L’anatomia cardiaca esplorata con tecniche di immagine non invasive

Francesco F Faletra
Fondazione Cardiocentro Ticino

The Mitral annulus

The mitral annulus is a *concept* rather than a well-distinguished anatomic entity and it is defined differently by anatomists, surgeons or imagers….

Mitral annulus

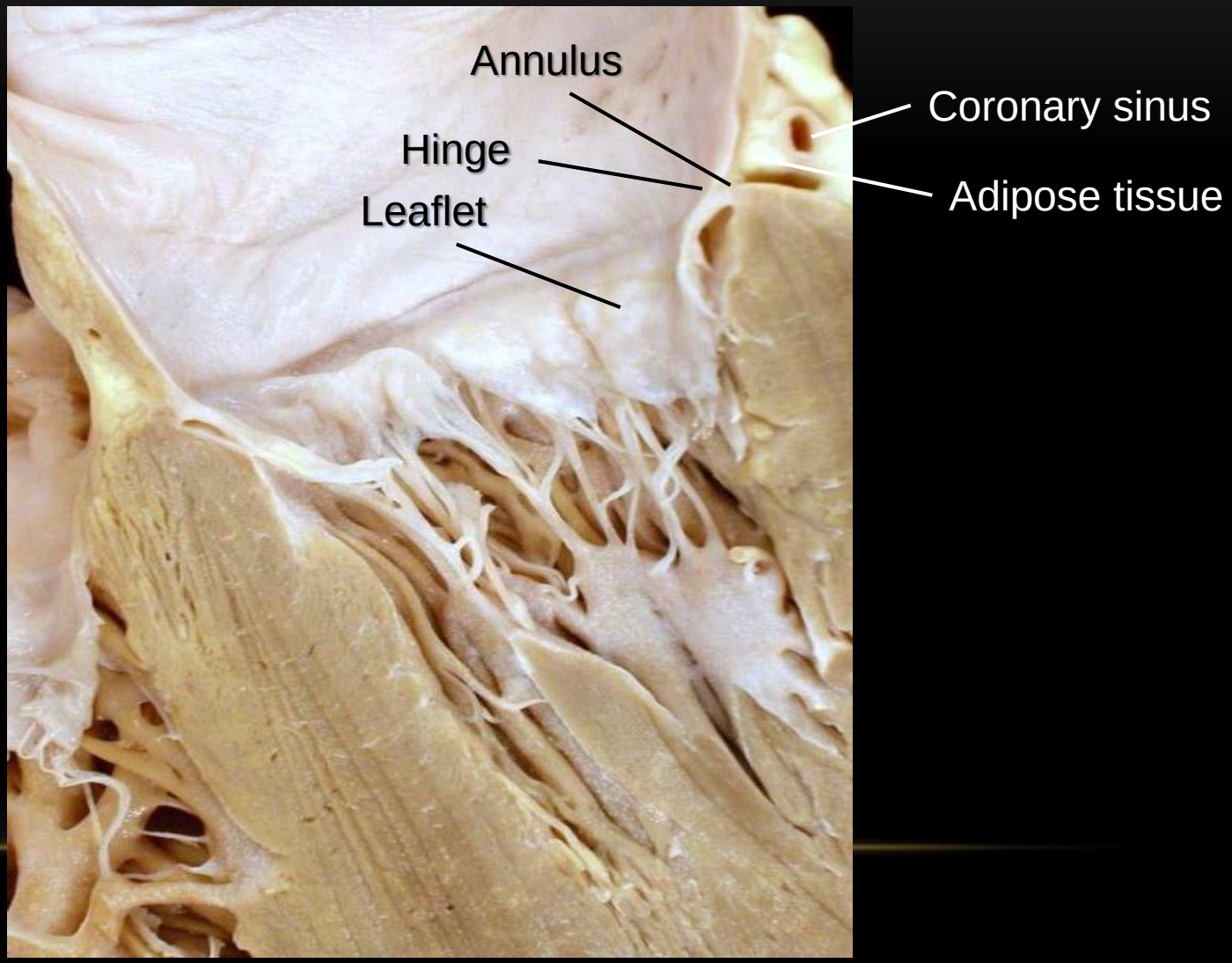
The posterior mitral annulus

The posterior annulus from an *anatomical* point of view……

" The posterior annulus is a junction between three anatomical structures: The *atrial wall*, the *leaflet hinge* and the *crest of the ventricle*. This junction *may be filled irregularly by a cord of more or less dense connective tissue* "

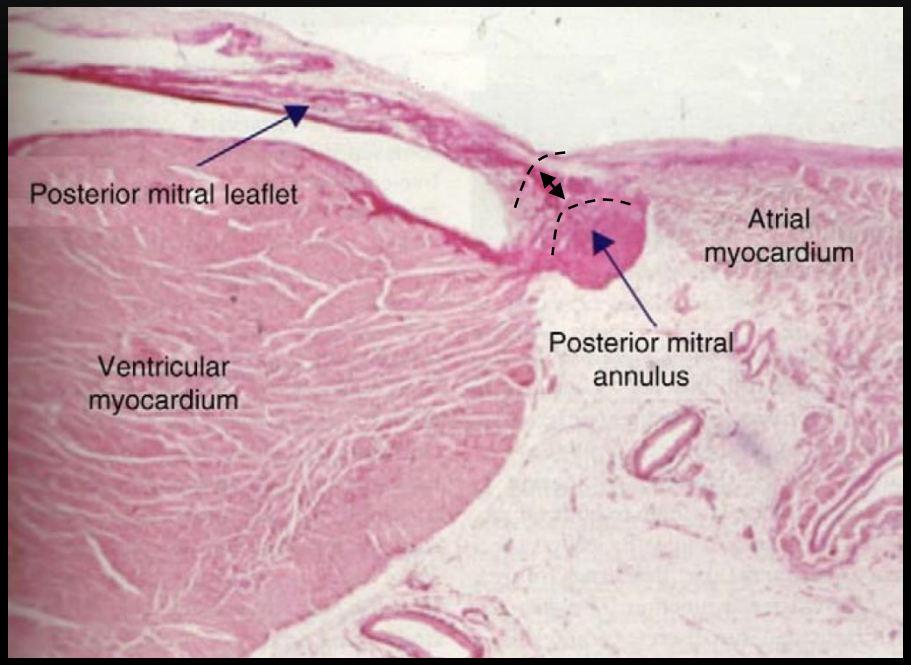
The posterior annulus

From an anatomical point of view



The posterior annulus

From an anatomical point of view



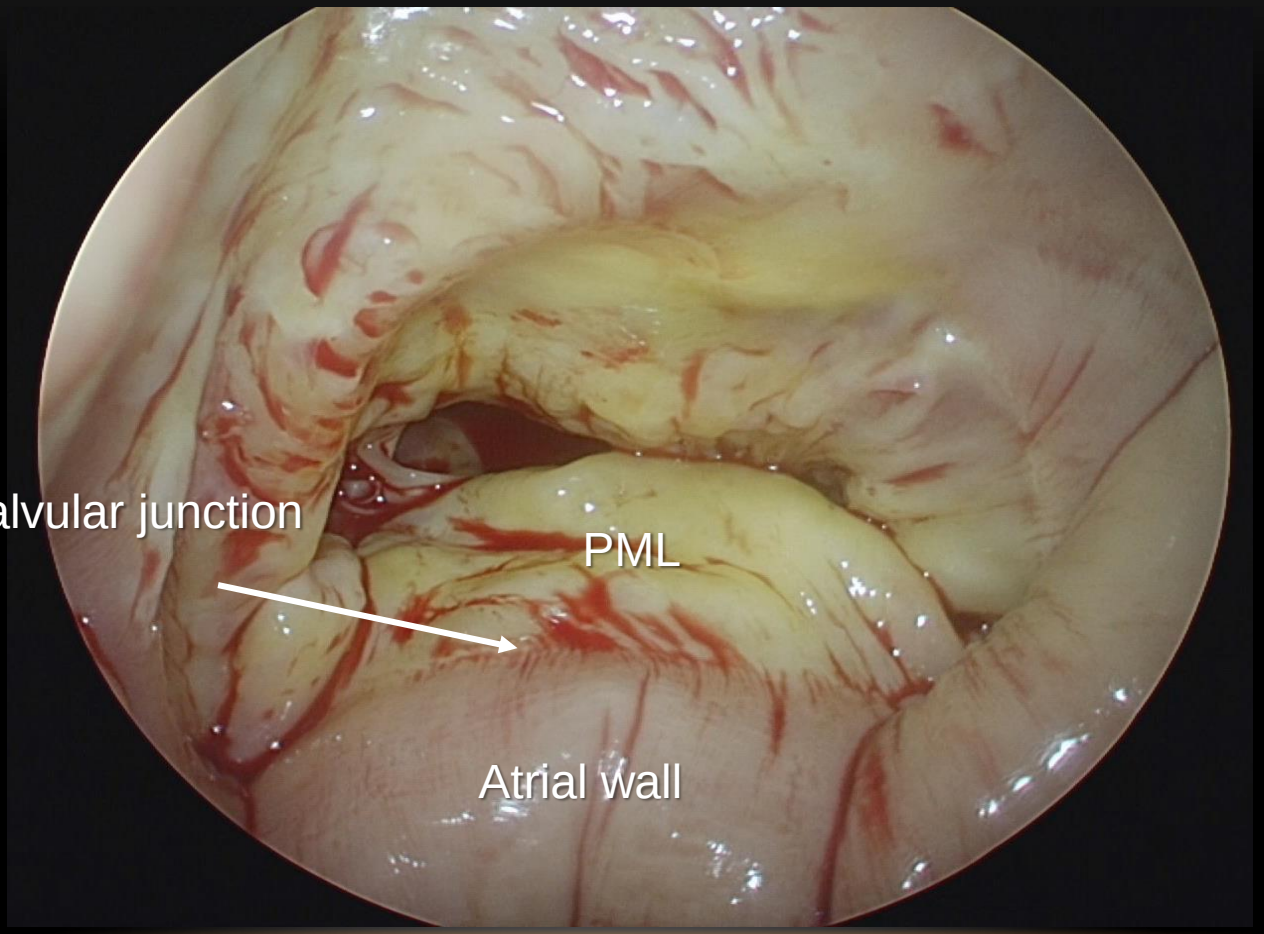
Wilcox BR, Cook AC, Anderson RH,
Surgical anatomy of the valves of the heart. In: Surgical anatomy of the heart. New York: Cambdridge University Press; 2004. p. 55).

Posterior annulus from a *surgical* point of view…..

" The posterior annulus is the *"transition zone"* between the brownish atrial wall and whitish posterior leaflet: the *atrio-valvular junction "*

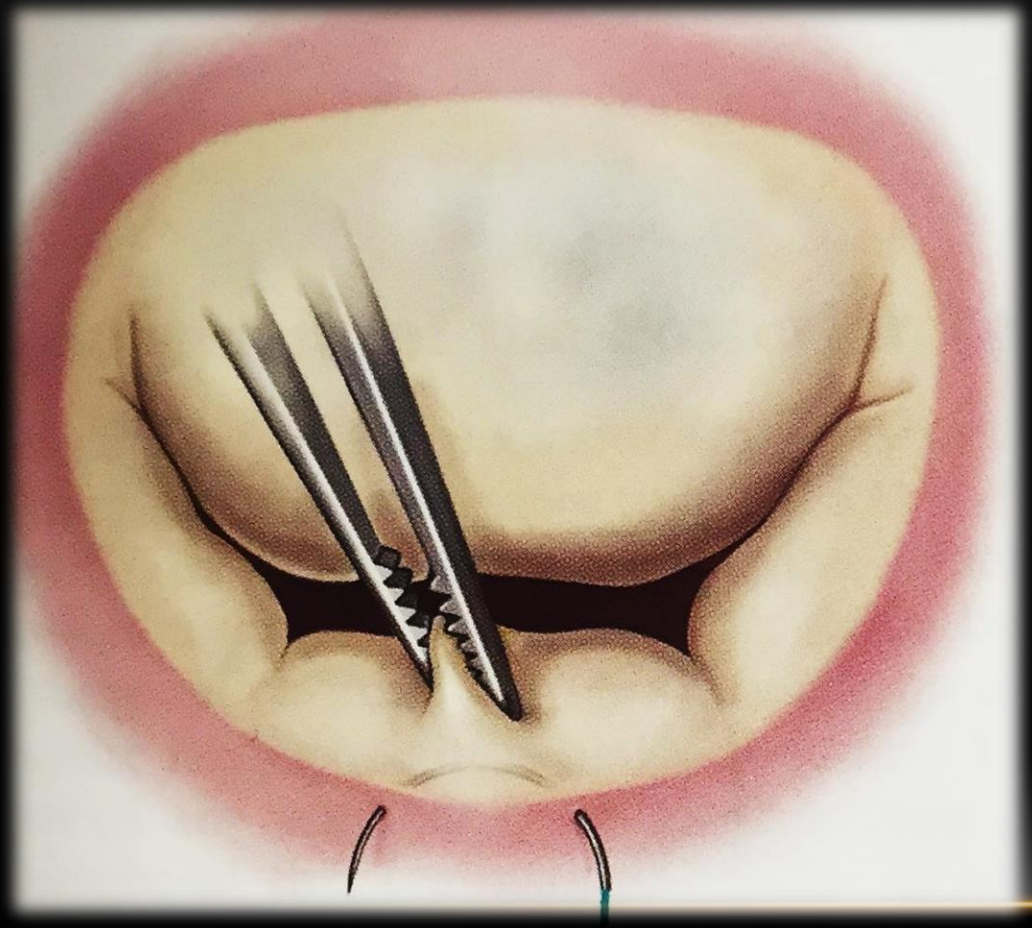
The posterior annulus

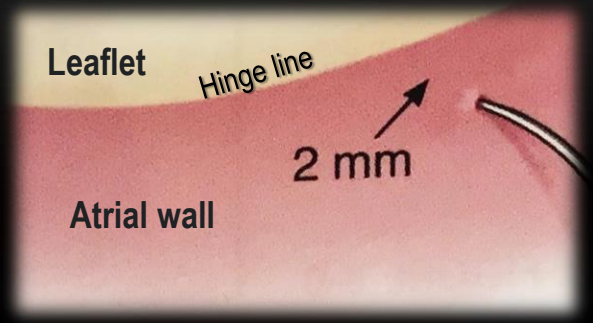
From a surgical point of view

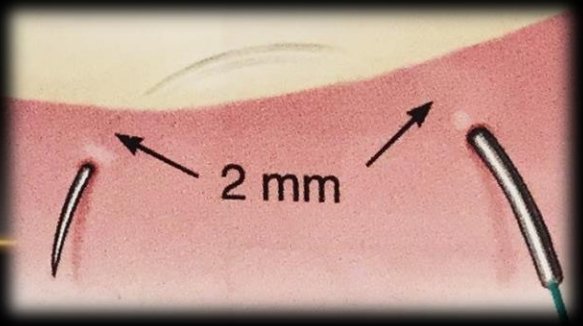


The posterior annulus

From a surgical point of view







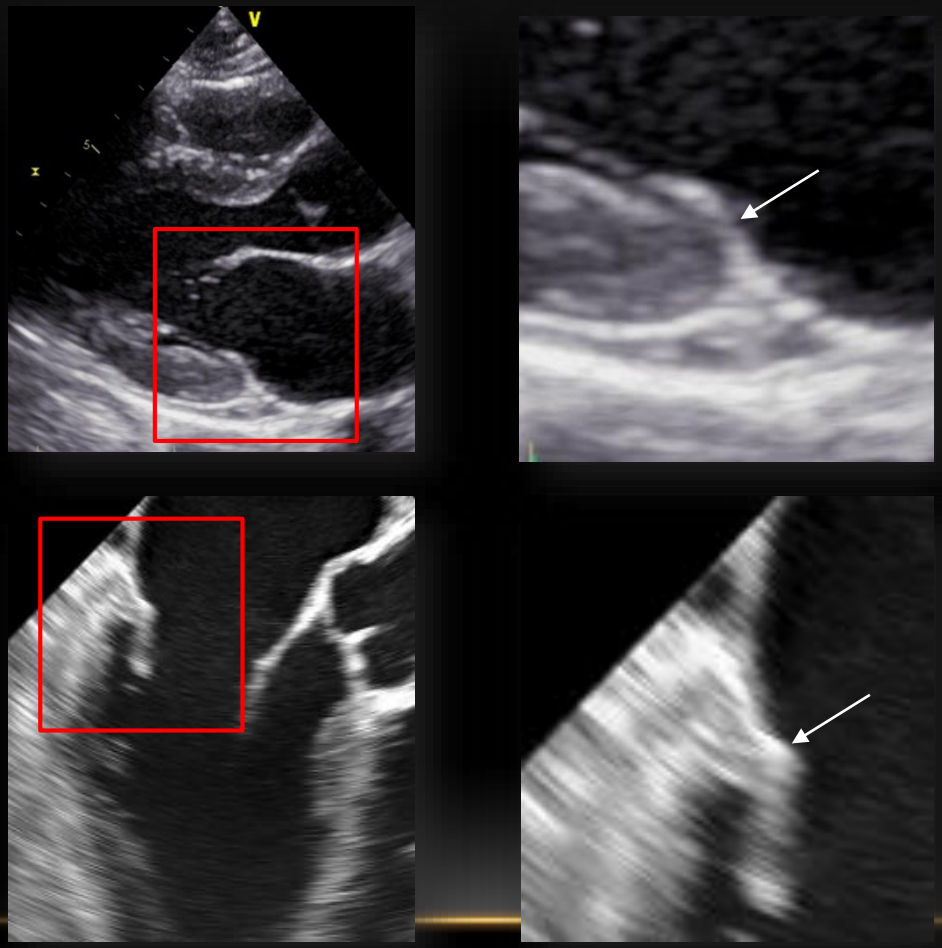
Carpentier's Reconstructive Valve Surgery Saunders Elsevier 2010

Posterior annulus from an *imager's* point of view……

" The posterior annulus is the *hinge line* between posterior leaflet and left atrial wall "

