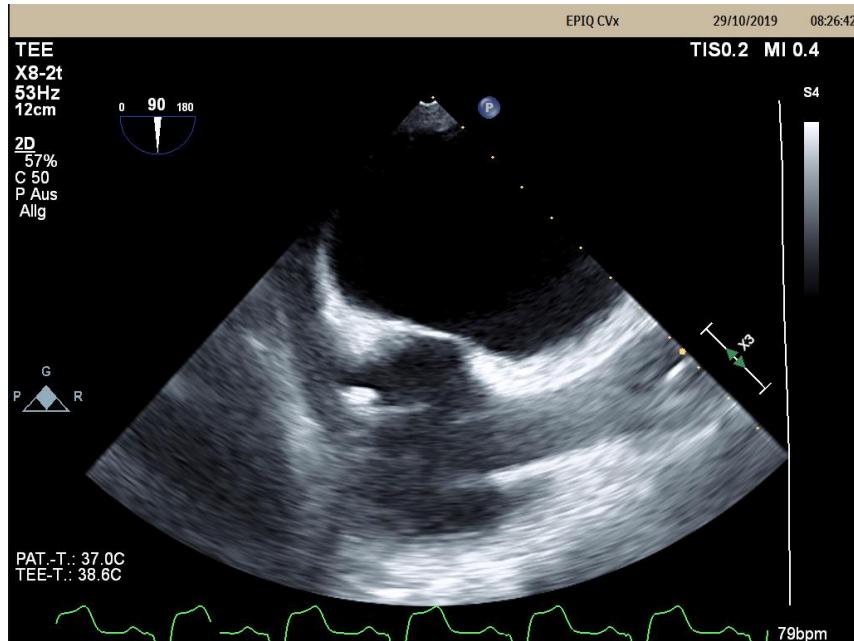
When viewed from the left atrium (left), the atrial septum should be oriented with the right upper pulmonary vein at the one o'clock position. When displayed as viewed from the right atrium (right), the superior vena cava should be located at the 11 o'clock position.

AS=atrial septum, Ao=aorta, LAA=left atrial appendage, RUPV=right upper pulmonary vein, SVC=superior vena cava

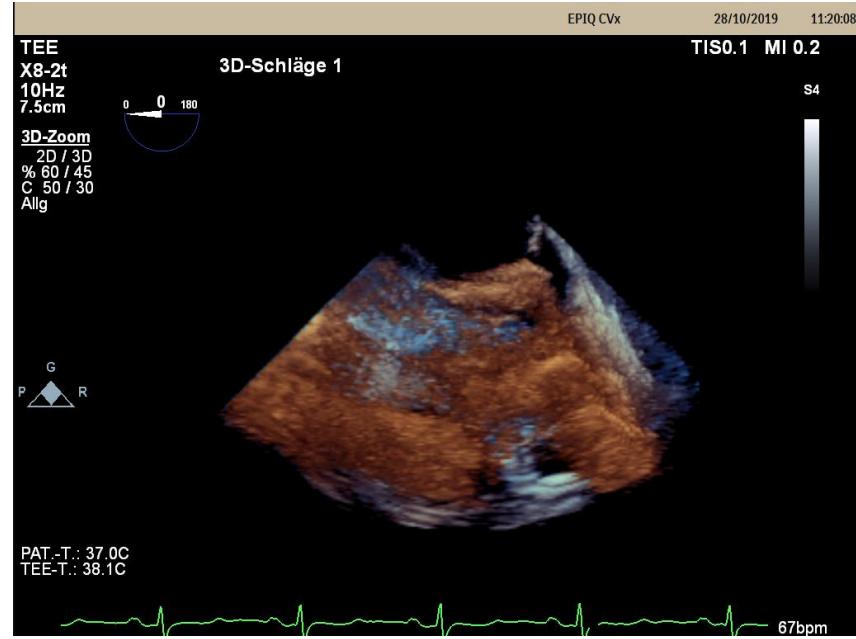
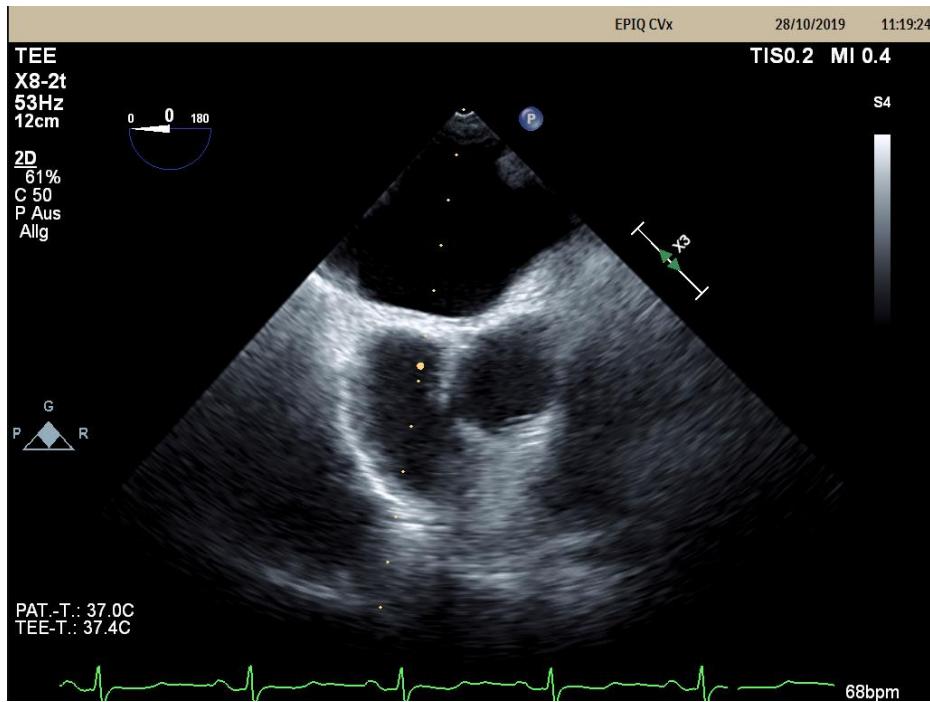


**Figure 26** Still image depicting the two perpendicular 2D TEE planes (A,B) used to acquire a zoomed 3D TEE data set of the interatrial septum (C). The left side of the atrial septum (AS) is shown in the en face perspective visualized after a 90° up-down rotation (curved arrow) of the data set (D). Image D can be cropped to remove the left half of the atrial septum (E), and when rotated 90° counter-clockwise (curved arrow), the entire course of the crista terminalis (CT) from the superior vena cava (SVC) toward the inferior vena cava (arrows) can be visualized, as seen in image F. Ao, Aorta; CS, coronary sinus; FO, fossa ovalis; LA, left atrium; RA, right atrium; RAA, right atrial appendage; RUPV, right upper pulmonary vein.

