

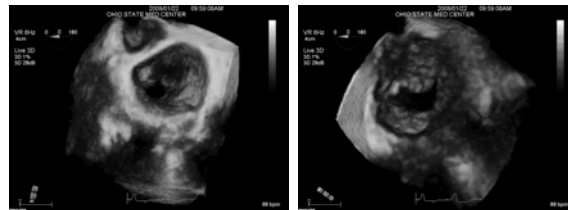
Advances in Cardiac Imaging

Focus On Valvular Heart Disease

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Joseph M. Ryan Chair in CV Medicine
Director, Cardiovascular Imaging
Ohio State University Medical Center

3-D Echocardiography

Real-Time TEE of MV

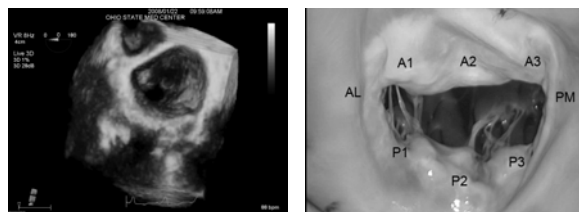


Surgical (Unroofed LA) View

LV View

3-D Echocardiography

Real-Time TEE of MV

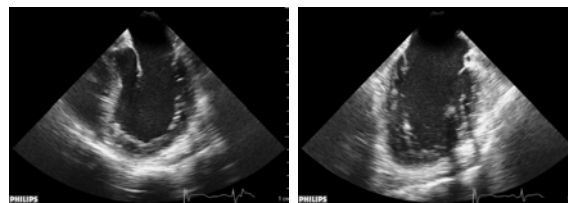


- Obtainable in > 80% of TEE studies

Courtesy: David Adams MD,
Mt. Sinai Medical Center, NY

2-D Echocardiography

Real-Time TEE of MV Anatomy



3-D Echocardiography

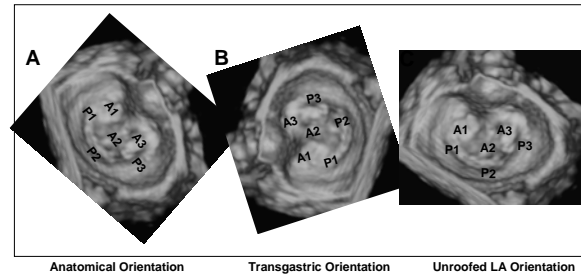
Real-Time TEE of MV



Let us see what 3-D offers: Demonstration

3-D Echocardiography

Real-Time TEE of MV Anatomy



Anatomical Orientation

Transgastric Orientation

Unroofed LA Orientation

JACC Imaging (in press): Figure from University of Chicago, Lang MD

Live 3-D Echocardiography

Impact on Clinical Practice

JACC: CARDIOVASCULAR IMAGING
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REVIEWS

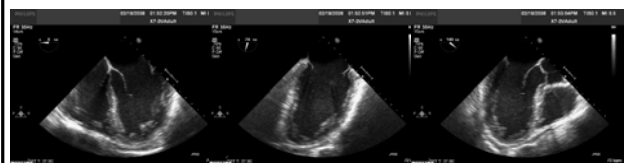
FROM PICTURES TO PRACTICE PARADIGMS

The Role of Imaging in Chronic Degenerative Mitral Regurgitation

Patrick O'Gara, MD, FACC,* Lissa Sugeng, MD, FACC,† Roberto Lang, MD, FACC,‡
Maurice Sarano, MD, FACC,§ Judy Hung, MD, FACC,¶ Subha Raman, MD, FACC,||
Blasé Carabello, MD, FACC,** David Adams, MD, FACC,† Mani Vannan, MBBS FACC||

2-D Echocardiography

Real-Time TEE of Abnormal MV



What is the abnormal anatomy ?

2-D Echocardiography

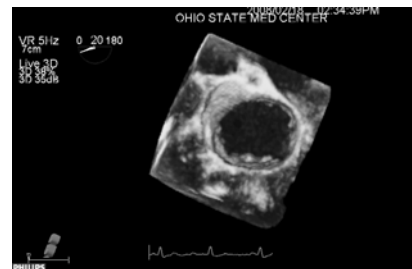
Real-Time TEE of Abnormal MV



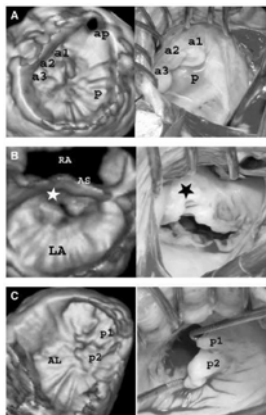
Now what is the abnormal anatomy ?