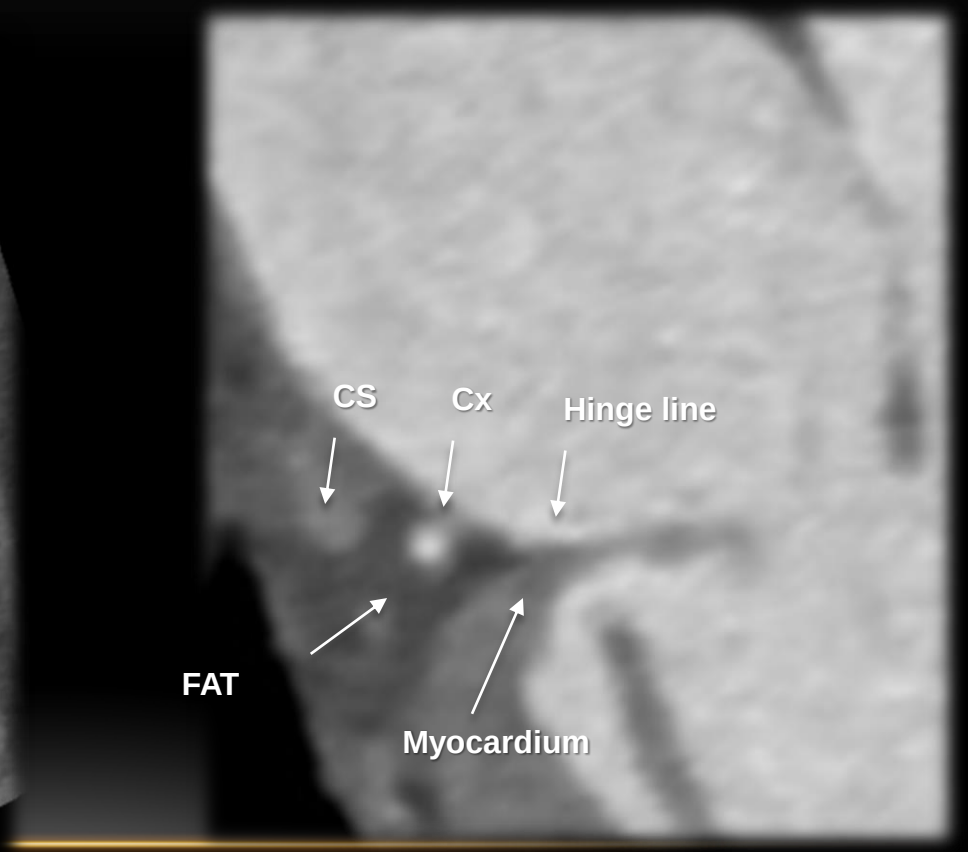
The posterior annulus

From an imager's point of view



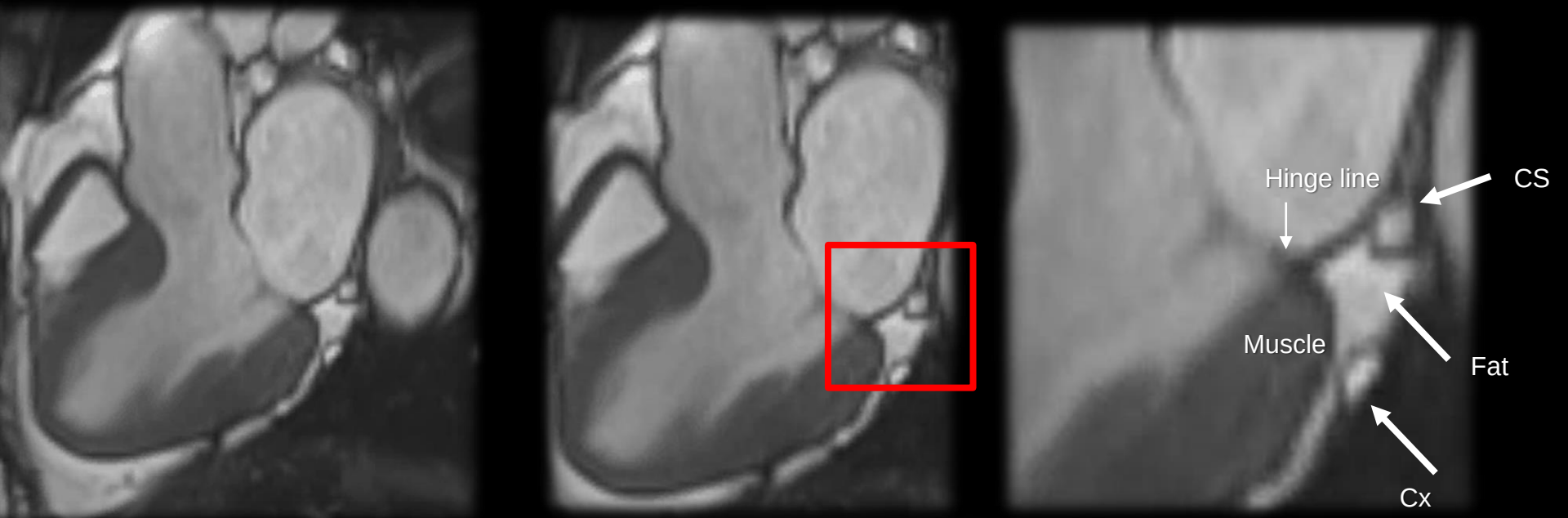
The posterior annulus

From an imager's point of view



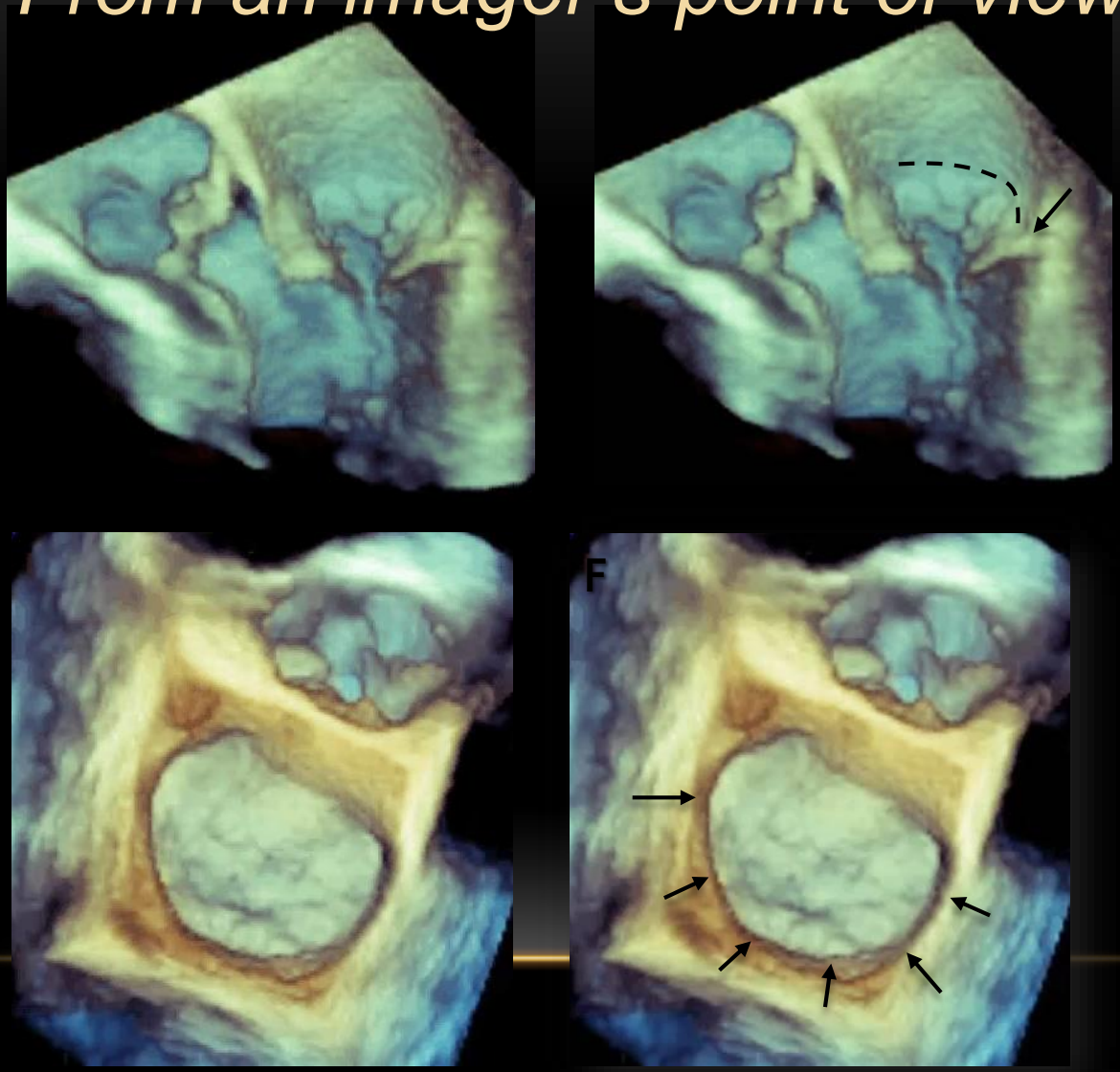
The posterior annulus

From an imager's point of view



The posterior annulus

From an imager's point of view

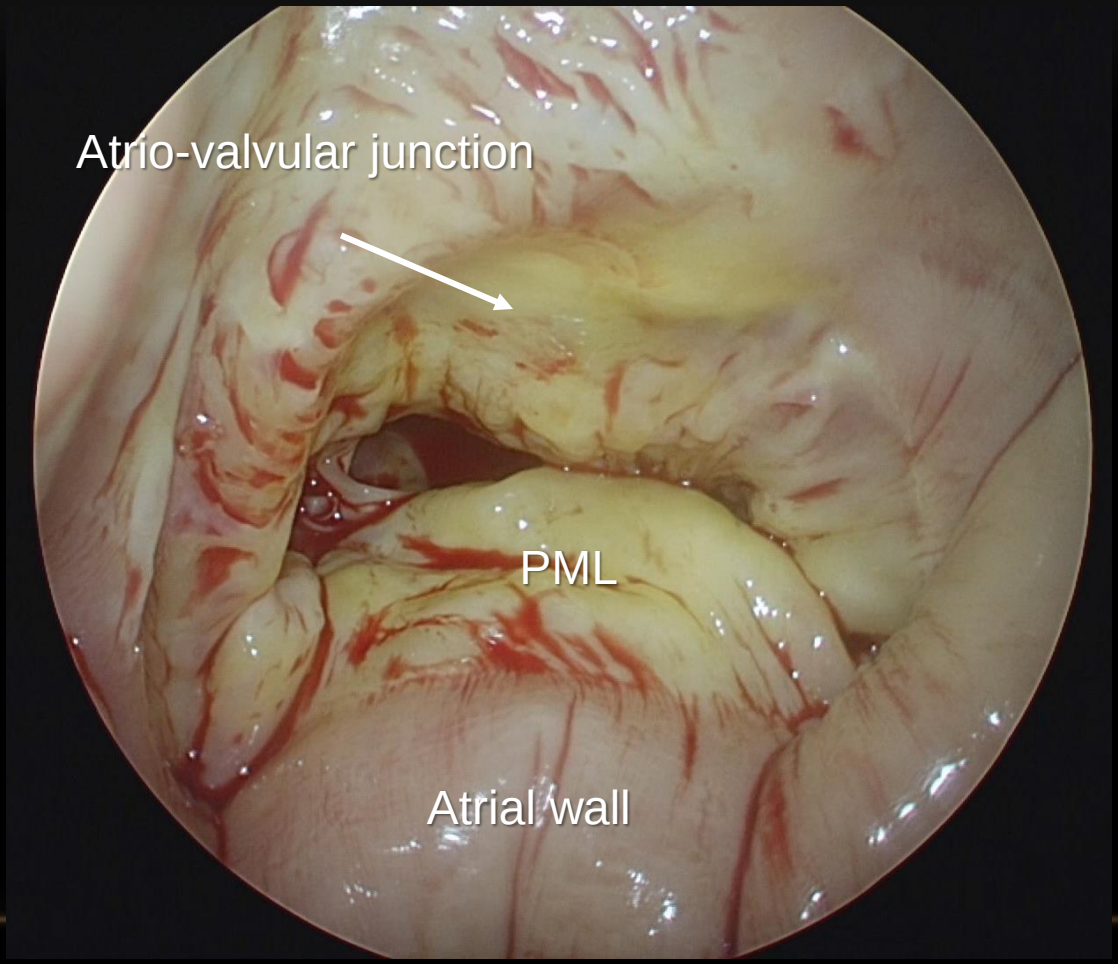


The anterior mitral annulus

The anterior mitral annulus considered as a chord of connective tissue that anchors the anterior leaflets simply *does not exist*

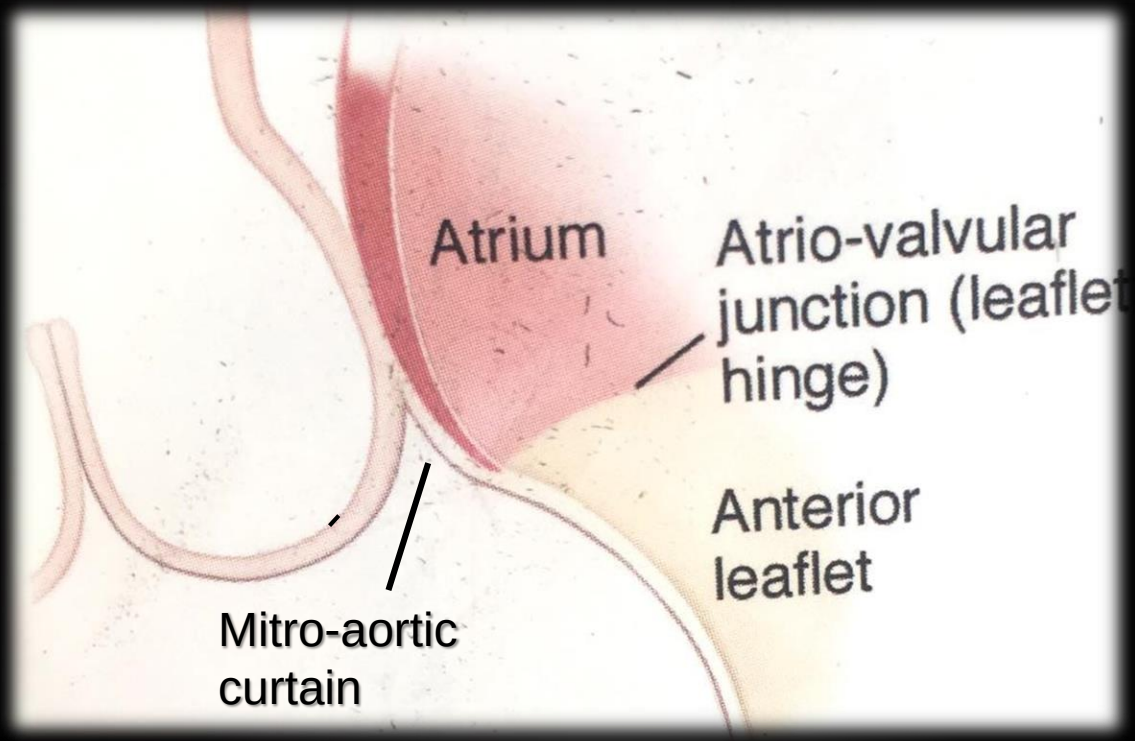
The anterior annulus

From a surgical point of view



The anterior annulus

From an anatomical point of view



Carpentier's Reconstructive Valve Surgery Saunders Elsevier 2010

The anterior annulus

From an anatomical point of view

Thorax (1960), **15**, 70.

SOME ITRAL VALVE

From the Dep ital Medical School, London

28, 1959)

Examination of a serie has revealed certain feat the mitral valve that textbooks of anatomy o

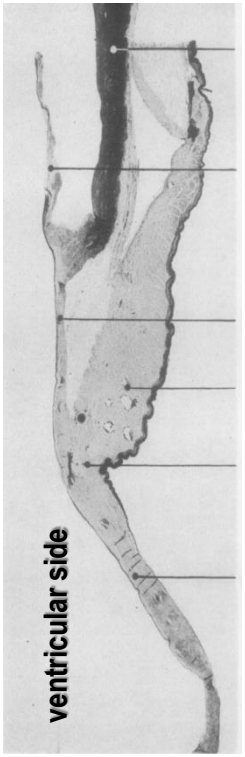
Briefly, the fibrous rin the mitral valve are attac plane as shown in standa quently the relationship or septal cusp of the valv to the inflow and outflo ventricle, is not that whi the ring were in one pla

The fibrous ring, part of the framework of the heart, which separates atrium from ventricle, and

e cusps of the mitral valve are attached, its superomedial part, of the borders nt and left fibrous trigones, and the l of the subaortic part of the left ventri- nber with which they are continuous. ning and inferolateral part of the ring us with the trigones (Fig. 3). The ring does not lie in one plane but is hinged axis which joins the two commissures e cusps (Figs. 1 and 3).

pe of the anterior cusp can be seen in s attached border forms an arc, and its free border is subdivided into three regions: a middle one the centre of which is free from