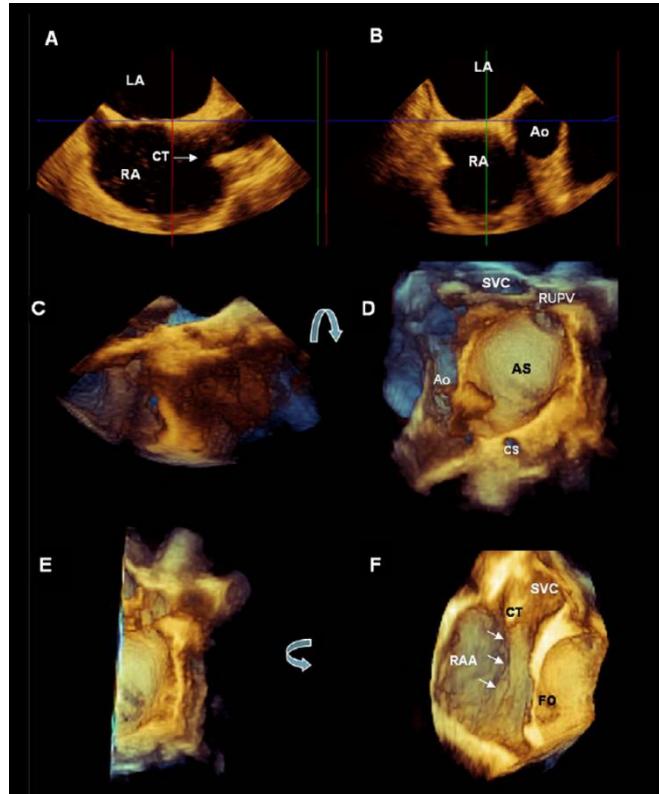
# 3 D Intratrial Septum



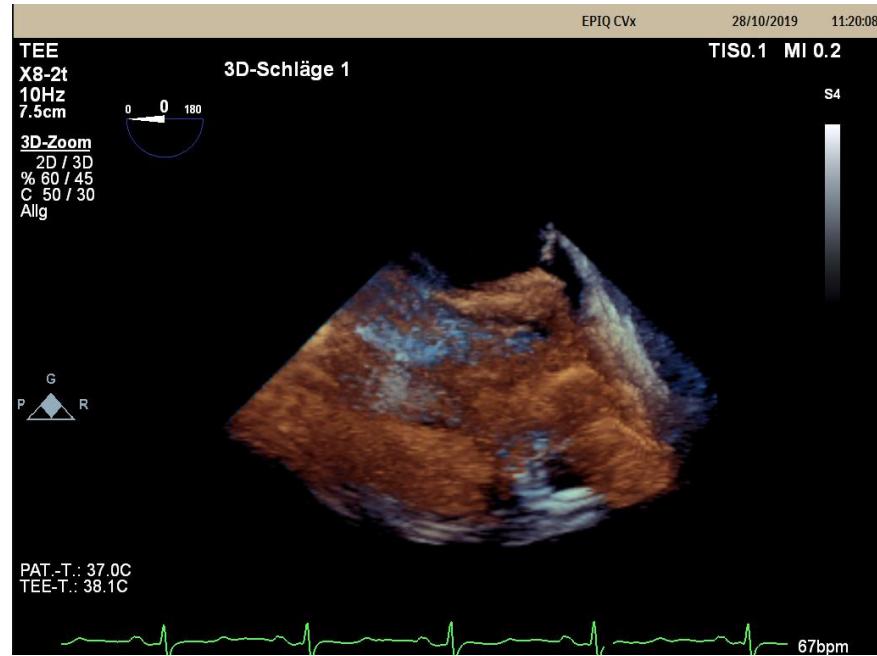
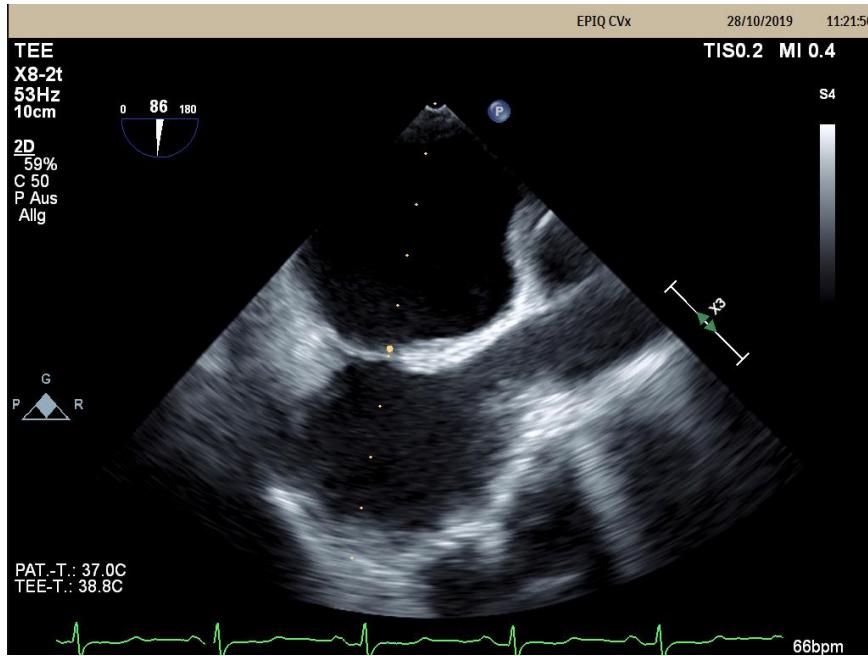
# 3 D Acquisition IAS