3-D Echocardiography

Real-Time TEE of Abnormal MV Anatomy



P2 and P3 Prolapse; maybe P1 also



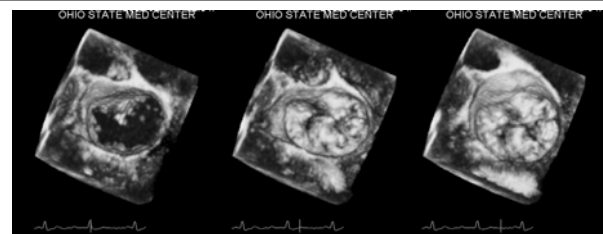
3-D Echocardiography

*2-D Vs. 3-D TEE for
Localization of
Abnormal Anatomy
in MV Repair*

3-D Vs 2-D TEE in MV repair, Garcia-Orta R et al, JASE 2007 20(1):4-12

3-D Echocardiography

Real-Time TEE of Posterior MV Leaflet Prolapse



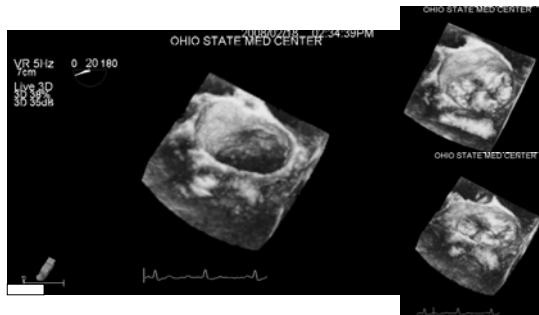
Diastole

Mid Systole

Late Systole

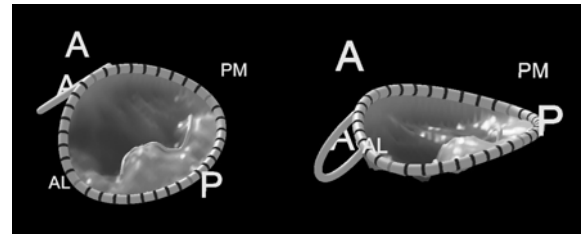
3-D Echocardiography

Real-Time TEE of Posterior MV Leaflet Prolapse



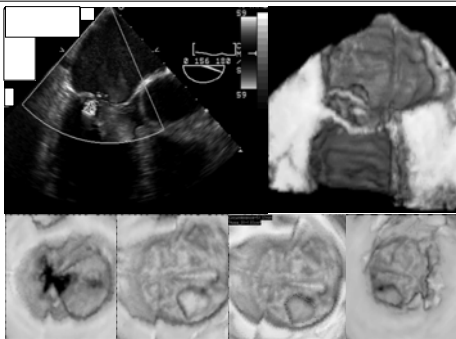
3-D Echocardiography

Real-Time TEE of Mitral Leaflets and Annulus



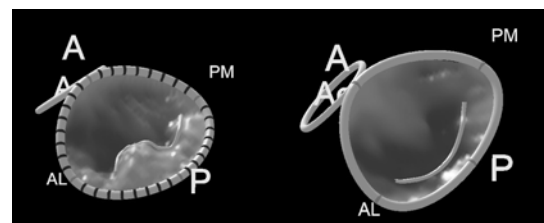
3-D Echocardiography

Localization and Quantification of MVP Volume



3-D Echocardiography

Real-Time TEE of Mitral Leaflets and Annulus



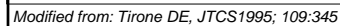
MVP

Normal

Quantitative Real-Time TEE of Mitral Leaflets and Ring

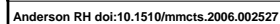
Dilated Sino-Tubular Junction

What Does The Surgeon Need From The Imager ?