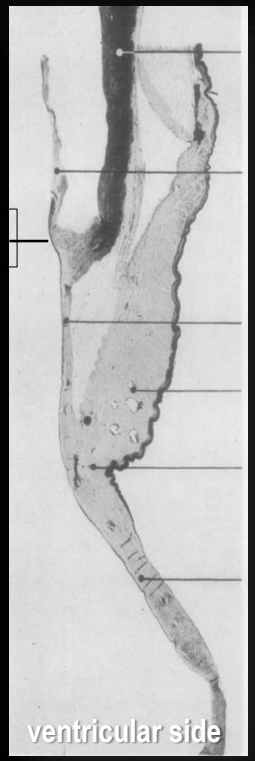
Anatomic specimen



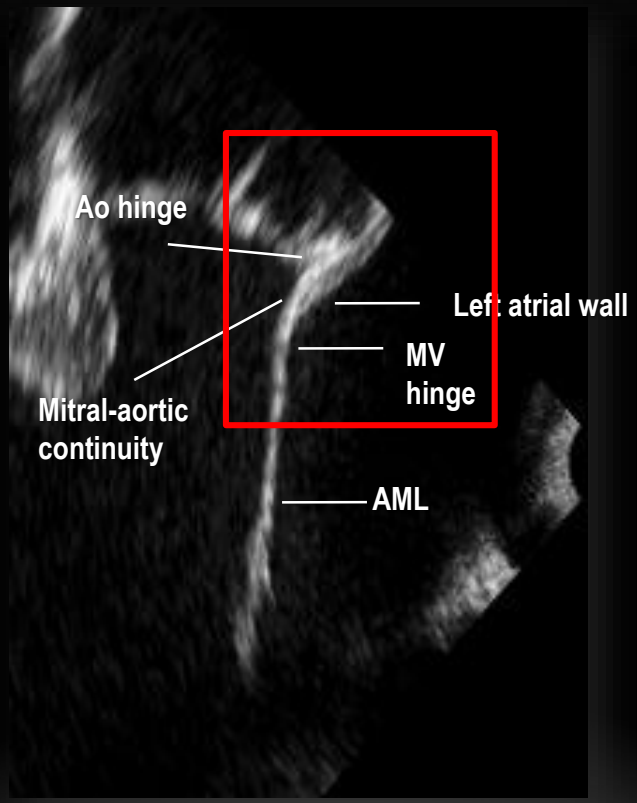
The anterior mitral annulus

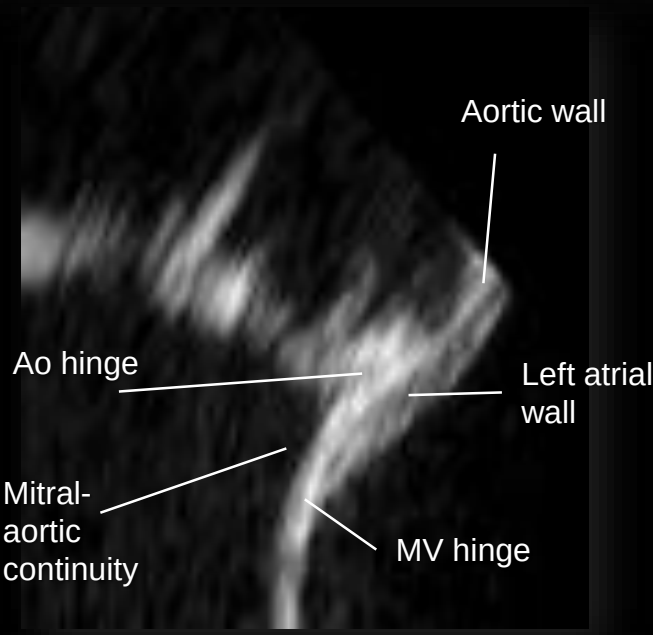
From an imager's point of view

Anatomic specimen



ECHO

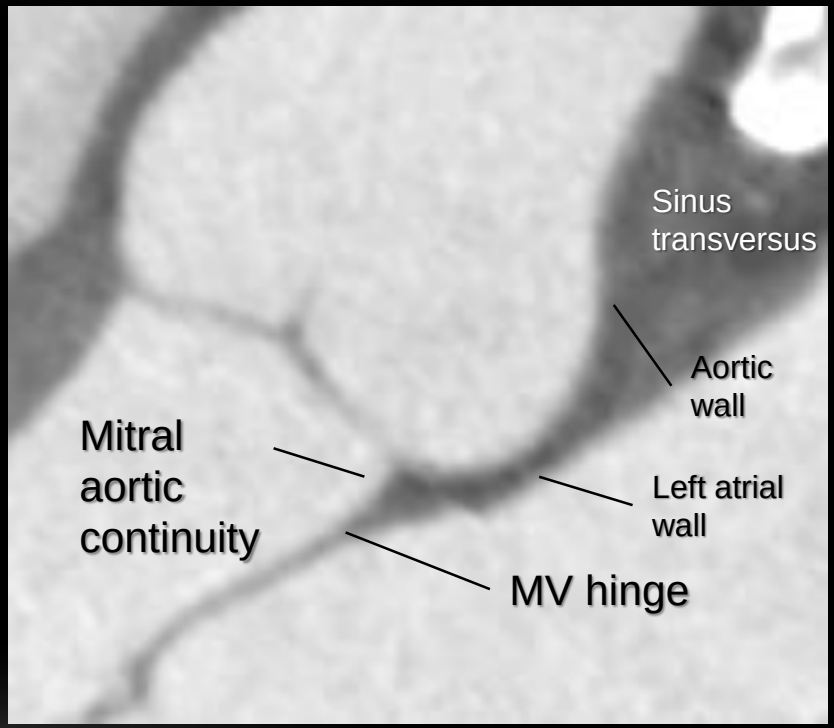




E.W.T. Morris. Thorax 1960,

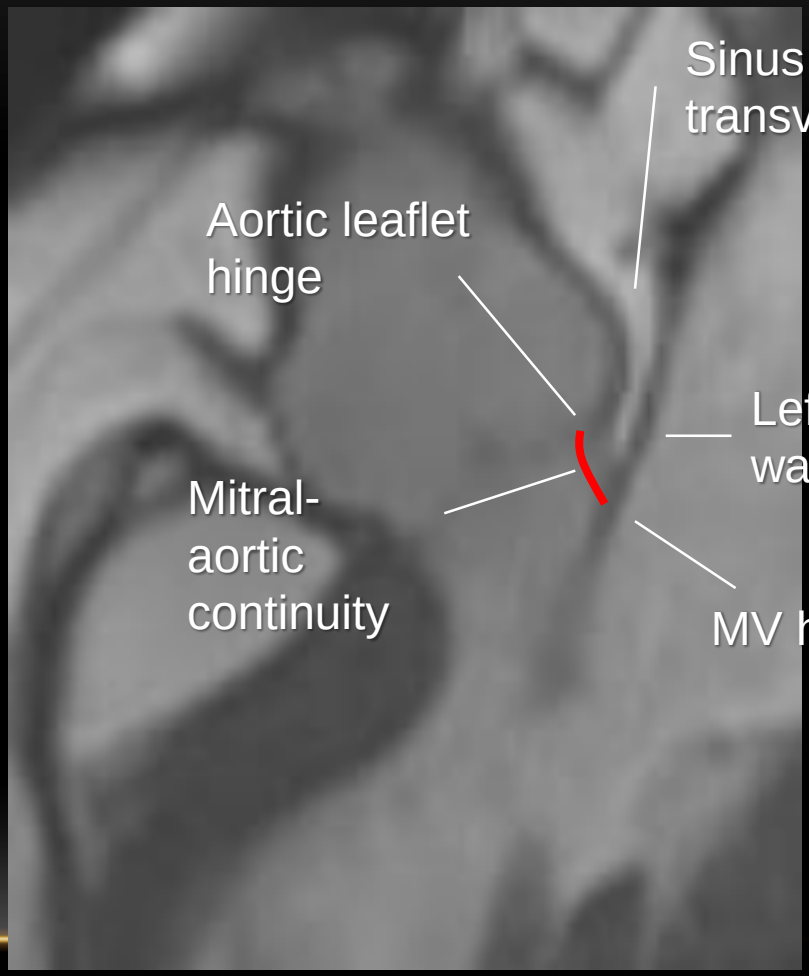
The anterior mitral annulus

From an imager's point of view



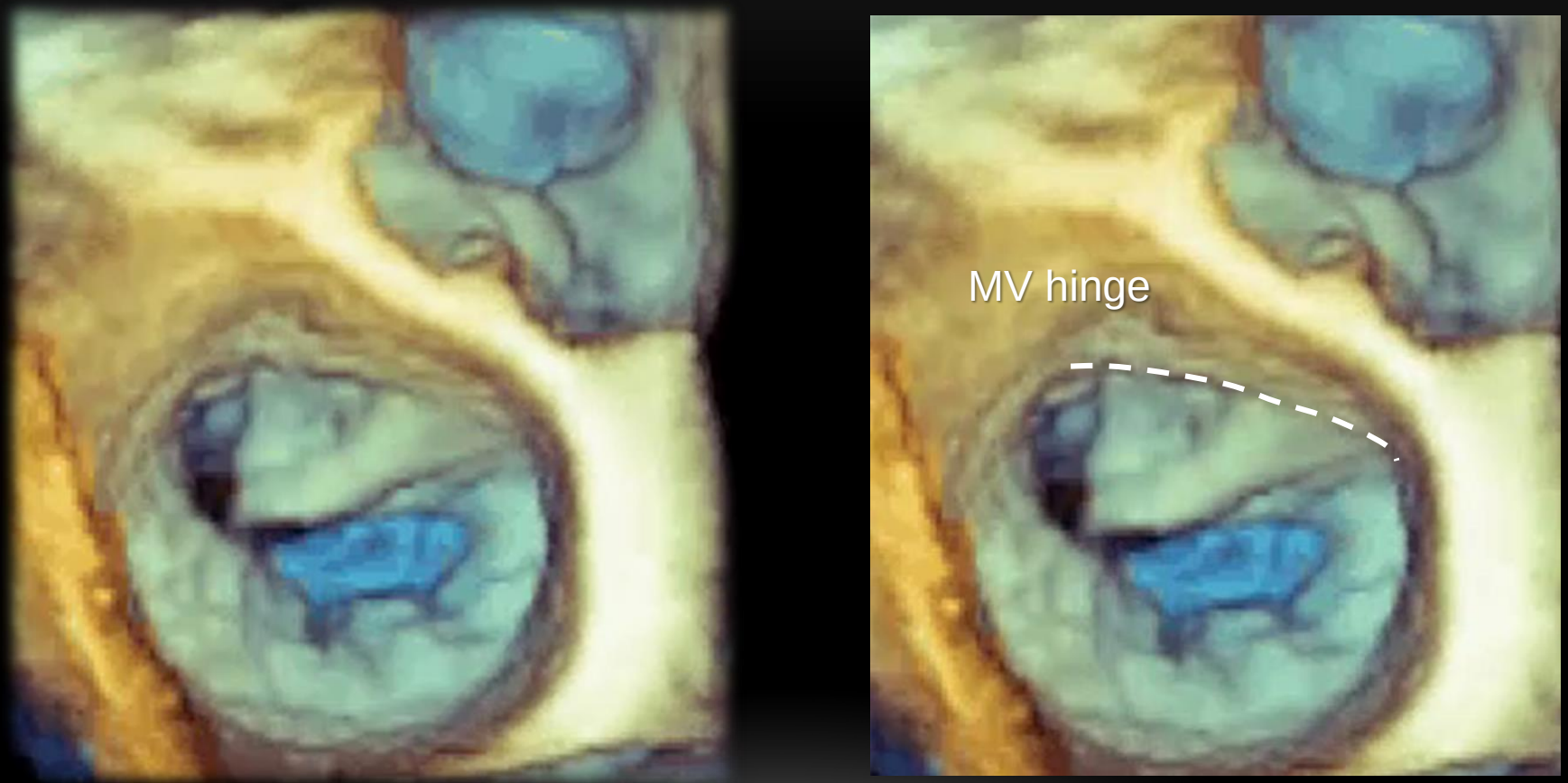
The anterior mitral annulus

From an imager's point of view



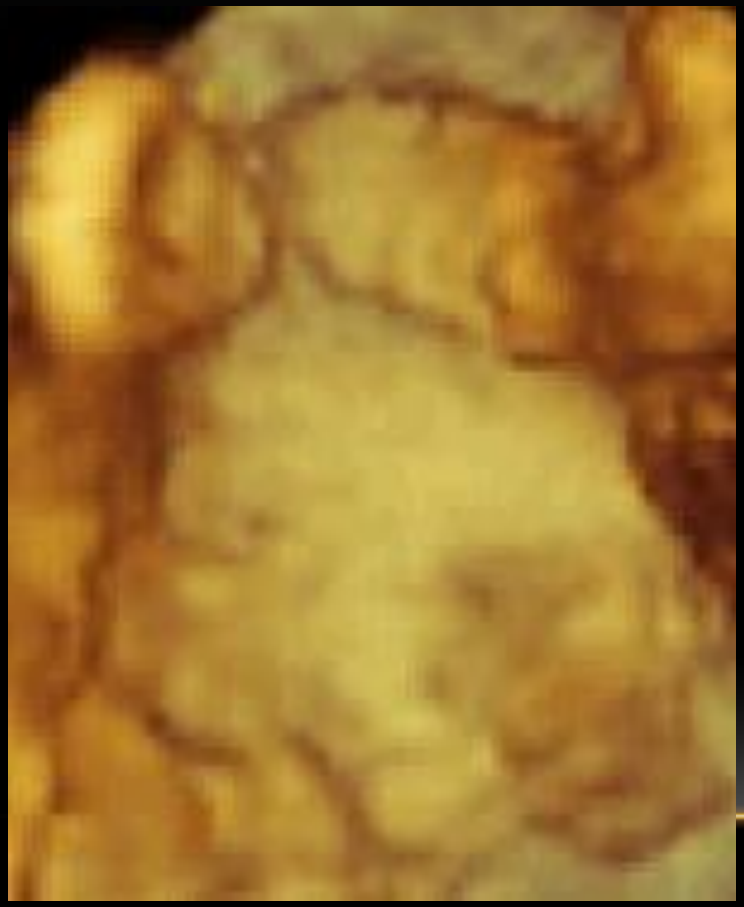
The anterior mitral annulus

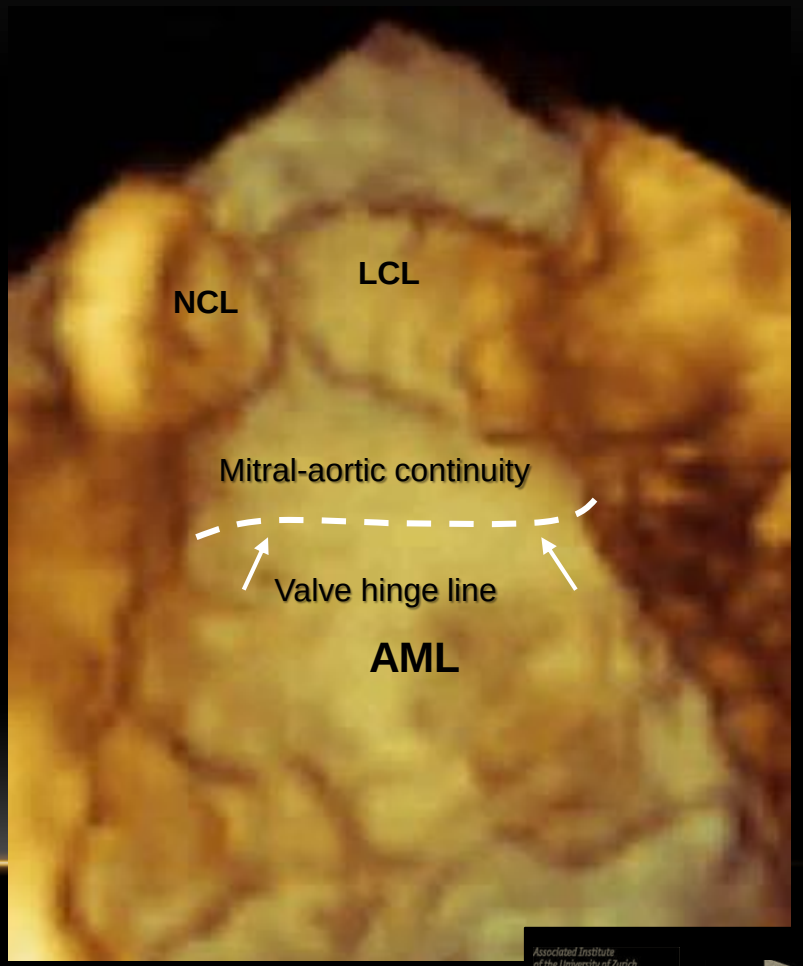
From an imager's point of view



The anterior mitral annulus

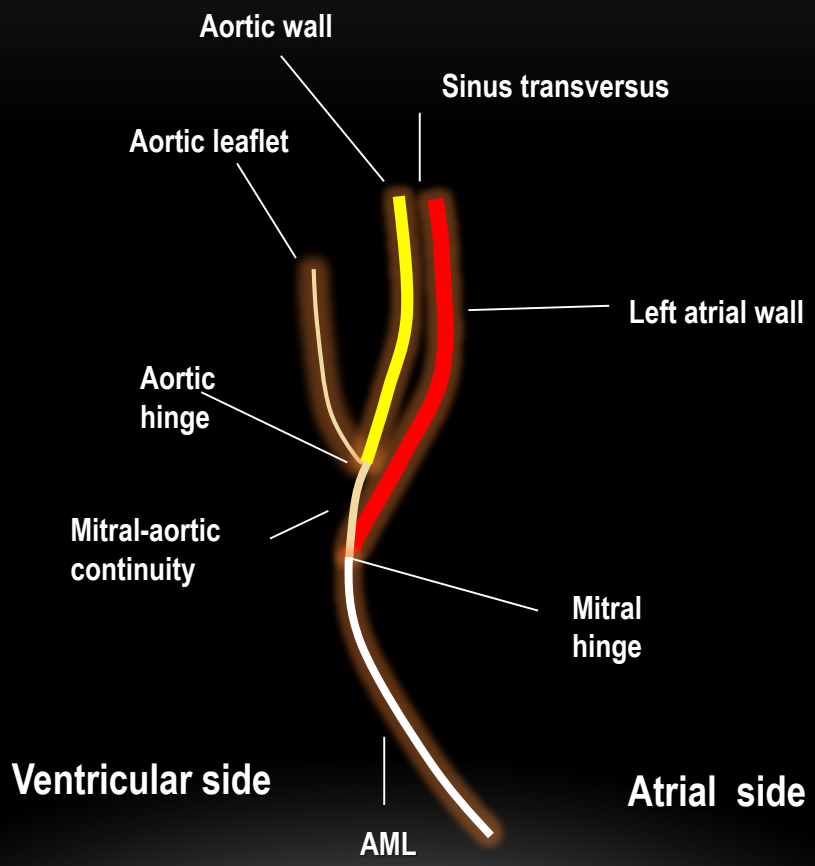
From an imager's point of view





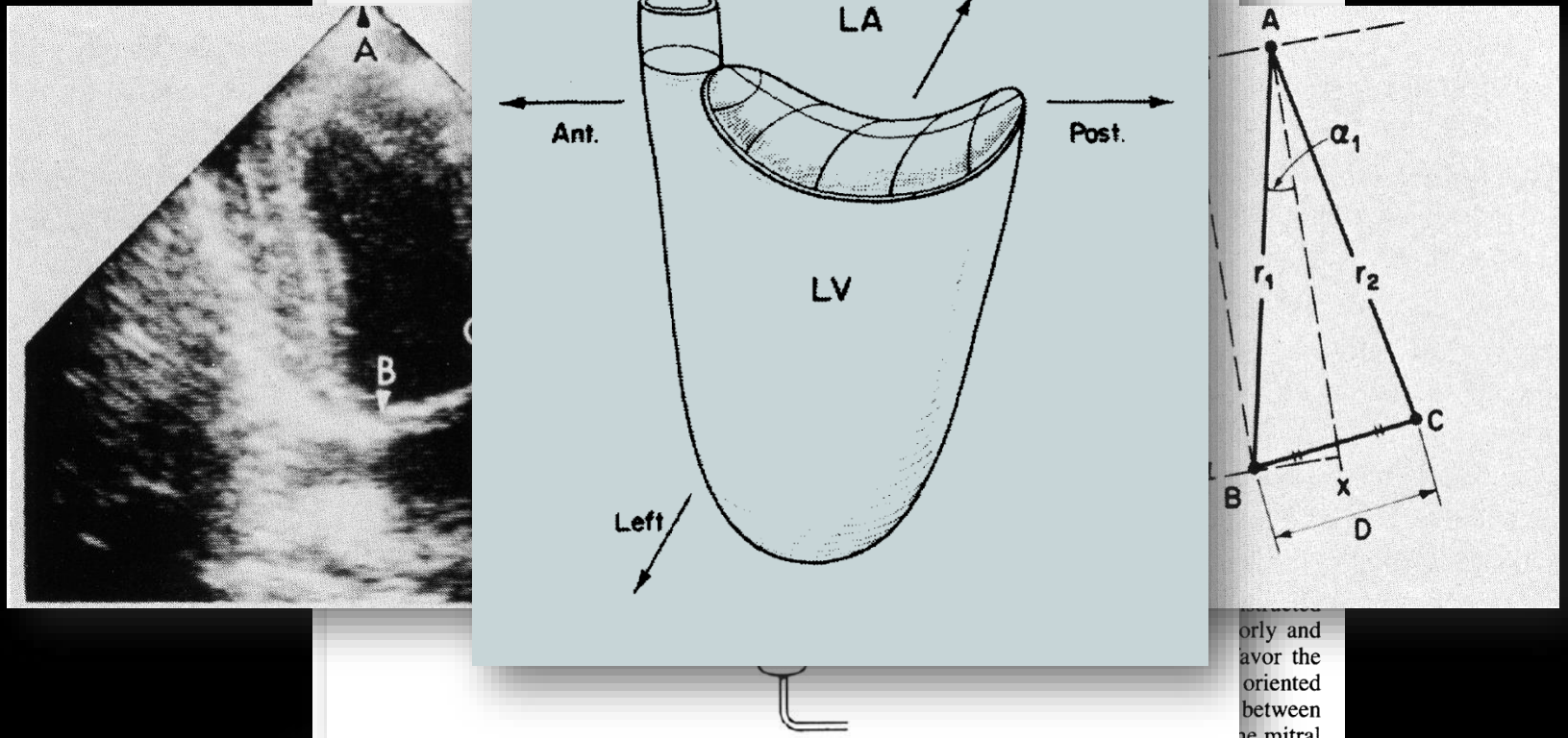
The anterior mitral annulus

Take home message



Is the saddle-shaped configuration of the annulus a *misnomer* ?