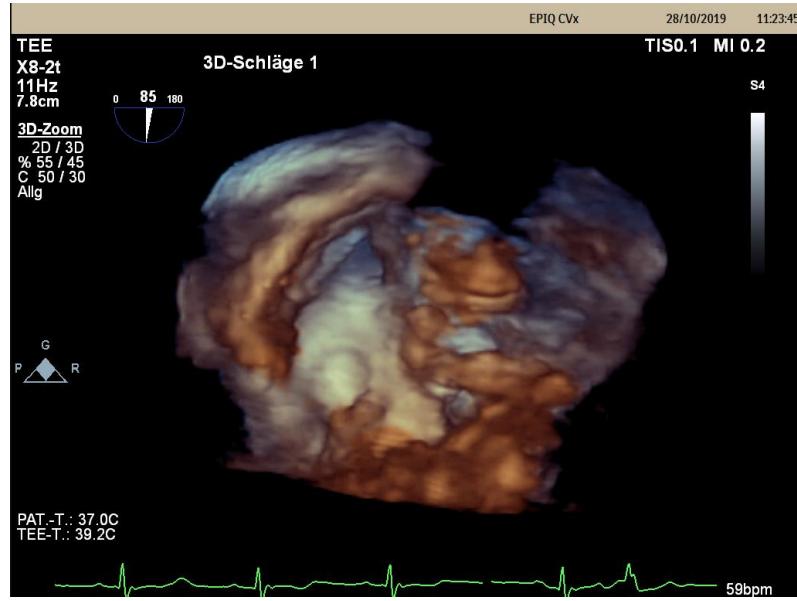
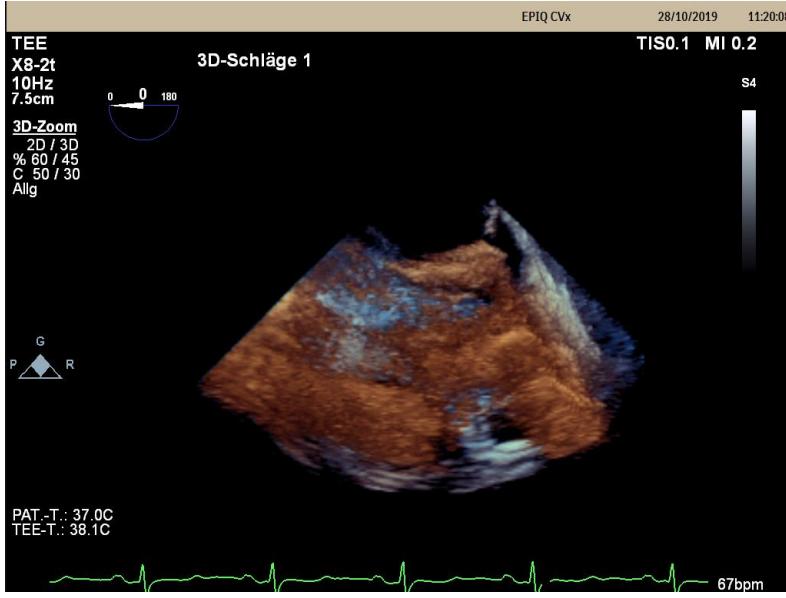
# 3 D presentation of intraatrial septum



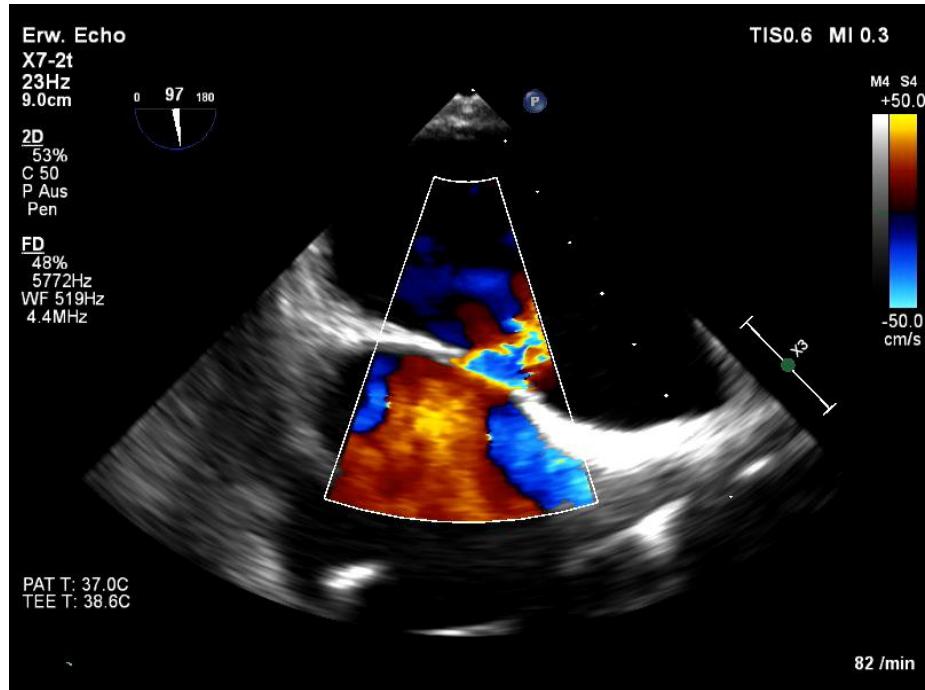
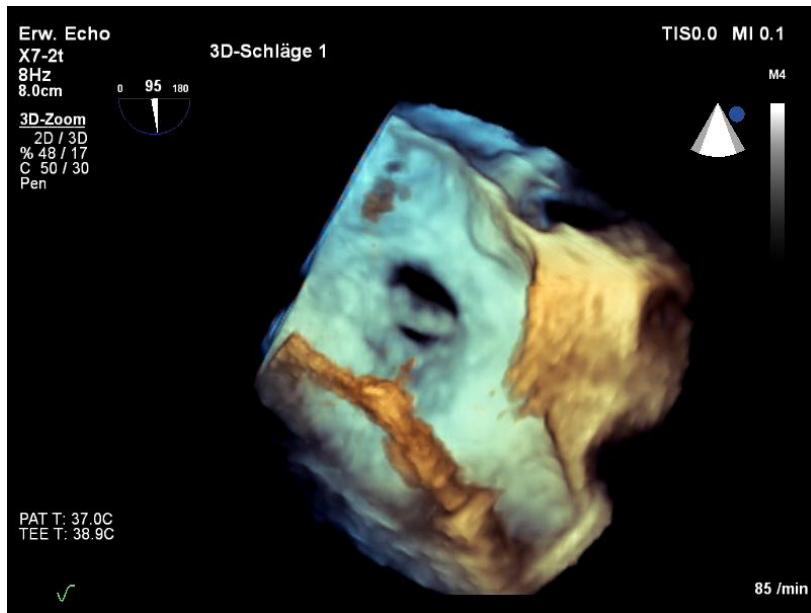
# Intraatrial Septum