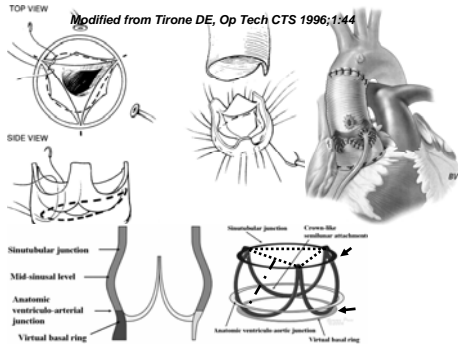


Ascending Aortic Aneurysm

What Does The Surgeon Need From The Imager ?

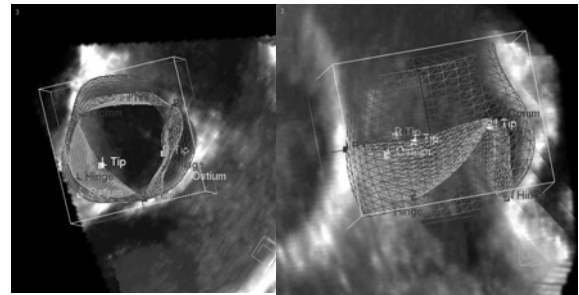


Ascending Aortic Aneurysm What Does The Surgeon Need From The Imager ?

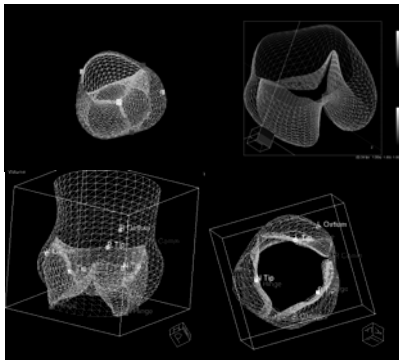


Anderson RH doi:10.1510/mmcts.2006.002527

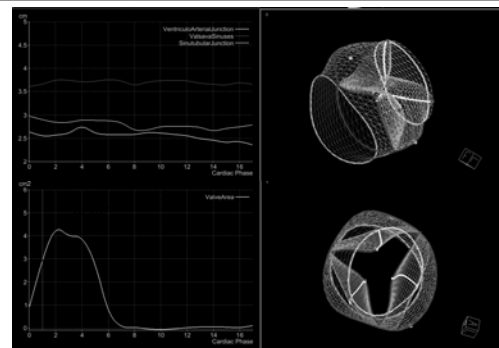
Quantitative 3-D Echocardiography of The Aortic Valve and Aortic Root



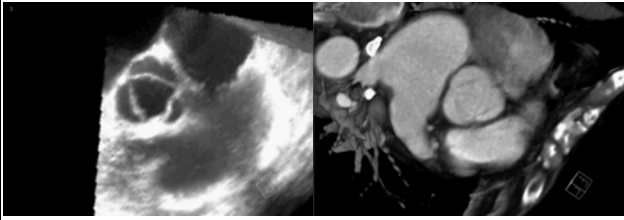
Aortic Valve and Root Modeling 3-D Echocardiography



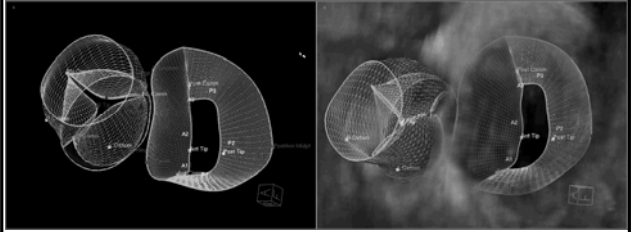
3-D Automated Quantification of Aortic Valve and Root



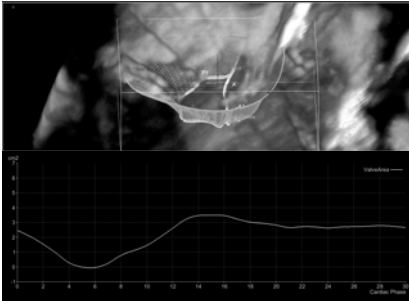
3-D Automated Quantification of Aortic Valve and Root – TEE and CT



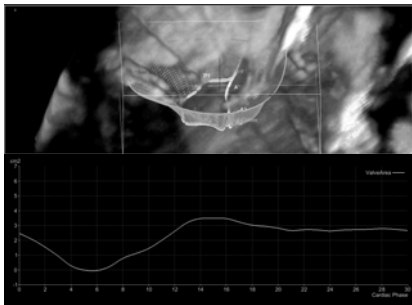
3-D Automated Quantification of The Mitral Valve and The Aortic Root