The saddle-shaped configuration of the annulus



orly and
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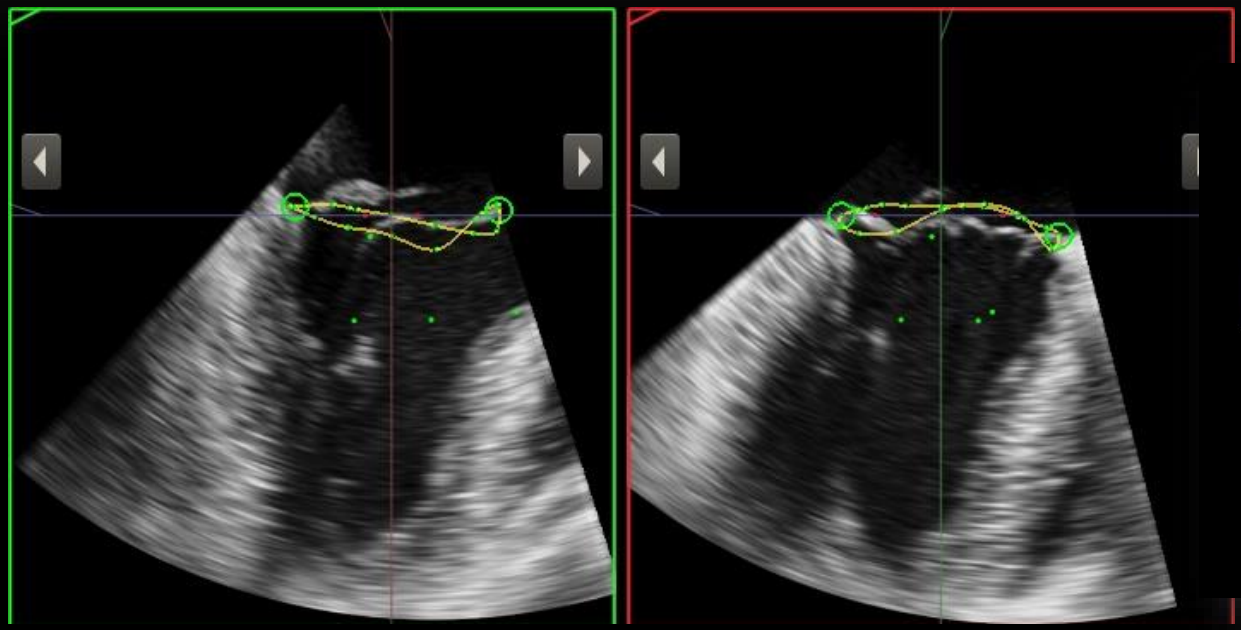
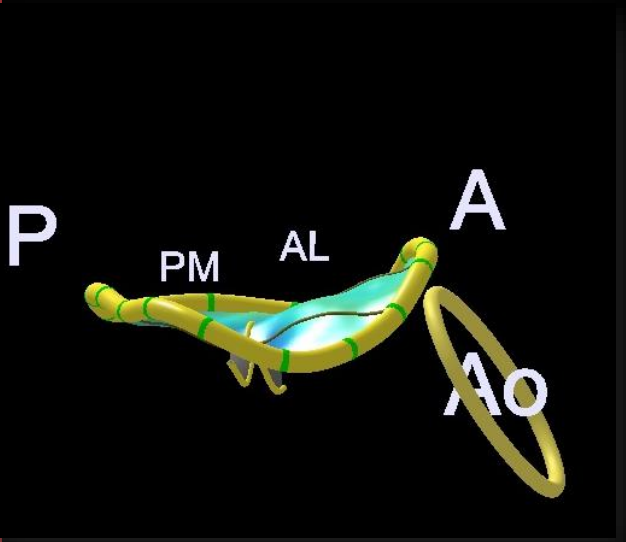
anulus is planar as well as the diagnosis of prolapse in many otherwise normal individuals based on that assumption.

The saddle-shaped configuration of mitral hinge line





The saddle-shaped configuration refers to the *hinge line* not to the annulus !!!

The *disjunction* of mitral annulus

Disjunction of mitral annulus

THE ASSOCIATION OF FLOPPY MITRAL VALVE WITH DISJUNCTION OF THE MITRAL ANNULUS FIBROSUS

GROVER M. HUTCHINS, M.D., G. WILLIAM MOORE, M.D., PH.D., AND DAGNA K. SKOOG, M.D.

Abstract Floppy mitral valve is usually attributed
connective-tissue degeneration. However, we have
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was mitral annulus disjunction
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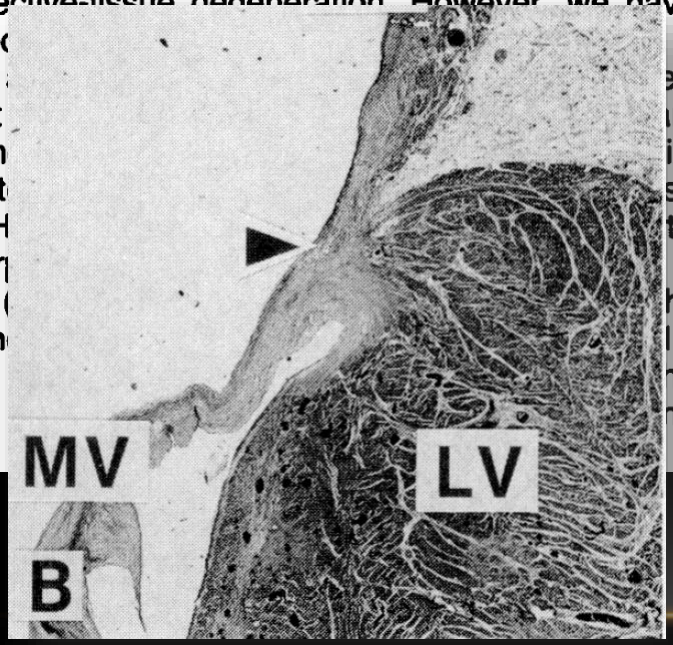
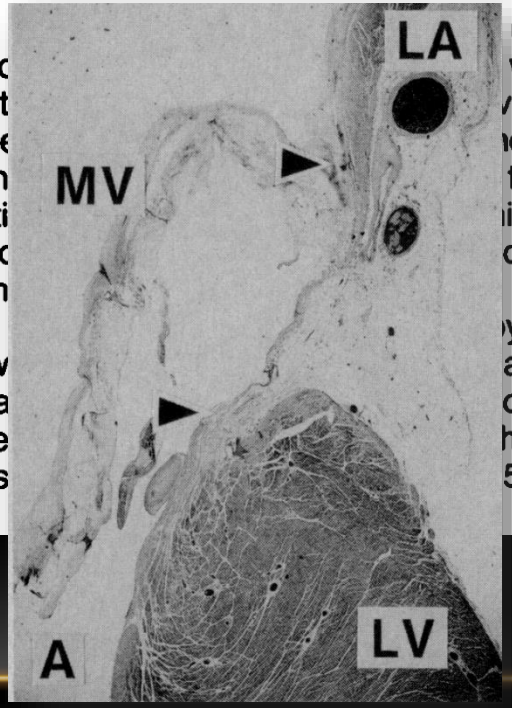
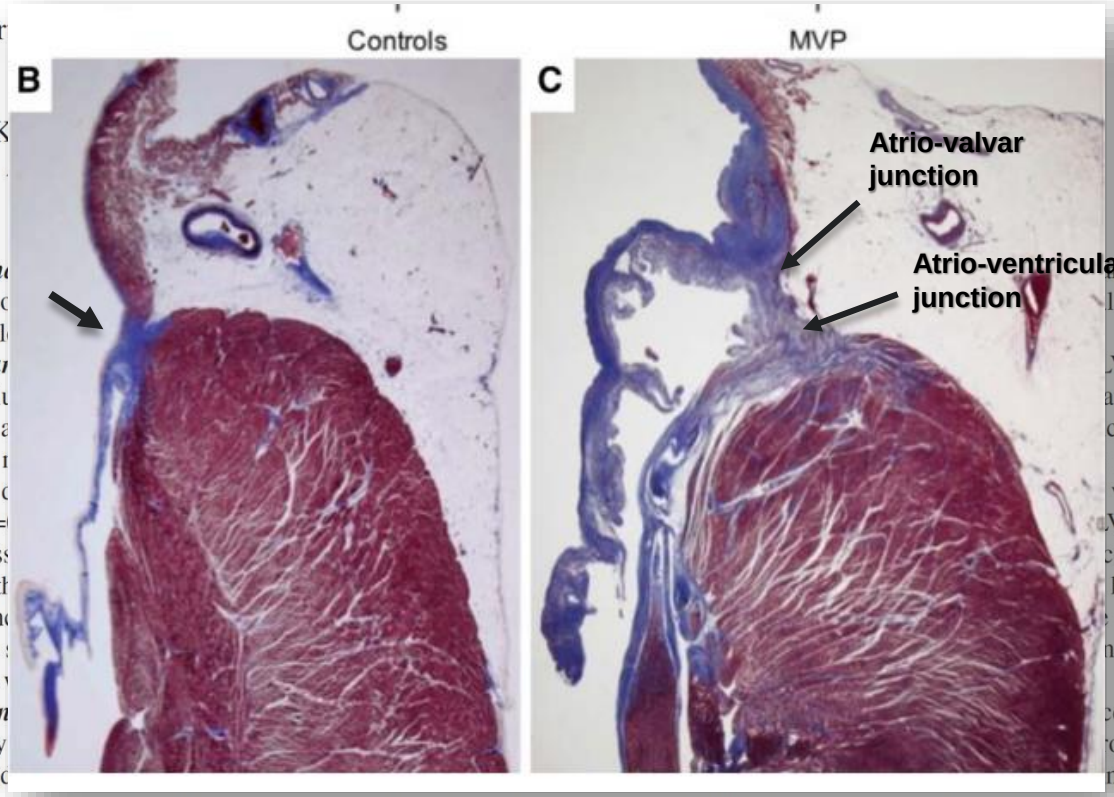
itral valve is significantly as-
of the mitral annulus fibrosus
y mitral valve develops from
apparatus, and that it is usually
of the mitral annulus fibrosus,
he morphology of the annulus.
535-40.)





Mitral annulus disjunction

Morphofunctional Abnormalities of Mitral Annulus and Arrhythmic Mitral Valve Prolapse



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Methods a gadolinit median a cardiac r annular c 31.5; *P*= thickness than in th prevalen annulus patients

Conclusion mobility wall and

(LV) l valve

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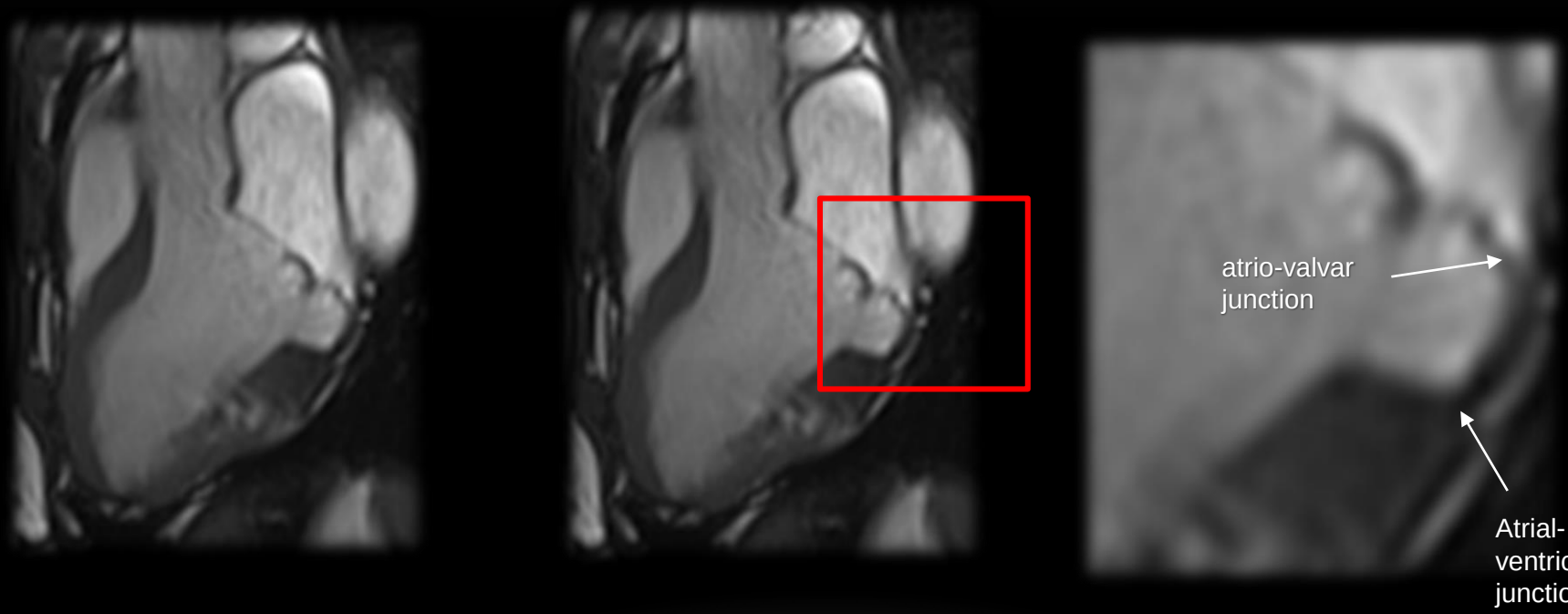
abnormalities, together with auscultatory midsystolic click, may identify MVP patients who would need arrhythmic risk stratification. (***Circ Cardiovasc Imaging*. 2016;9:e005030. DOI: 10.1161/CIRCIMAGING.116.005030.**)

Associated Institute of the University of Zurich
University of Zurich
CARDIOCENTROTICINO

Mitral Annulus Disjunction

Separation between atrio-valvar junction and LV attachment



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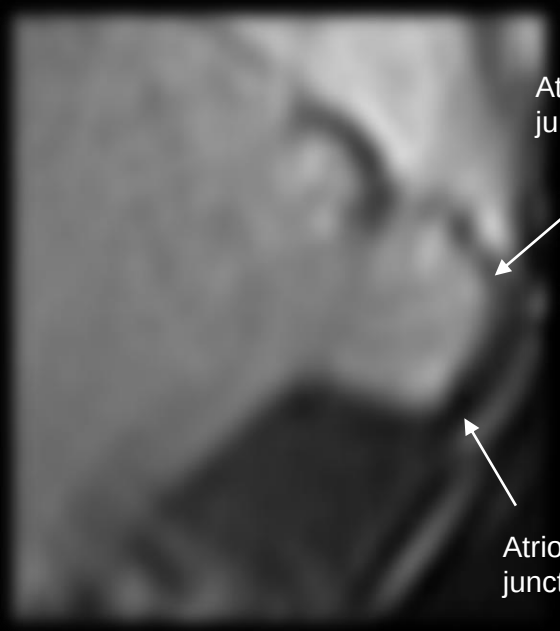

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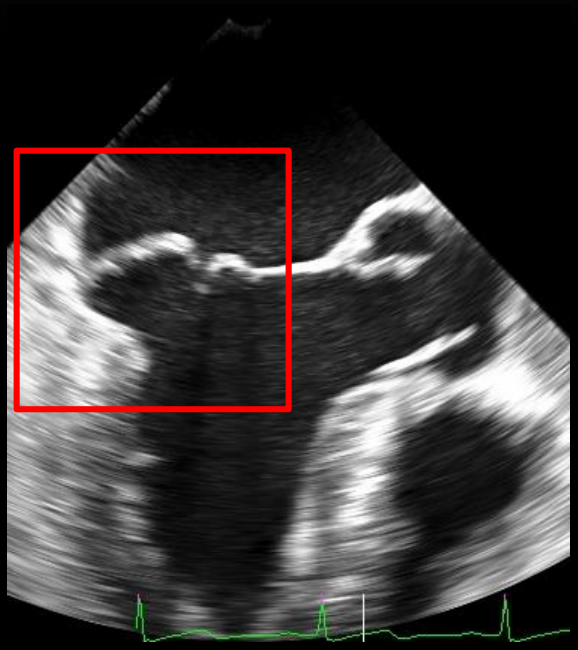

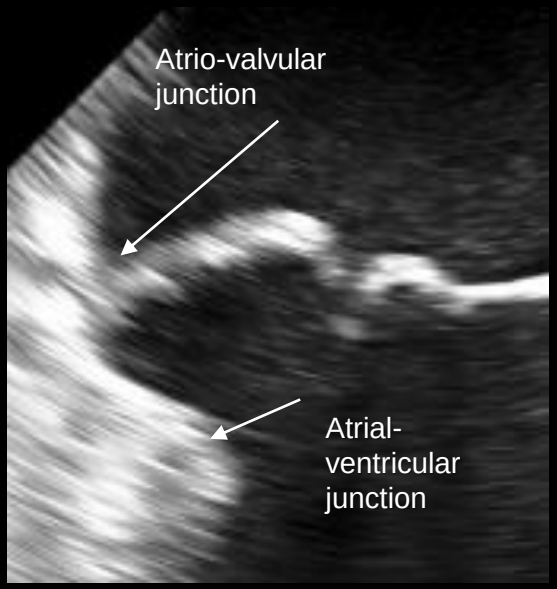

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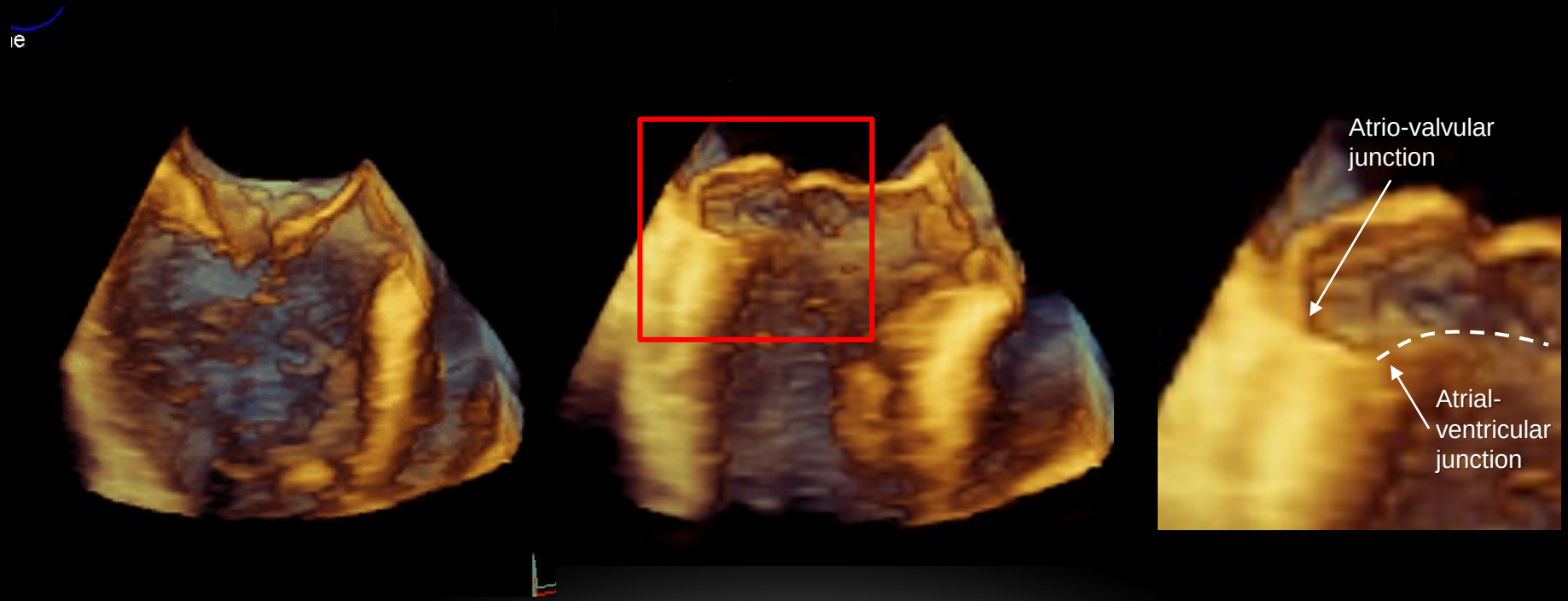