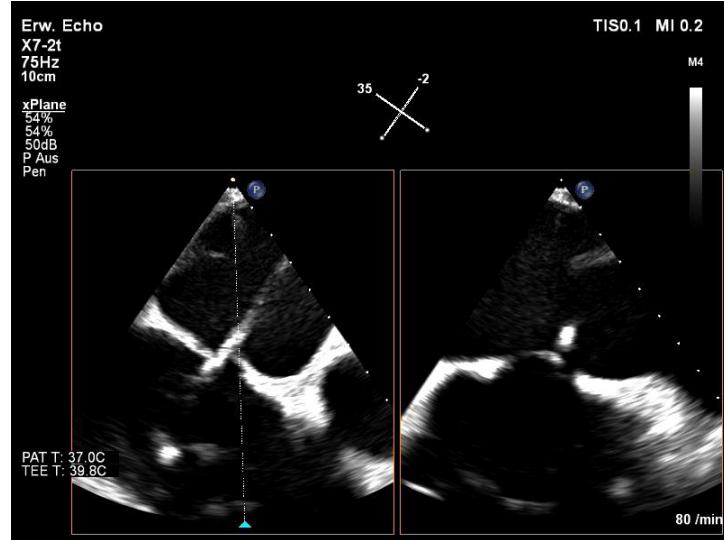
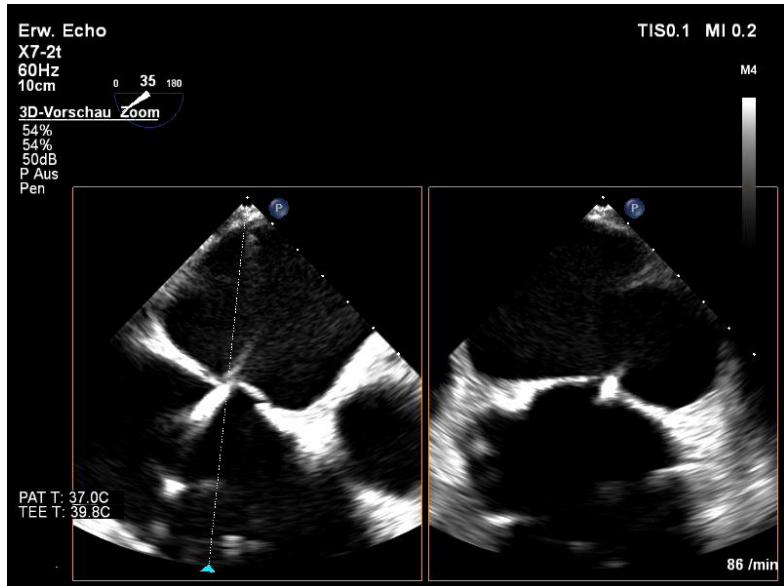
# Intraatrial Septum



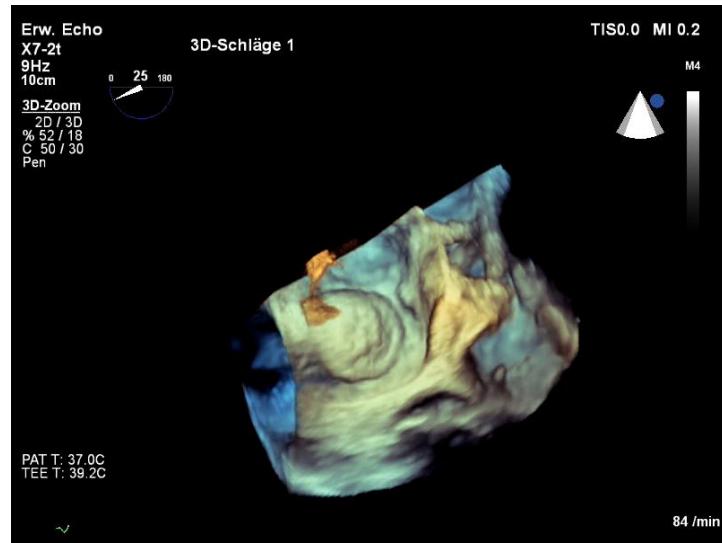
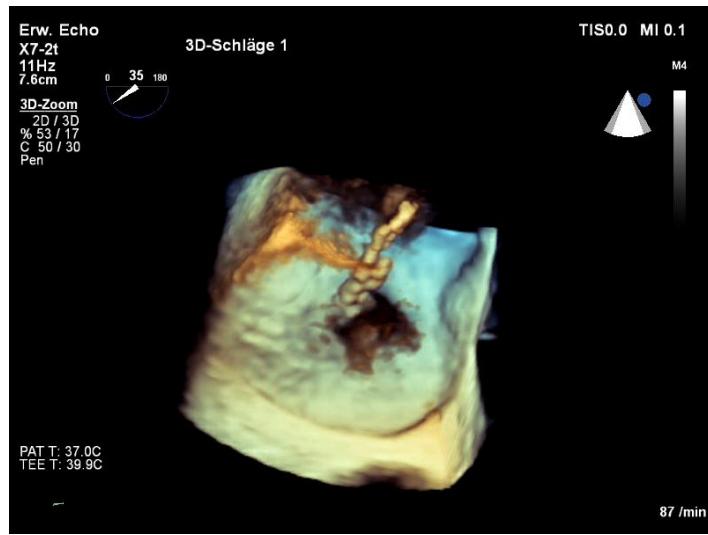
# ASD



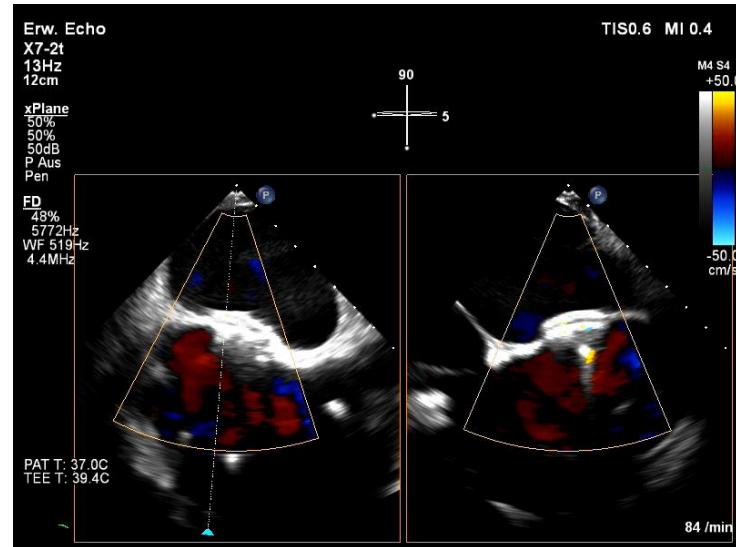
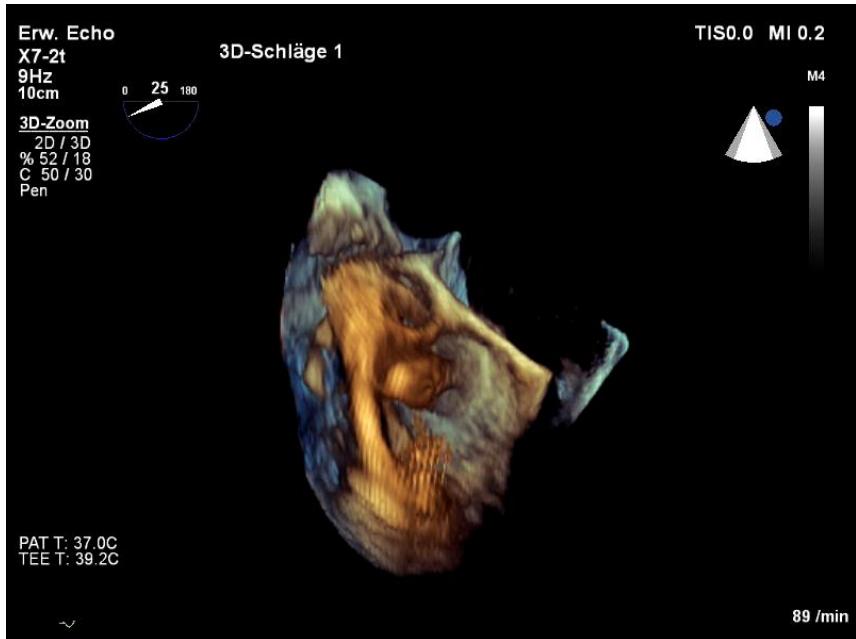
# ASD transseptal guidance