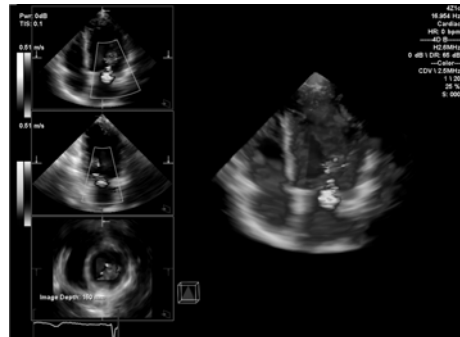
3-D Automated Quantification of The Mitral Valve



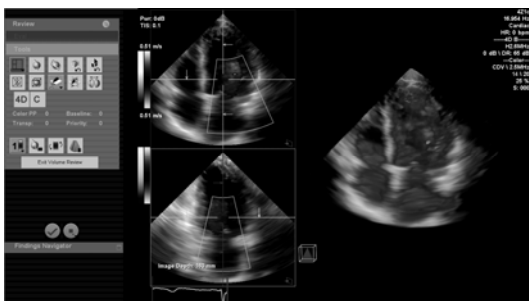
The figure displays a 3-D automated quantification of the mitral valve. The top panel shows a grayscale 3D reconstruction of the mitral valve structure, with a white line indicating the valve's position. The bottom panel is a line graph showing the 'Volume (mm³)' on the y-axis (ranging from 0 to 10) versus 'Volume (mm³)' on the x-axis (ranging from 0 to 28). The graph shows a curve that starts at approximately 8 mm³, dips to a minimum of about 4 mm³ at x=6, rises to a peak of about 8 mm³ at x=16, and then levels off around 7 mm³ for x values from 20 to 28. A legend in the top right corner indicates 'Volume (mm³)' with a corresponding line segment.



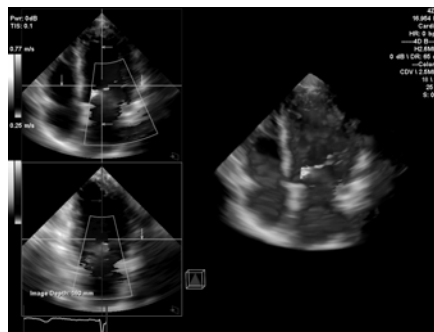
Real-Time Volume Imaging *Flow-Function*



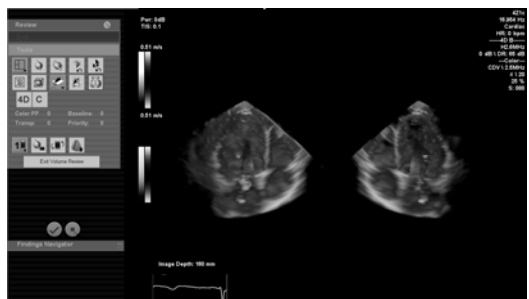
Real-Time Volume Imaging *Flow-Function*



Real-Time Volume Imaging *Flow-Function*



Real-Time Volume Imaging *Flow-Function*

[illegible]

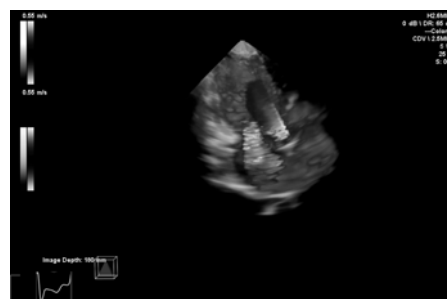
Courtesy – Nathalie DeMichelis

Real-Time Volume Imaging *Flow-Function*



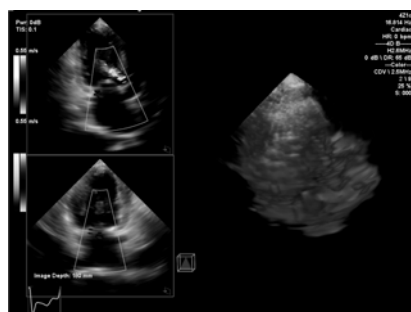
Courtesy – Nathalie DeMichelis

Real-Time Volume Imaging *Flow-Function*



Courtesy – Nathalie DeMichelis

Real-Time Volume Imaging *Flow-Function*



Courtesy – Nathalie DeMichelis