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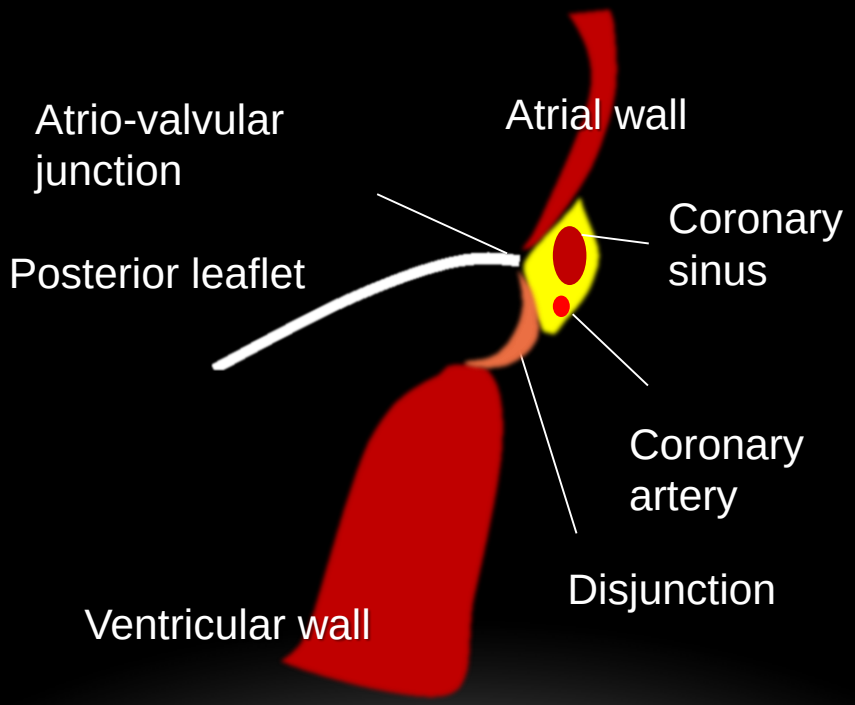
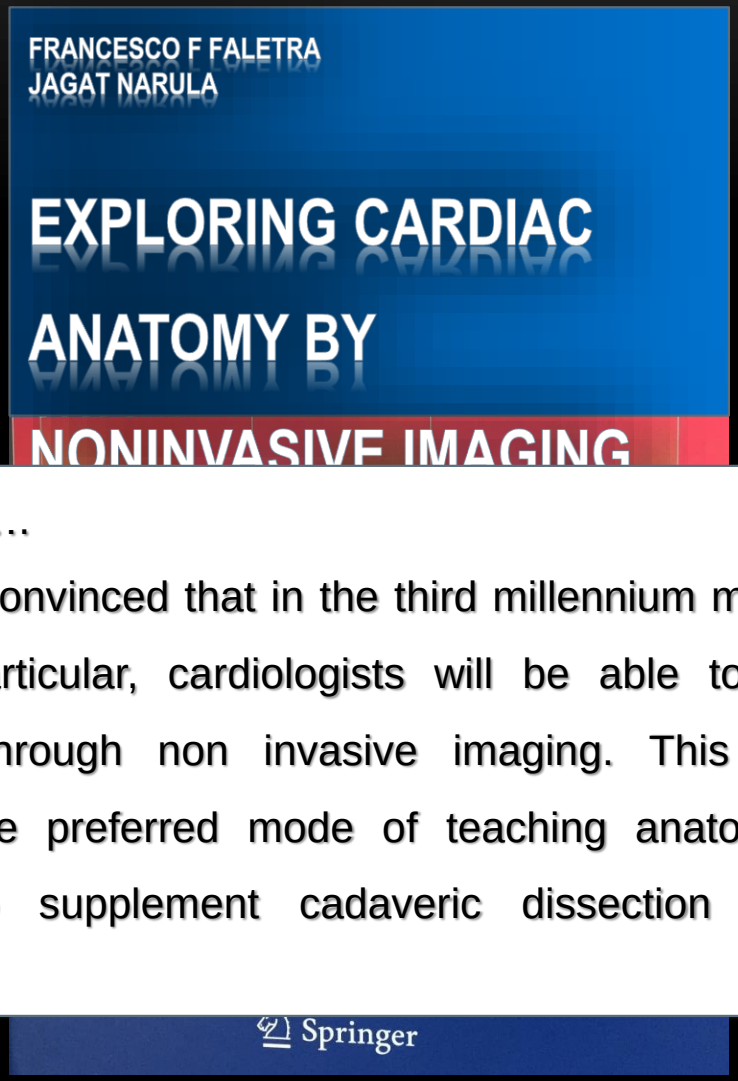




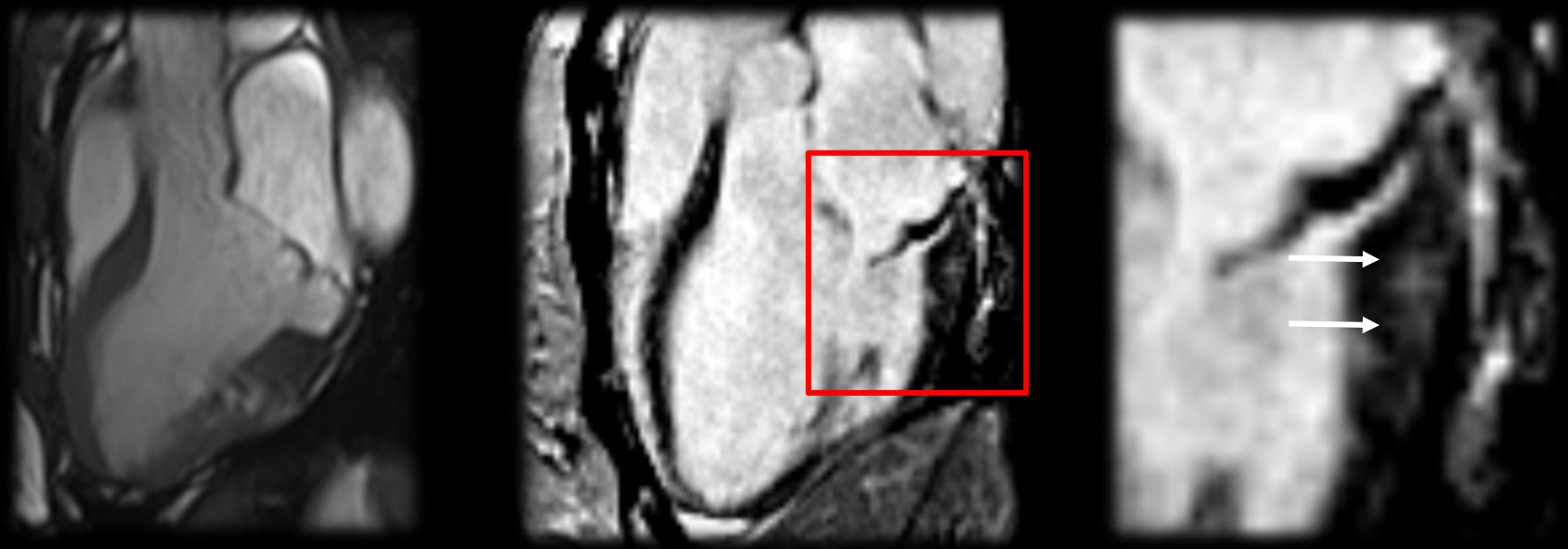
Preface…….

…We are convinced that in the third millennium medical students and, in particular, cardiologists will be able to learn cardiac anatomy through non invasive imaging. This method must become the preferred mode of teaching anatomy in medical schools to supplement cadaveric dissection and anatomic specimens.

Thank you for your kind attention

Mitral Annulus Disjunction

Separation between atrio-valvar junction and LV attachment



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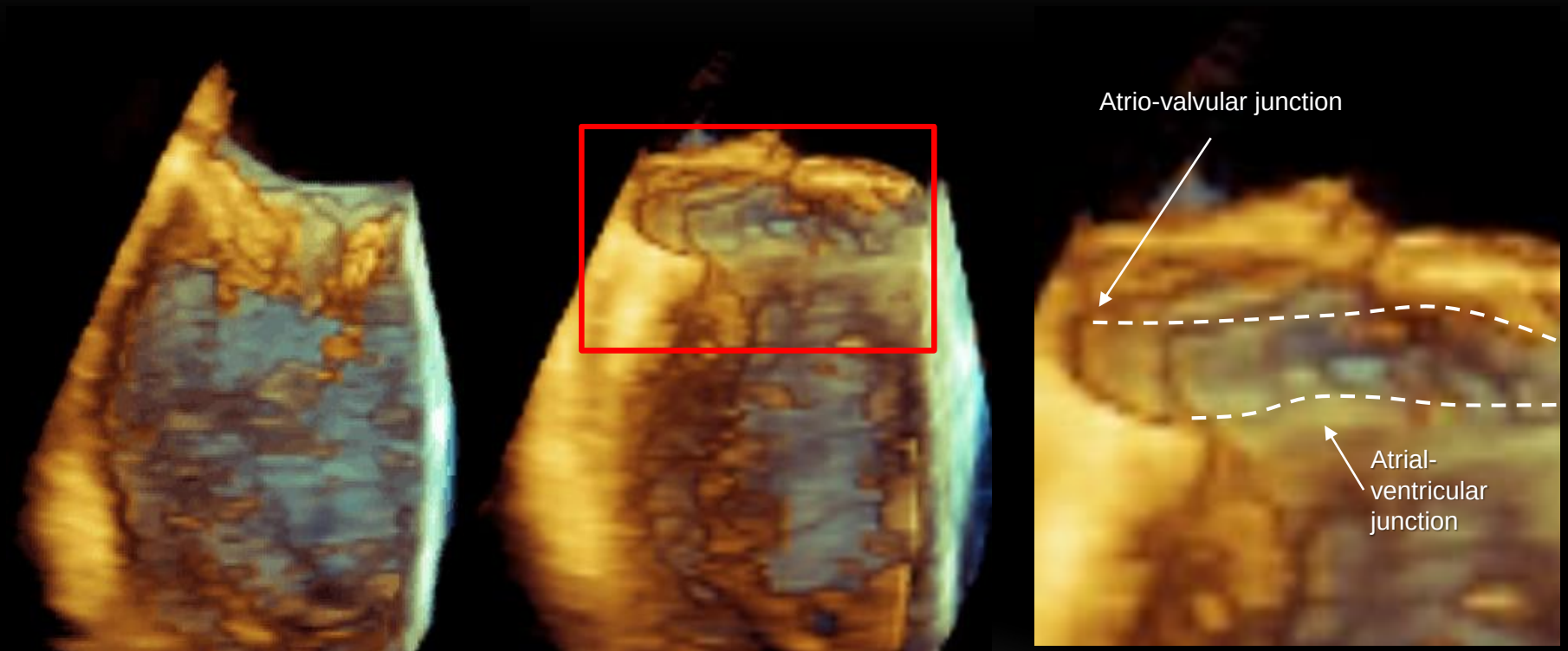
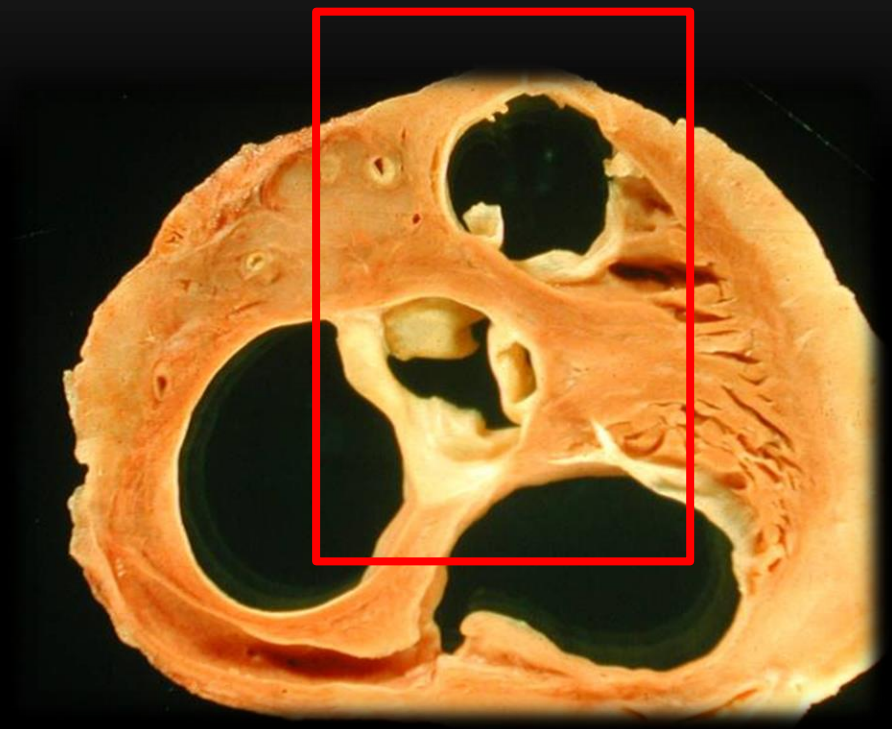


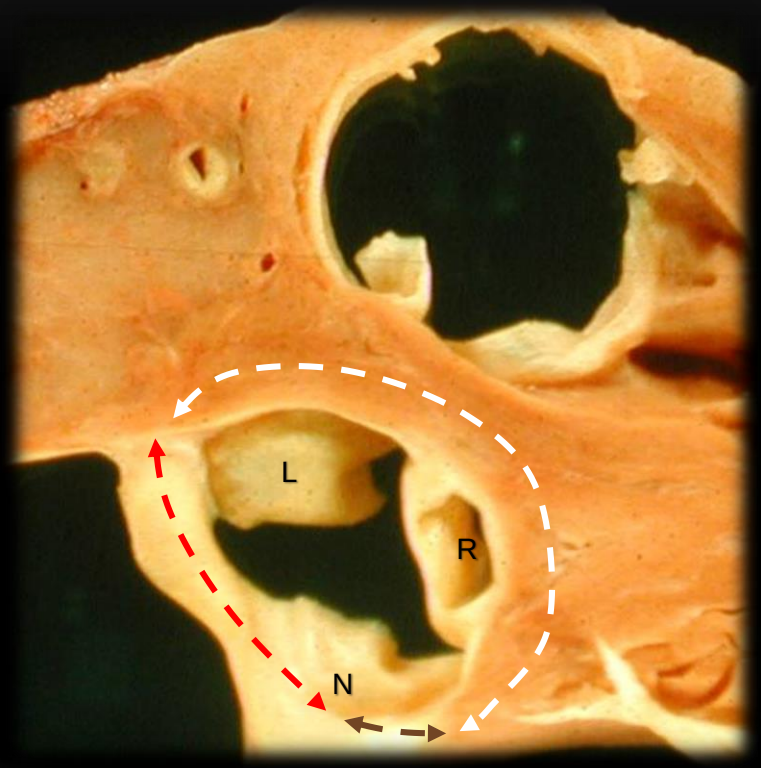
The *mysterious* left ventriculo-arterial junction

Definition

Site where the muscular tissue of ventricular myocardium meets the fibro-elastic wall of the aortic wall. The left ventricular-arterial junction is *not completely muscular*.

The ventriculo-arterial junction





Bonacina E
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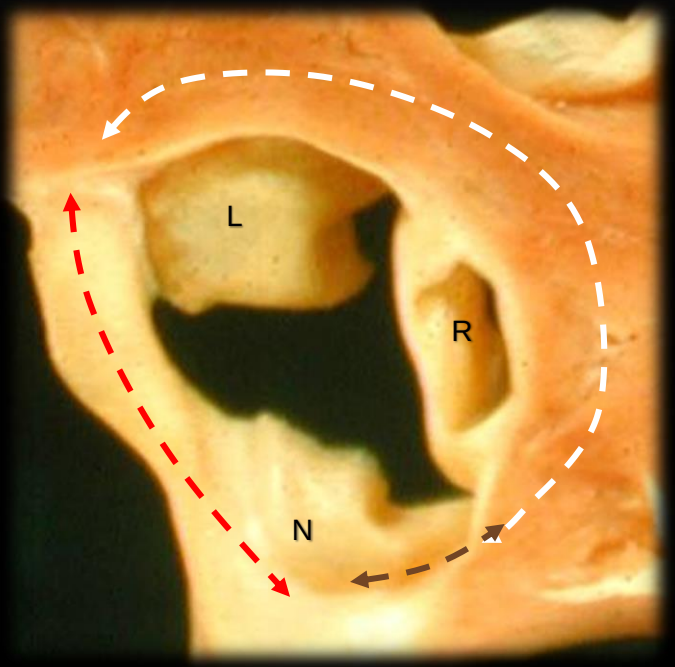
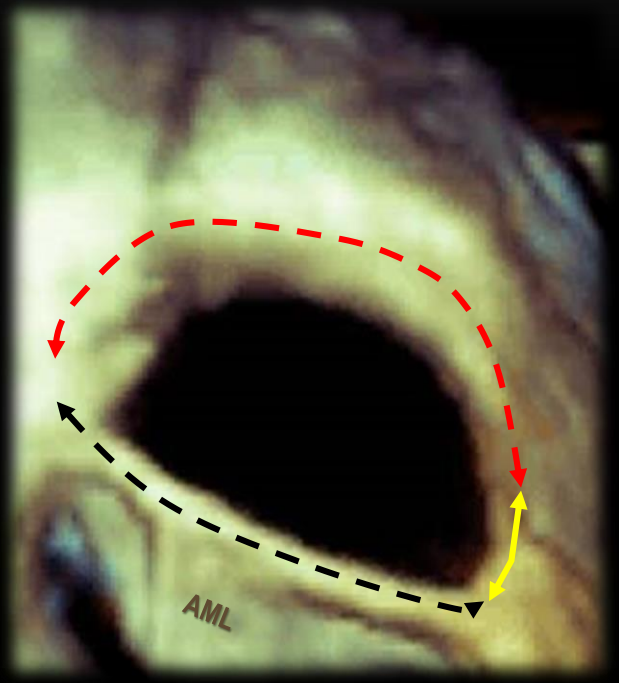
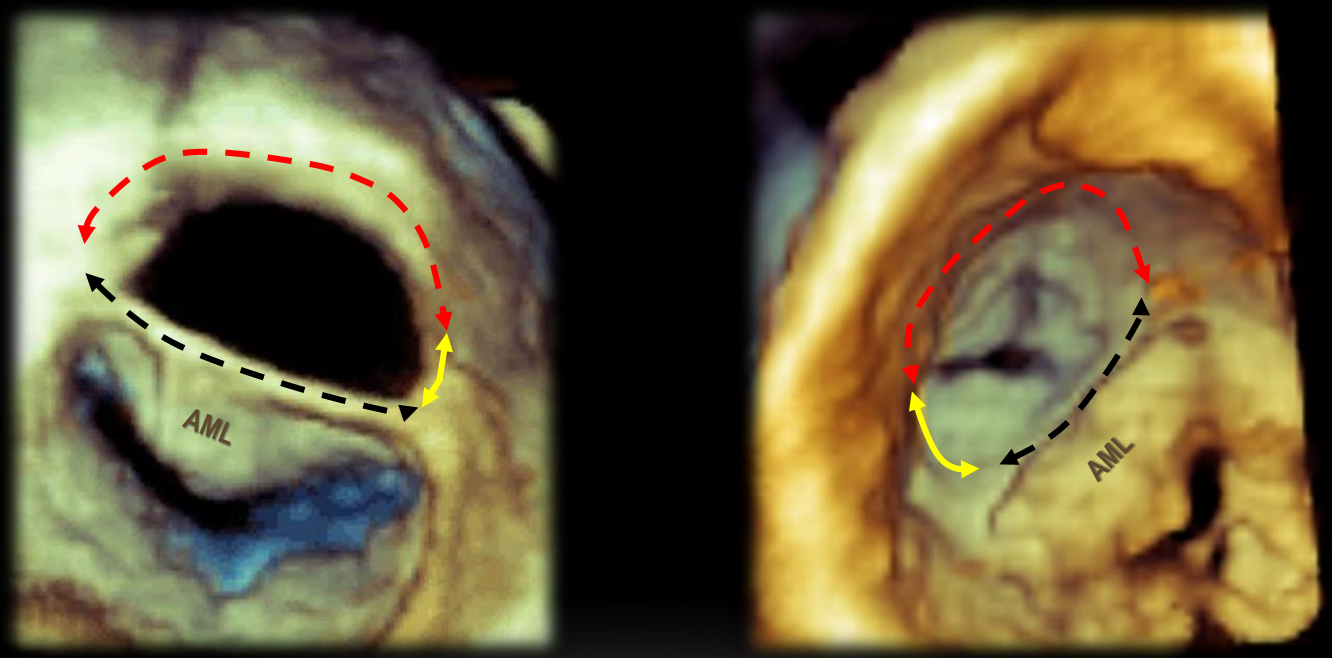
The ventriculo-arterial junction