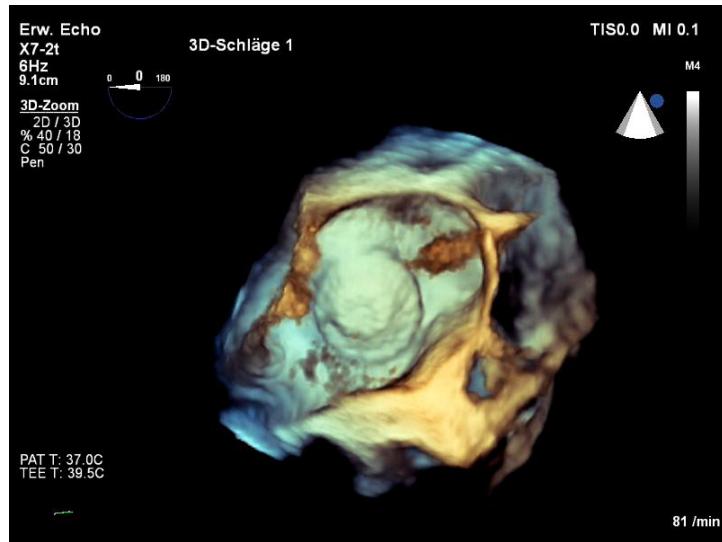
# ASD



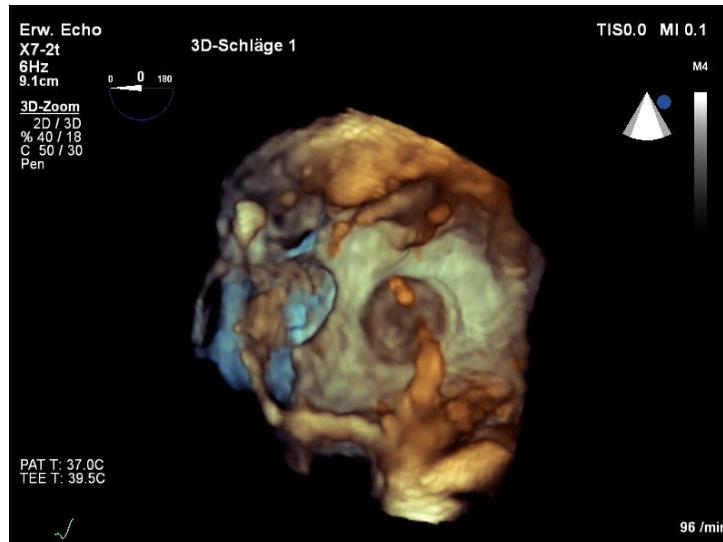
# ASD



# ASD      Intraatrial Septum

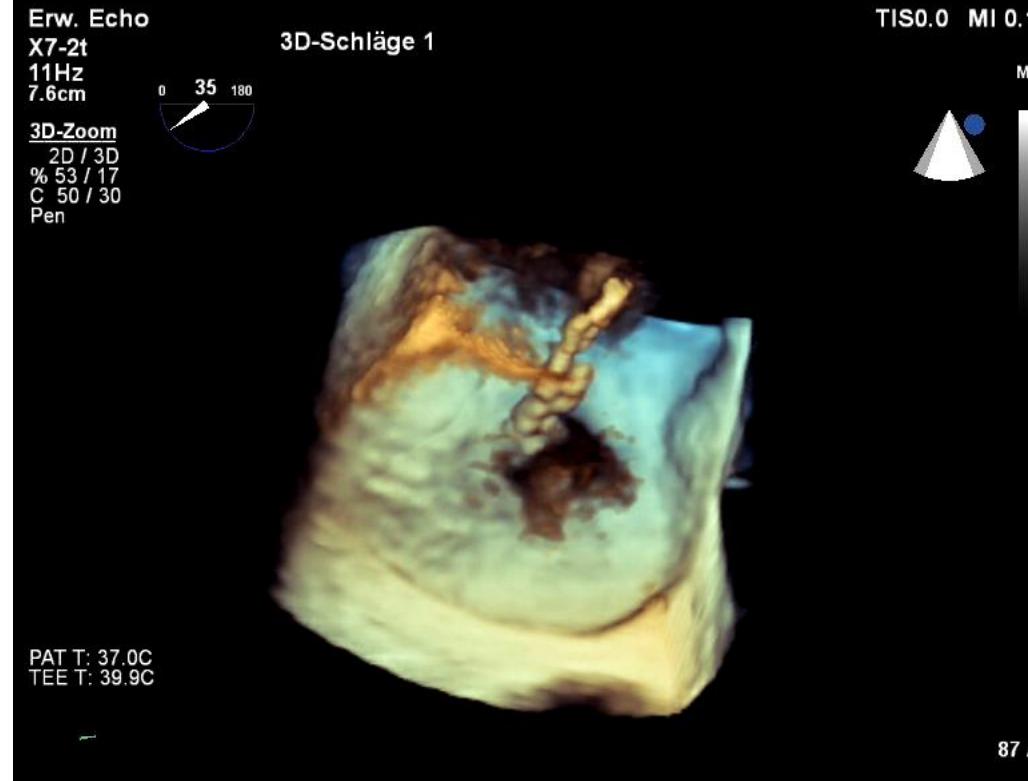
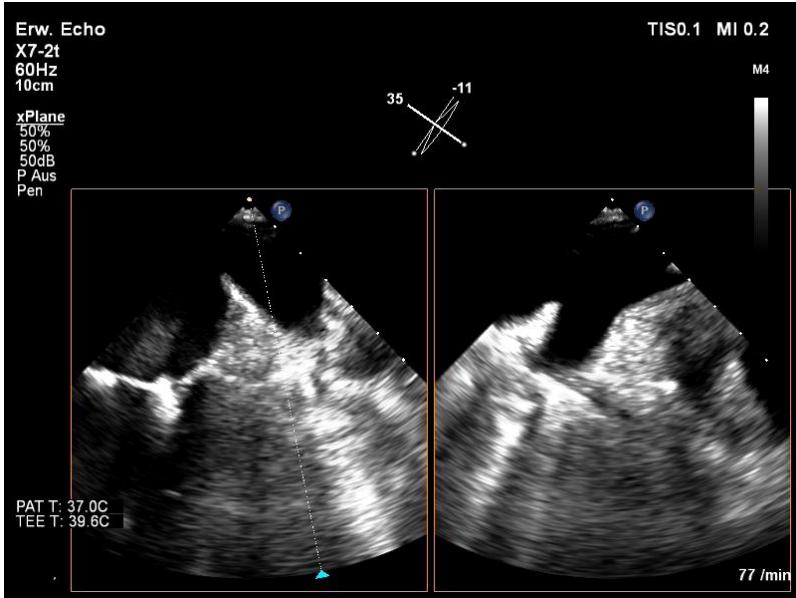


LA View

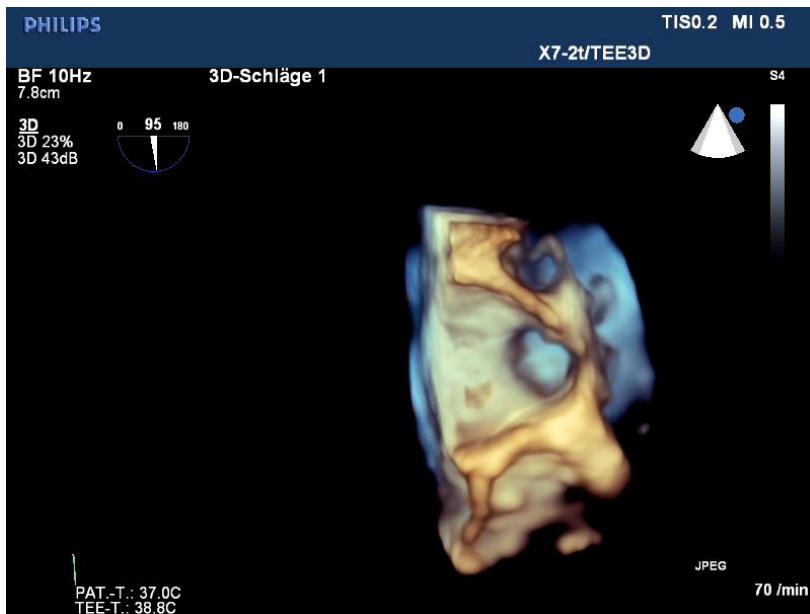
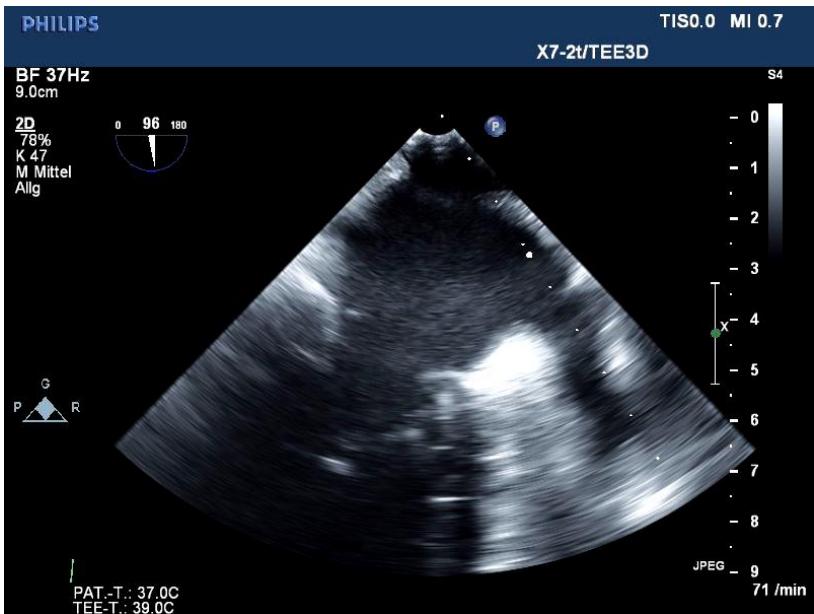


RA View

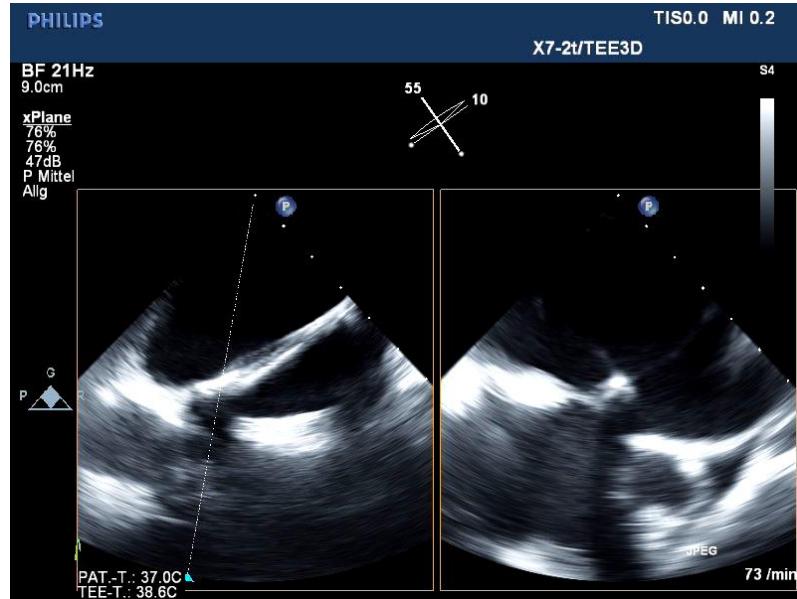
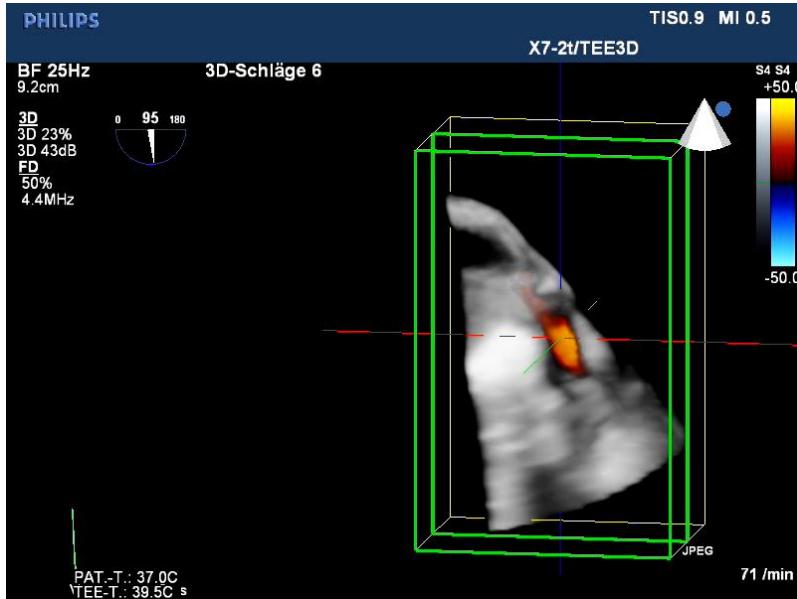
# LAA