The *mysterious* left ventriculo-arterial junction



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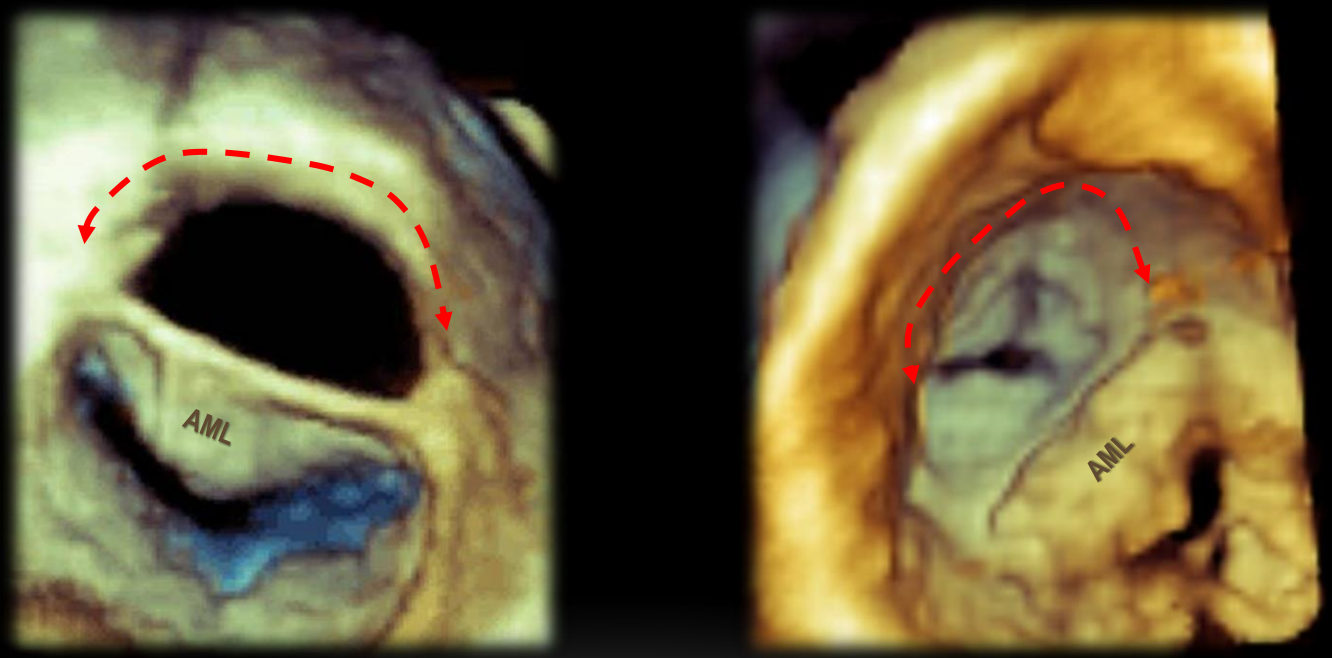

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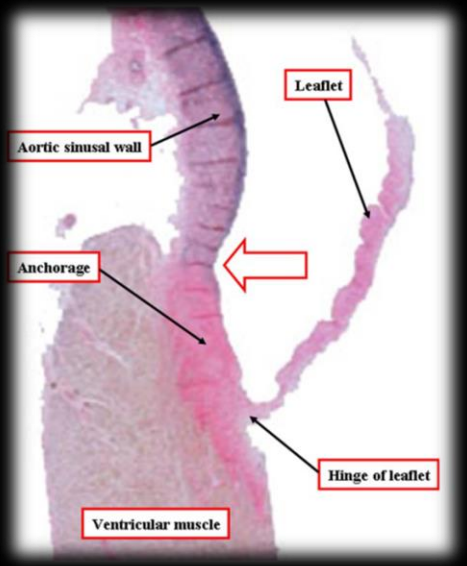

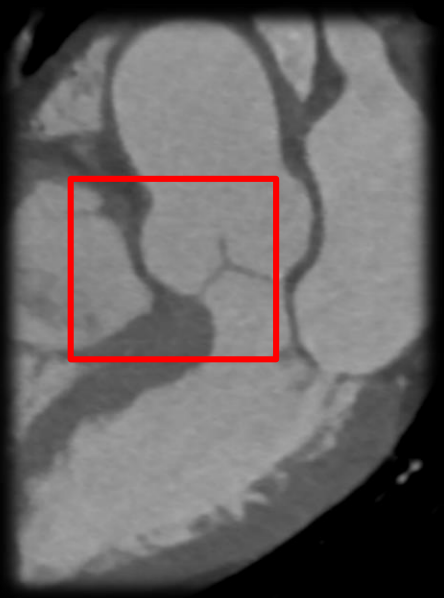

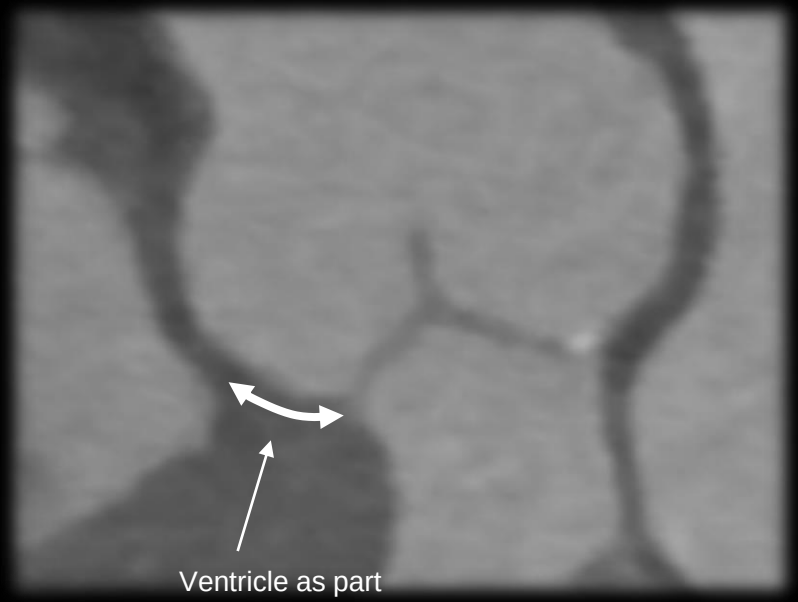

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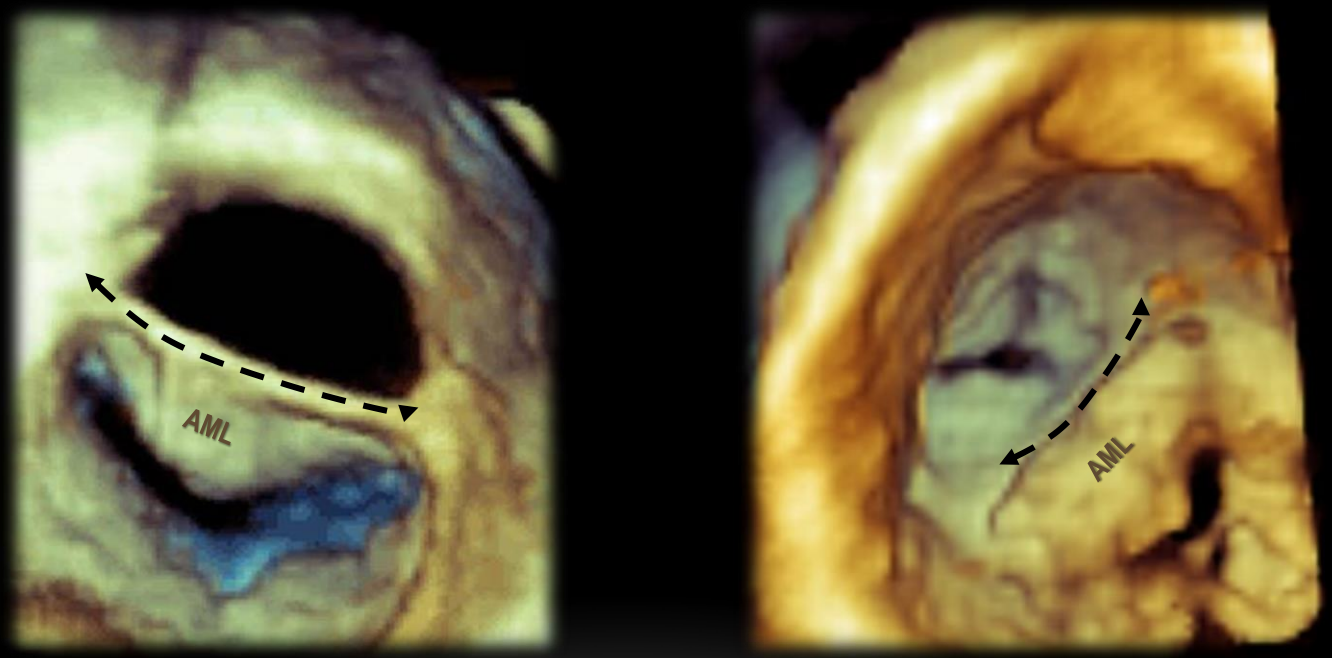

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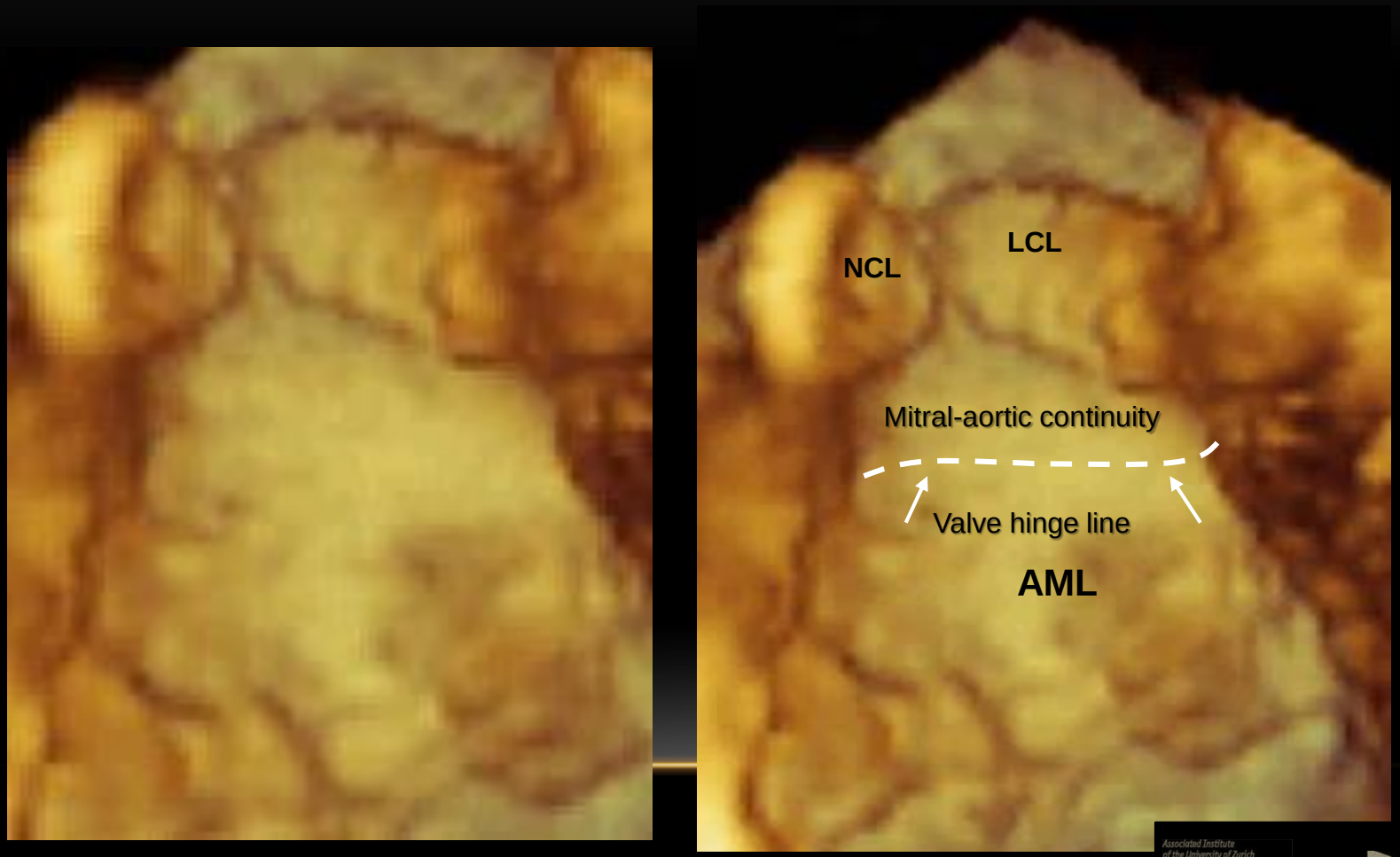
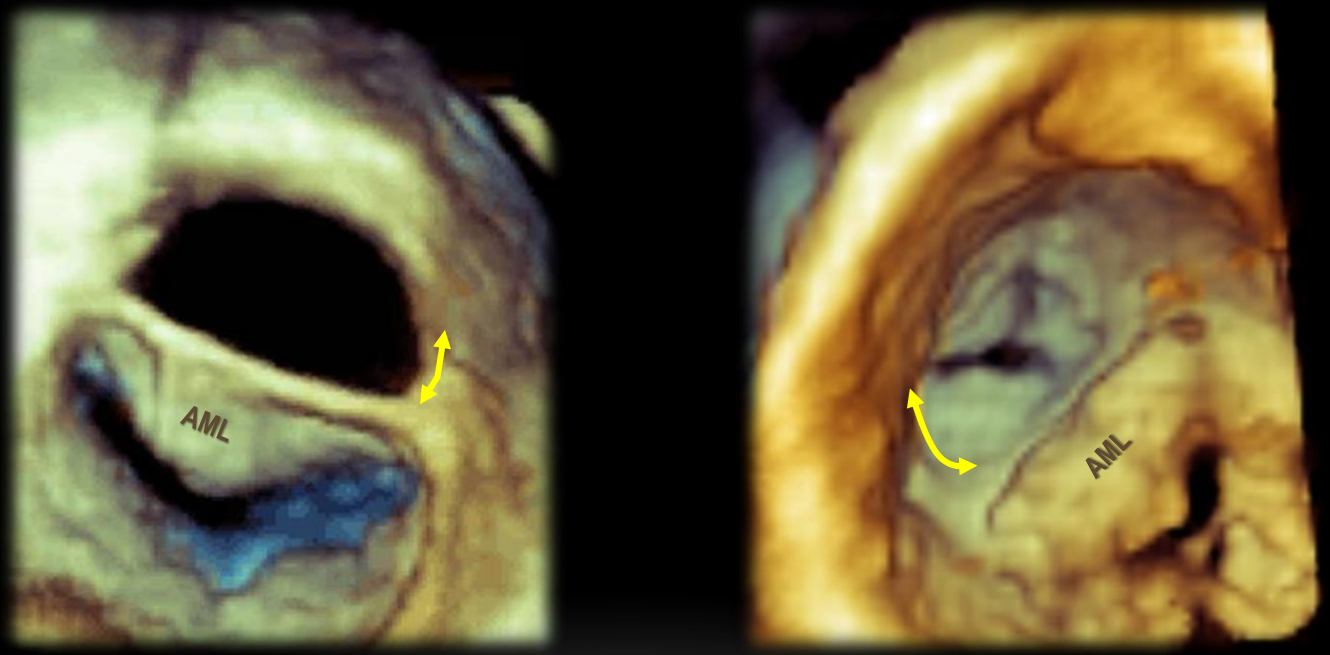


The *mysterious* left ventriculo-arterial junction



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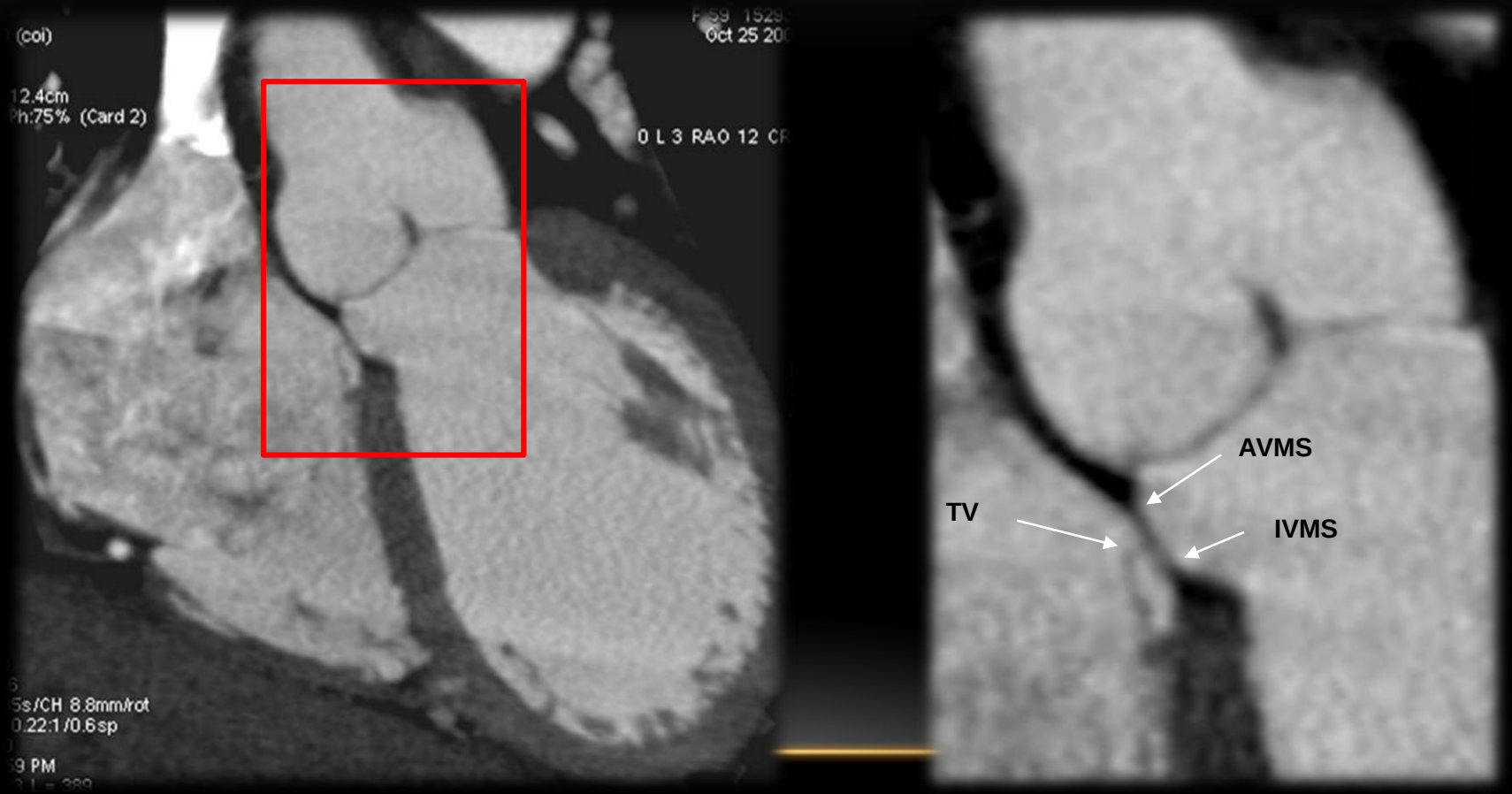