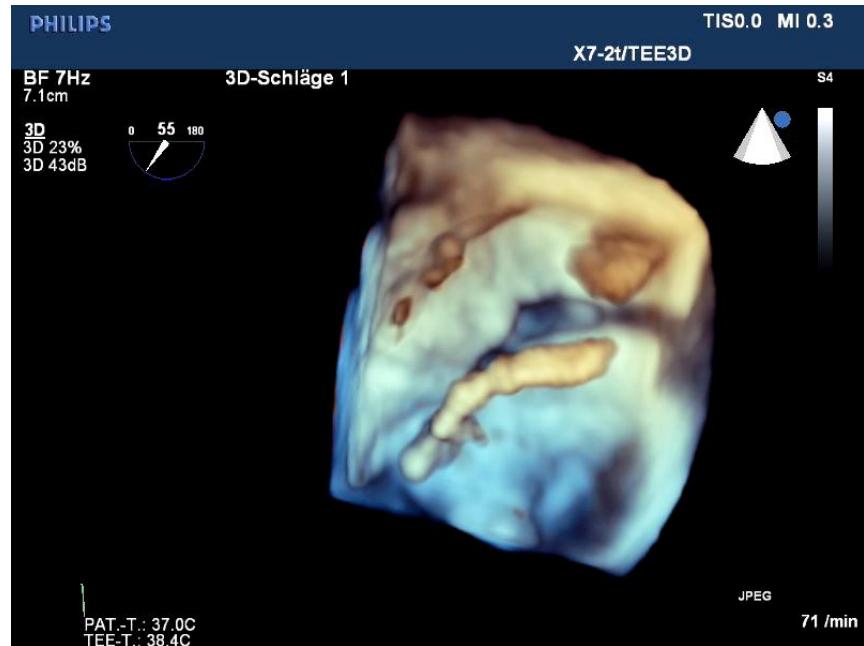
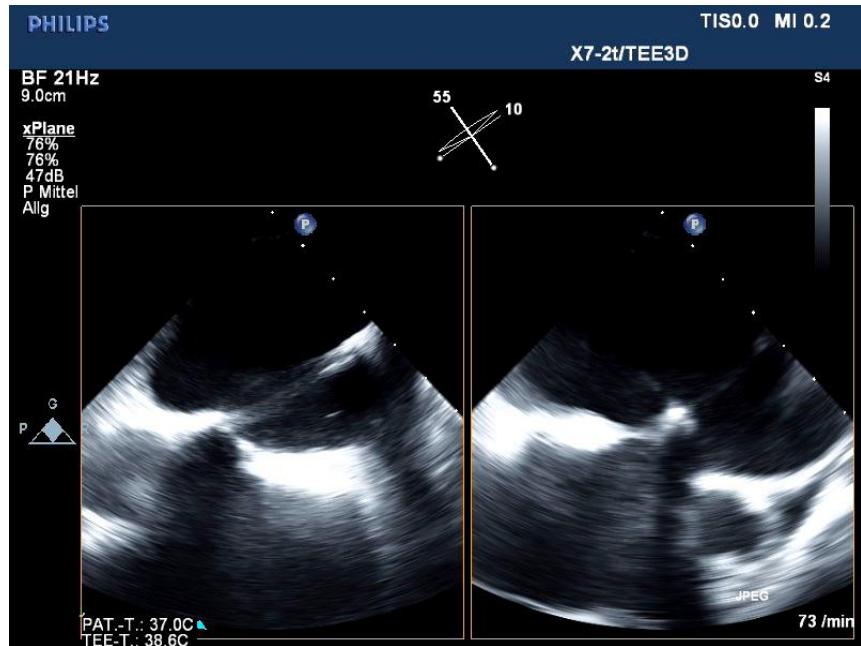
# LAA Closure