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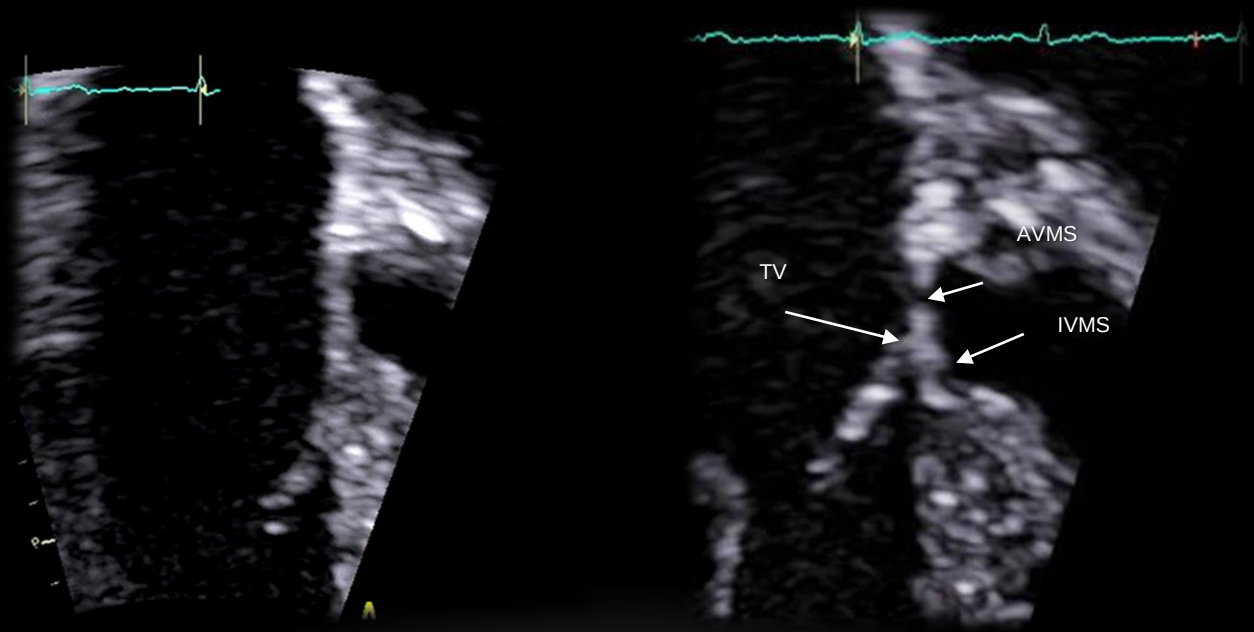
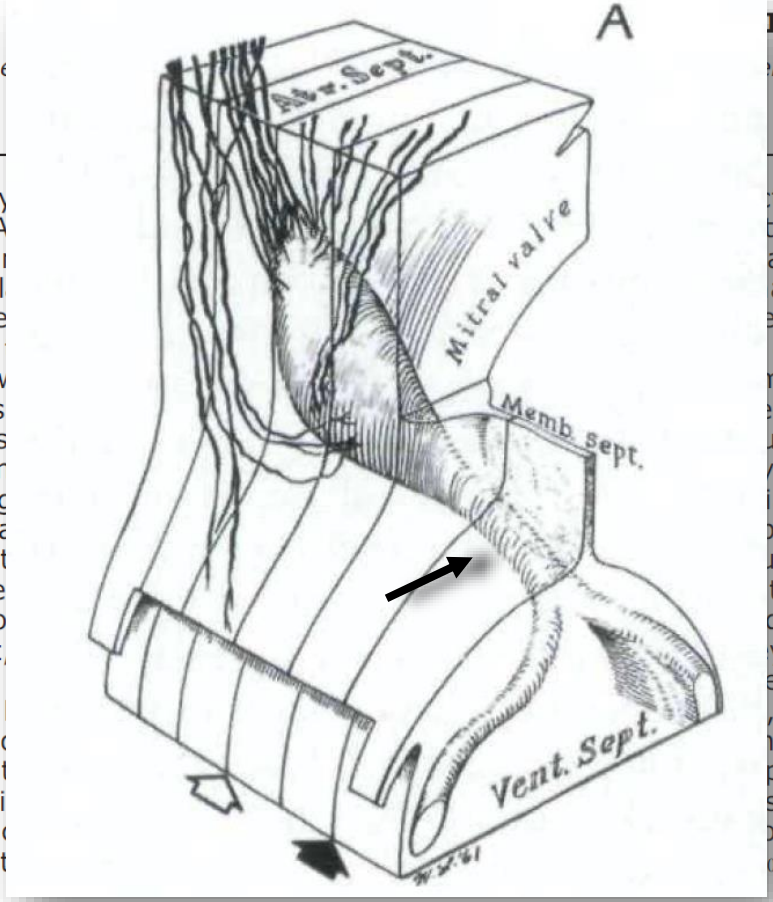


The Anatomy of the Cardiac Conduction System

ROBERT H. ANDERSON, JOSEPH YANNI, MARK R. BOYETT,
...I*

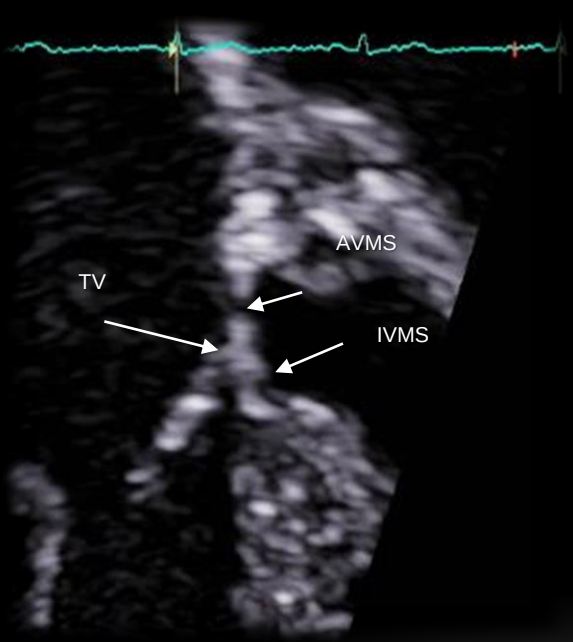
Cardiovascular Re... ...ersity of Manchester,



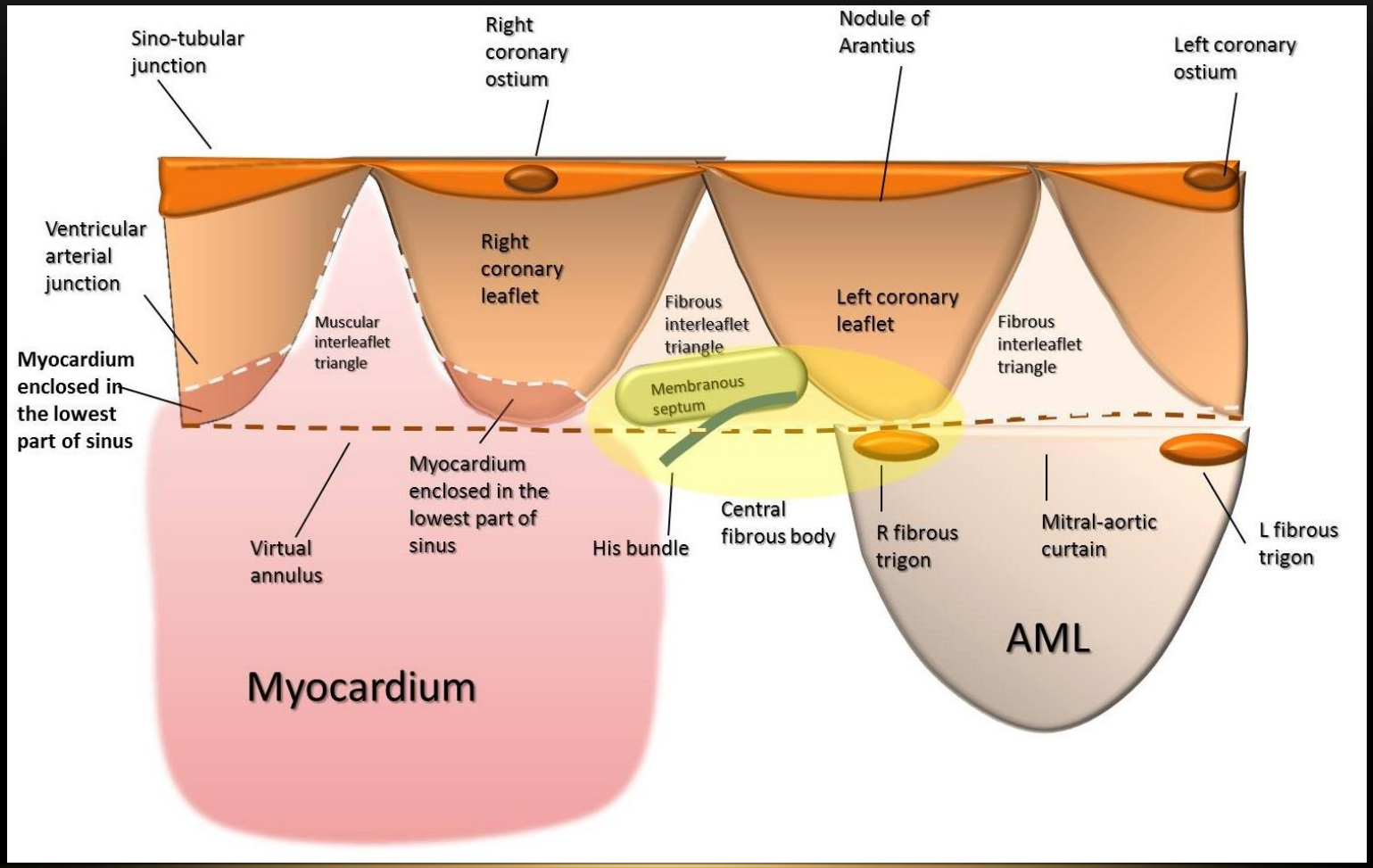
All the my... ...t the cardiac impulse. A... ...te the cardiac impulse ar... ...ar chambers. This popul... ...atomists who seek to de... ...em must contend with ... ...distinguished from the v... ...mportant presentations ... ...ere suggested for the his... ...ules proposed that the m... ...ystem, should be histolog... ...ially prepared material, a... ...by fibrous tissue from t... ...ues have now been deve... ...the cells specialized to... ...ques, for the most part... ...y also reveal additional ... ...ese additional areas are ... ..., in the vestibules of b... ...ng around the aortic root... ...phasizing the relationshi... ...shed parts of the cardiac... ...be assessed in the light...

Key words: sinus node; atrioventricular node; bundle of His; Purkinje fibers

The *mysterious* left ventriculo-arterial junction



The ventriculo-arterial junction



Agenda

The *elusive* mitral annulus

The *mysterious* ventriculo-arterial junction

The *misnomer* “septum secundum”

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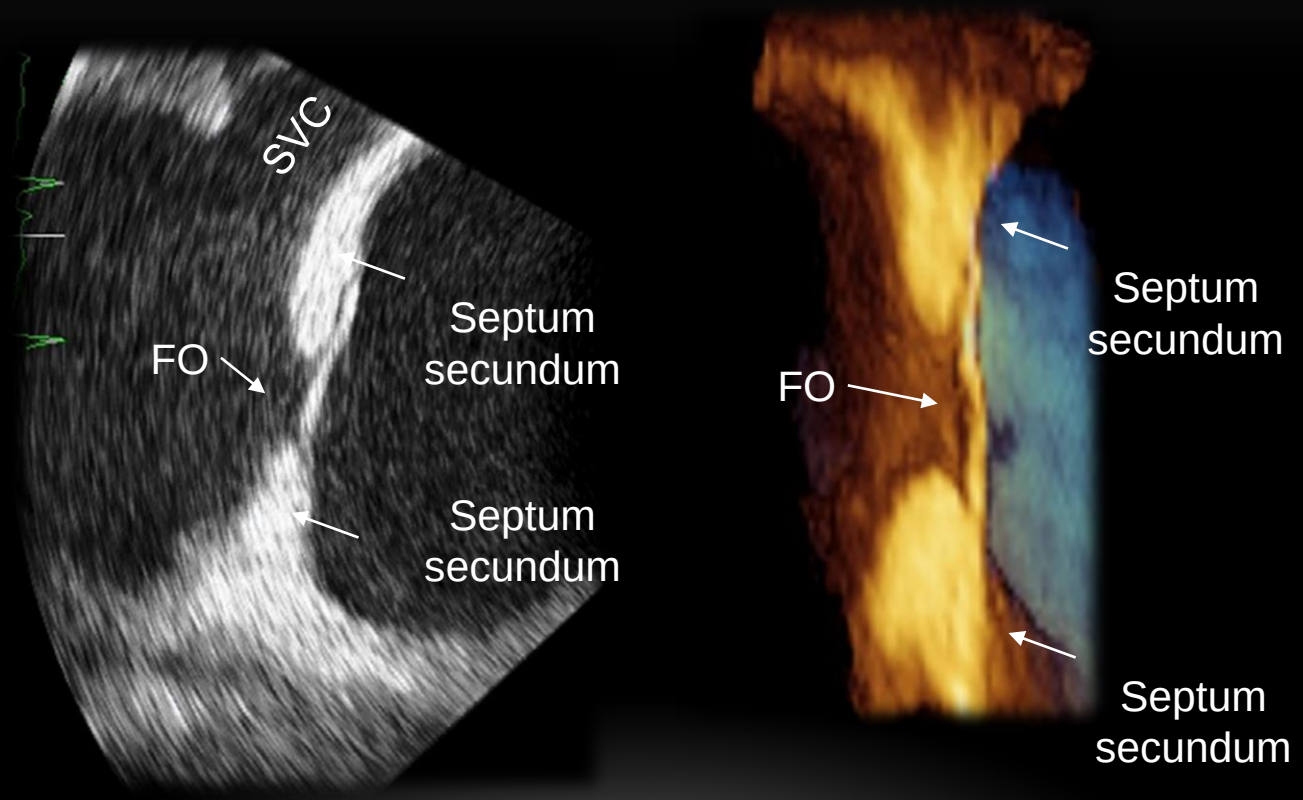
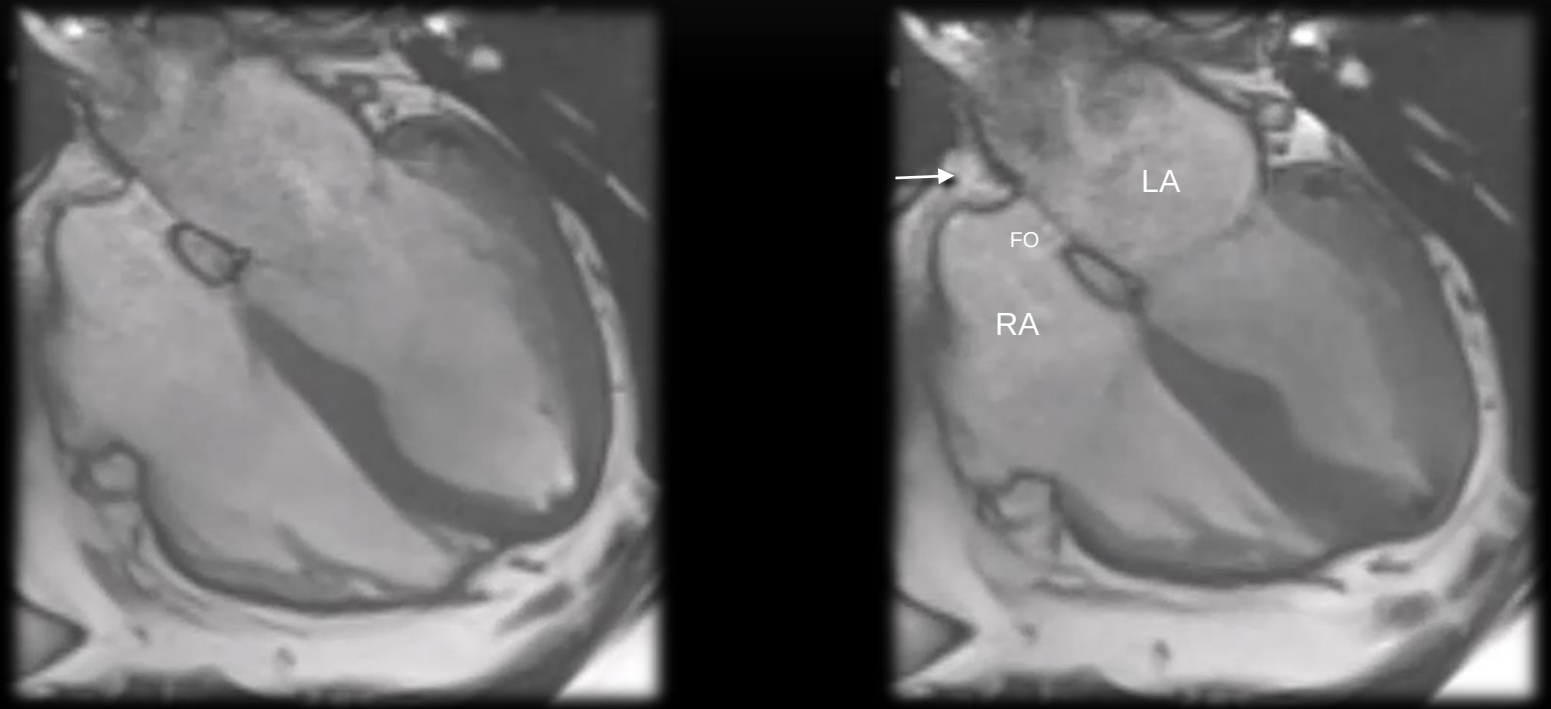


The misnomer “septum secundum”