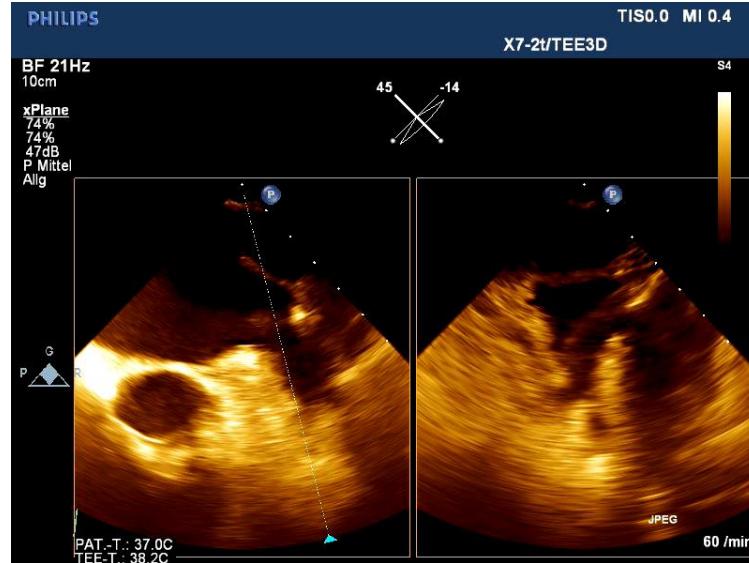
# LAA Closure



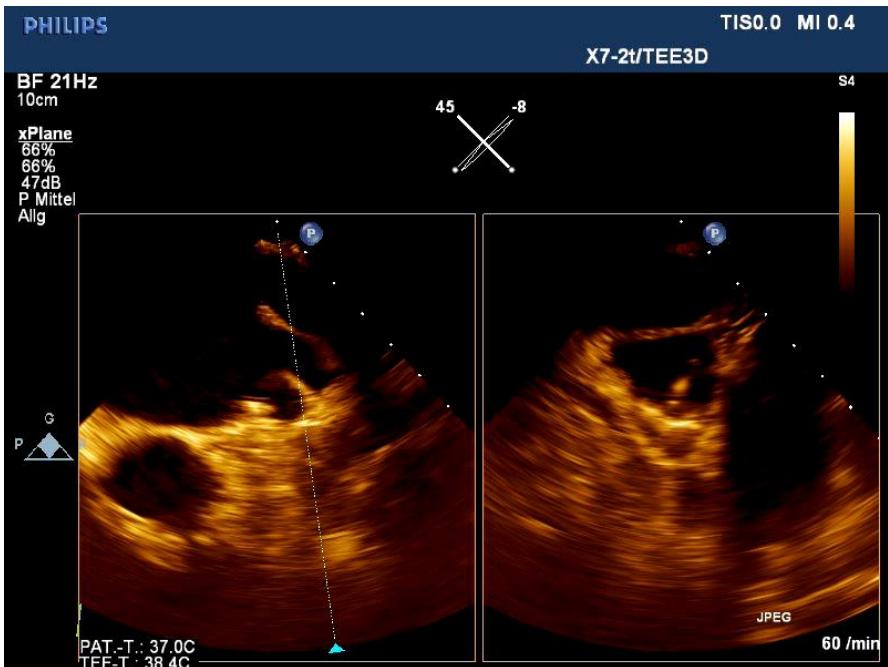
# LAA Closure



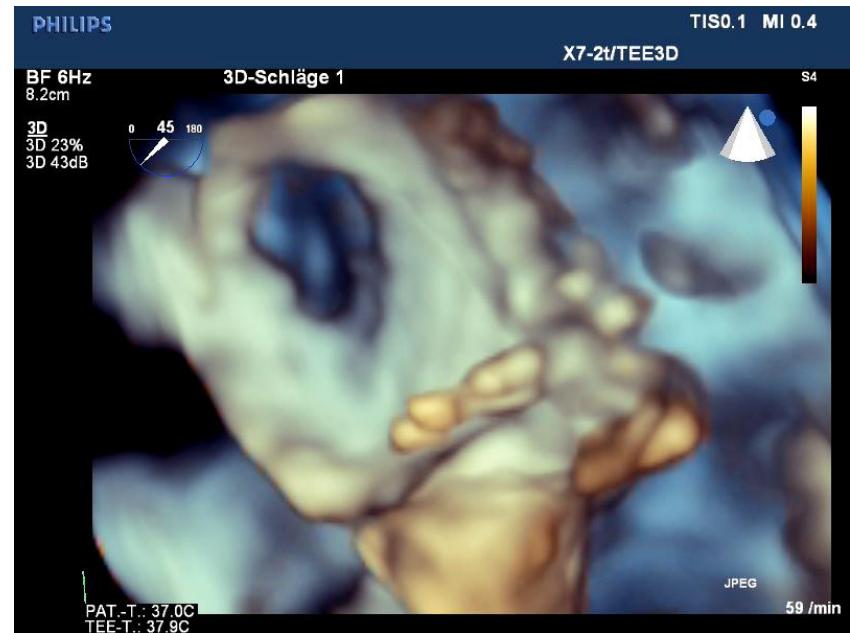
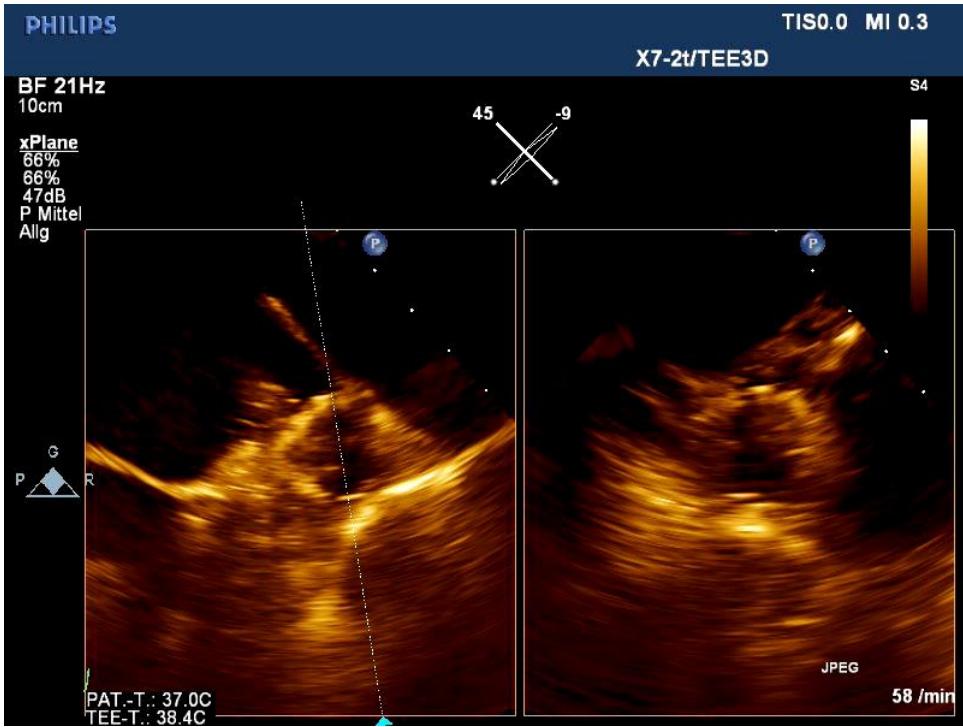
# LAA Closure



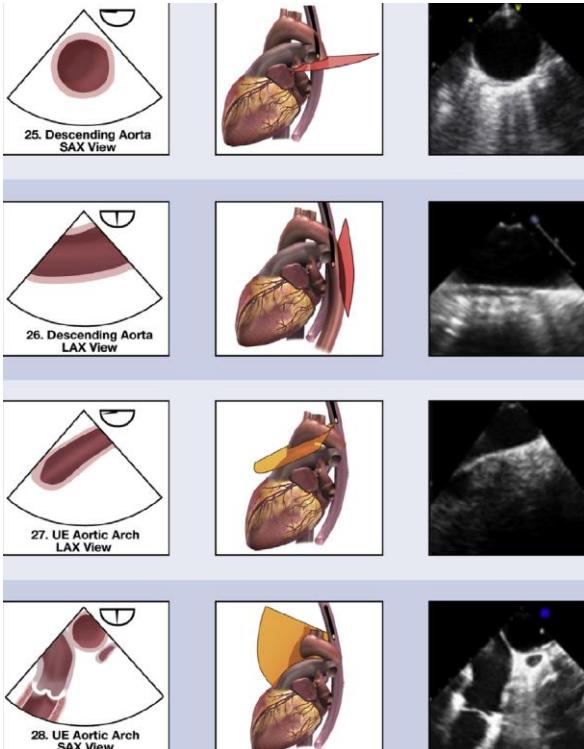
# LAA Closure



# LAA Closure



# Aorta 3D wide sector





# See you!

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