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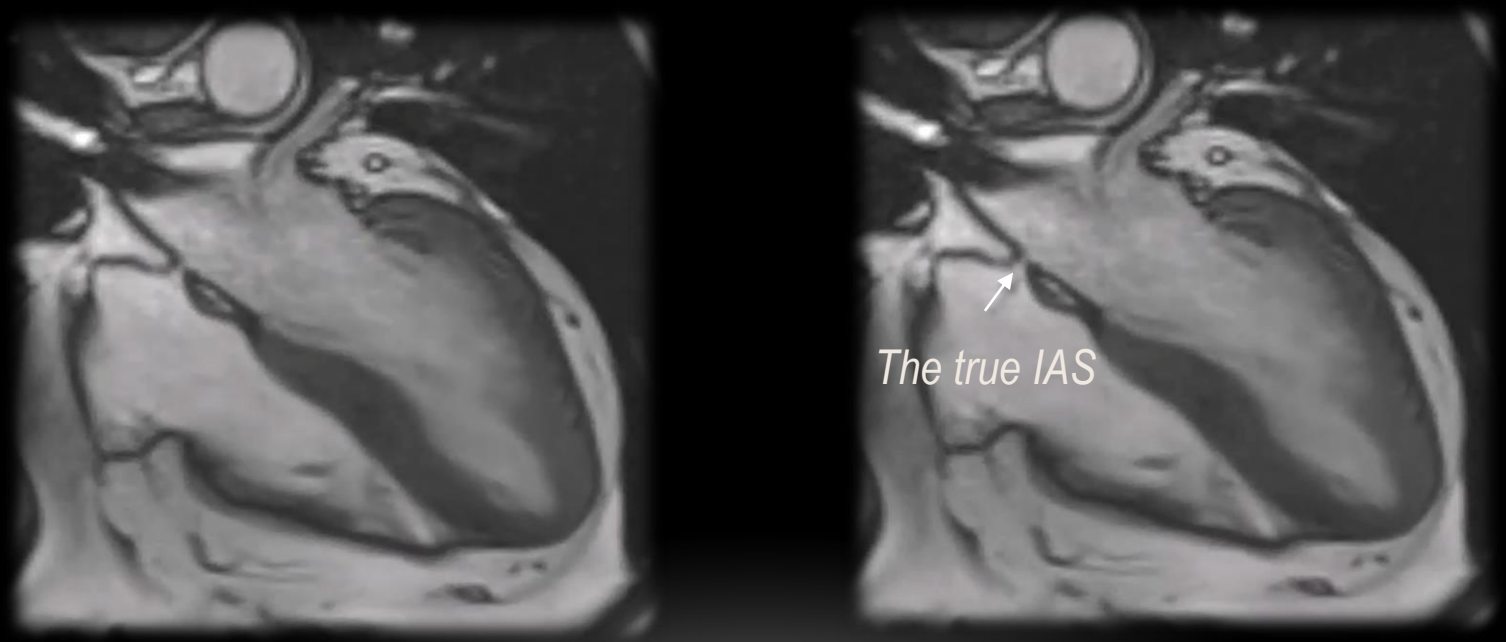

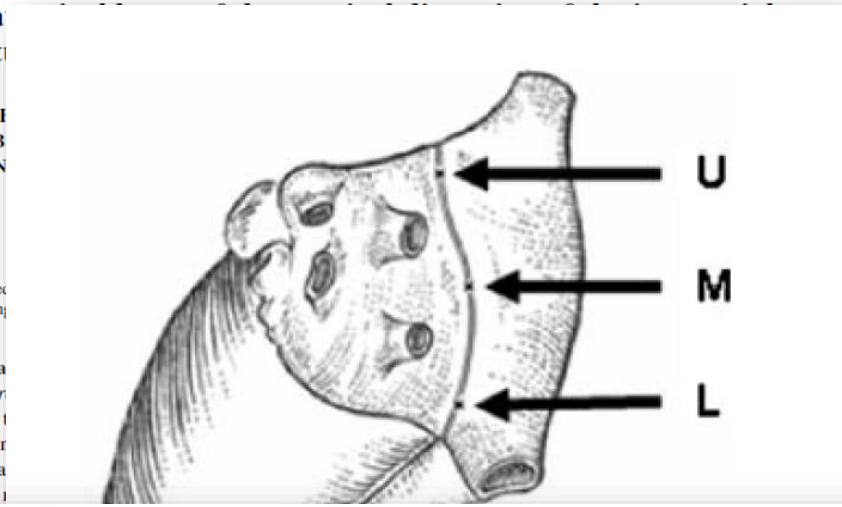

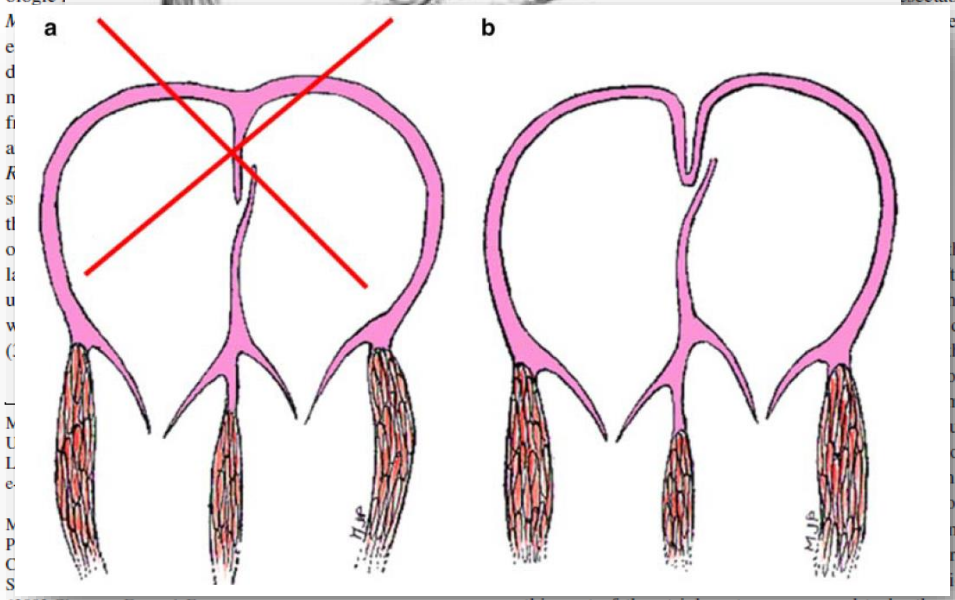

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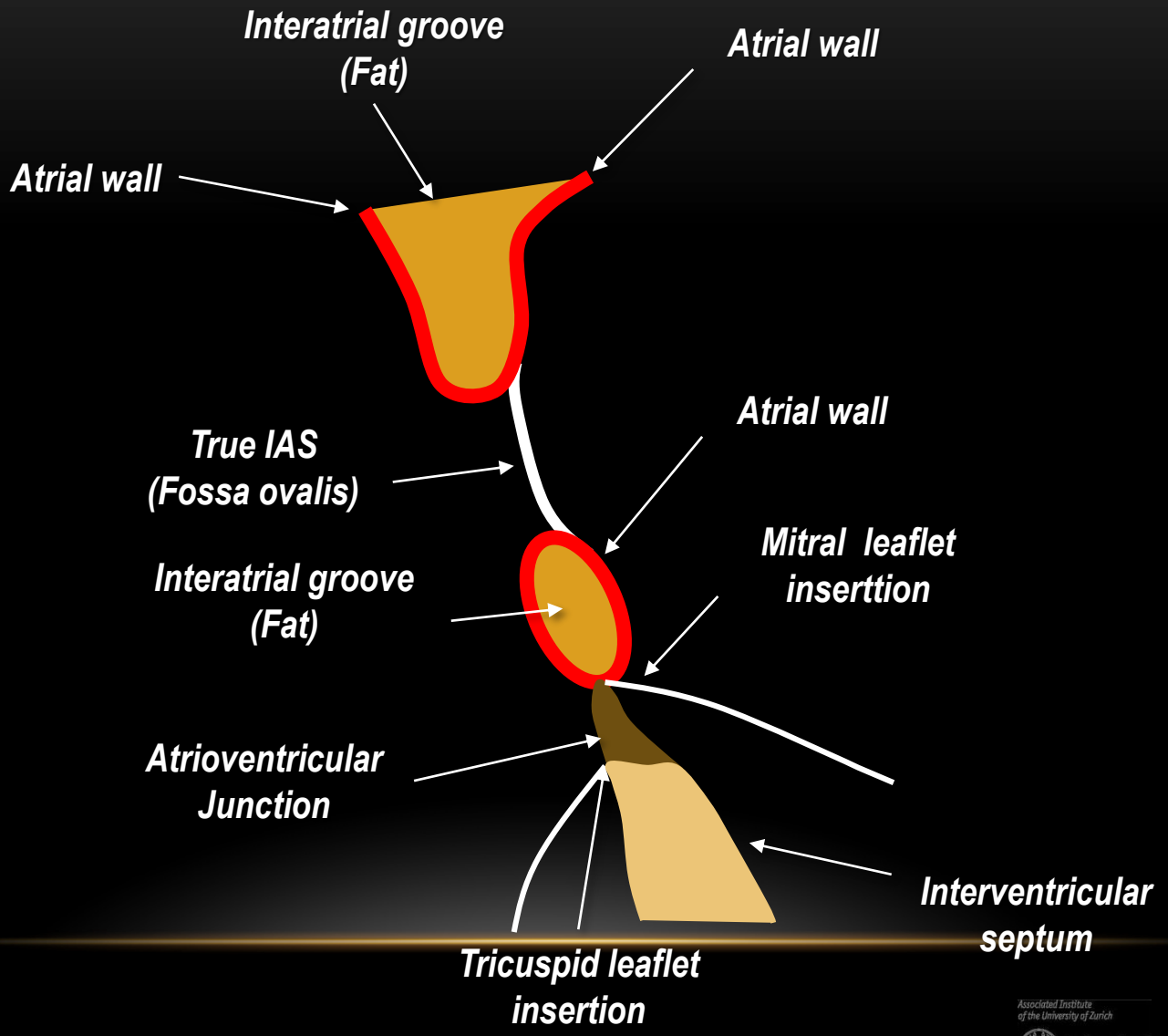
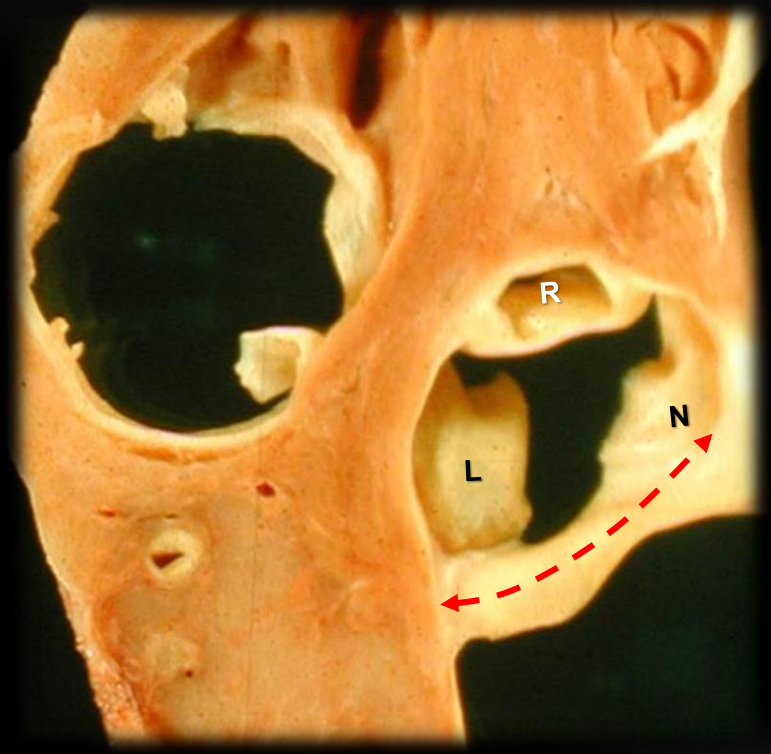
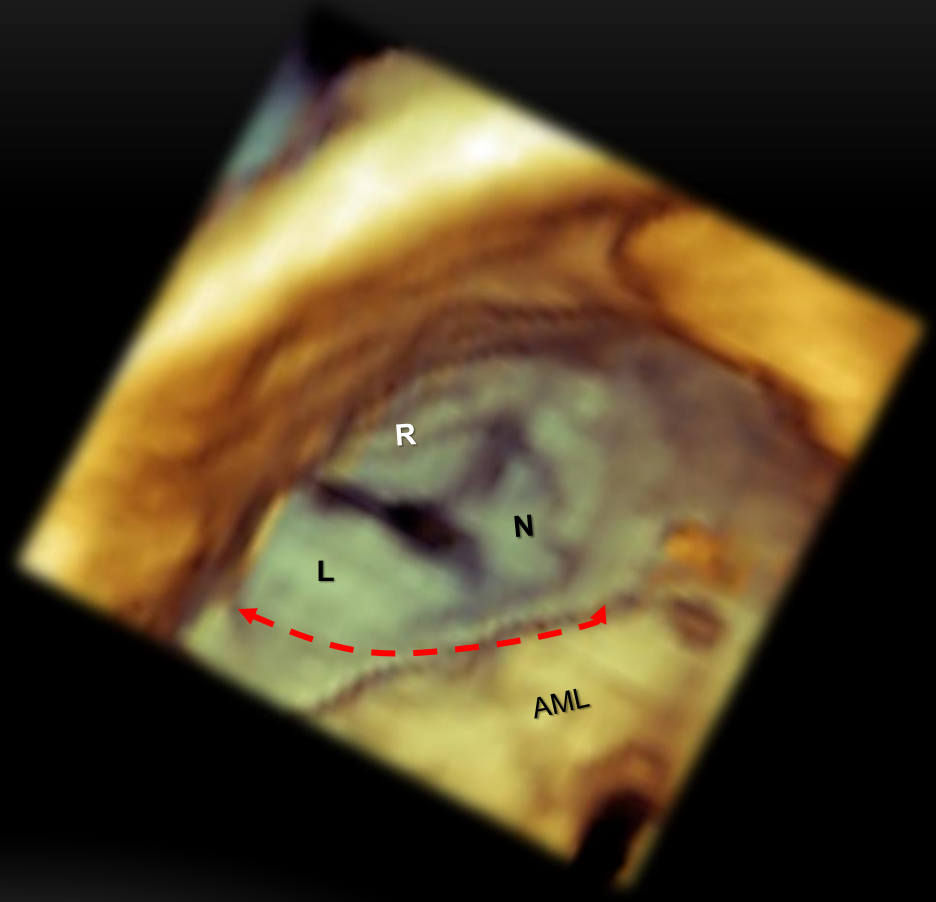
this part of the atrial septum, supposed to be the septum secundum, remain controversial [2]. In this study, we aimed to describe the morphological and histological aspect of the dissected structure, and the limits as well as the dangers of such dissection.

The *misnomer* "septum secundum"



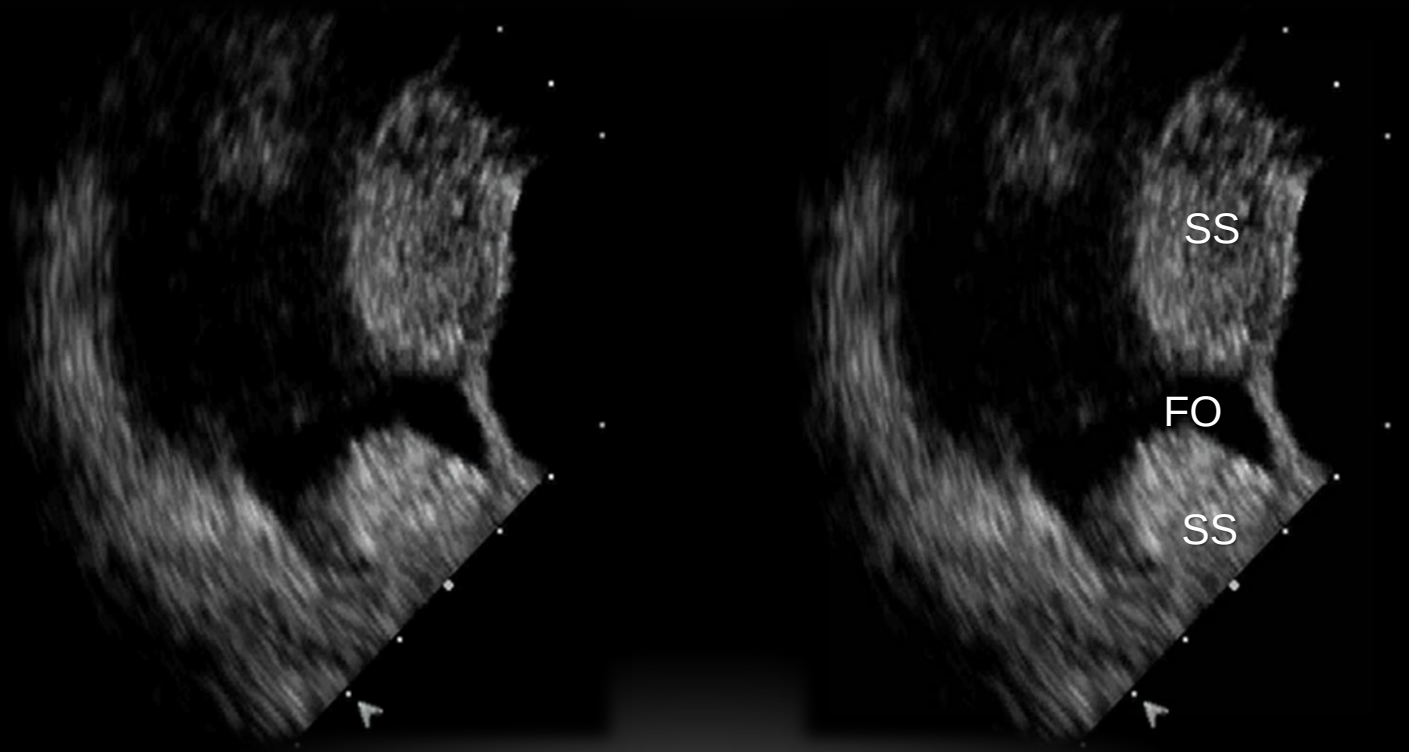
The ventriculo-arterial junction





The septum secundum

The lipomatous hypertrophy of interatrial septum



The septum secundum

The lipomatous hypertrophy of interatrial septum

STATE-OF-THE-ART REVIEW ARTICLE

Lipomatous Atrial Septal Hypertrophy: A Review of Its Anatomy, Pathophysiology, Multimodality Imaging, and Relevance to Percutaneous

Waterston's groove.[9] The fat accumulation of so-called LASH does not actually occur within the true septal tissue but rather in infoldings of the atrial wall adjacent to the true interatrial septum.

sive fat deposition in the region of the interatrial septum that spares the fossa ovalis. The etiology of LASH remains unclear, though it may be associated with advanced age and obesity. Because of the sparing of the fossa ovalis, LASH has a pathognomonic dumbbell shape. LASH may be mistaken for various tumors of the interatrial septum. Histologically, LASH is composed of both mature and brown (fetal) adipose tissue, but the role of brown adipose tissue remains unclear. In interventional procedures requiring access to the left atrium, LASH may interfere with transseptal puncture, as traversing the thickened area can reduce the maneuverability of catheters and devices. This may cause the needle to enter the epicardial space, causing dangerous pericardial effusions. LASH was once considered a contraindication to percutaneous device closure of atrial septal defects because of an associated increased risk for incorrect device deployment. However, careful attention to preprocedural imaging and procedural intracardiac echocardiography enable interventional cardiologists to perform procedures in patients with LASH without serious complications. In this review article, the authors describe anatomic and functional aspects of LASH, with emphasis on their roles in percutaneous interventions. (J Am Soc Echocardiogr 2016;29:717-23.)