

# Surgical Approach to Aortic Insufficiency

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NOVEMBER 3, 2019

# Outline

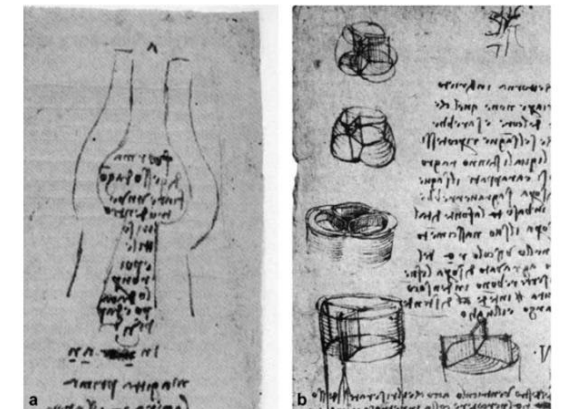
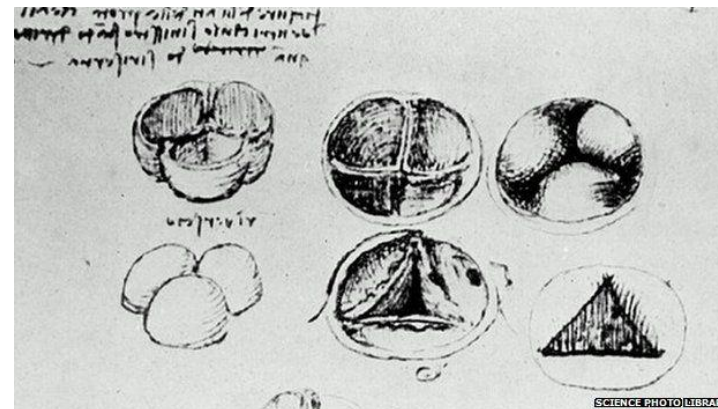
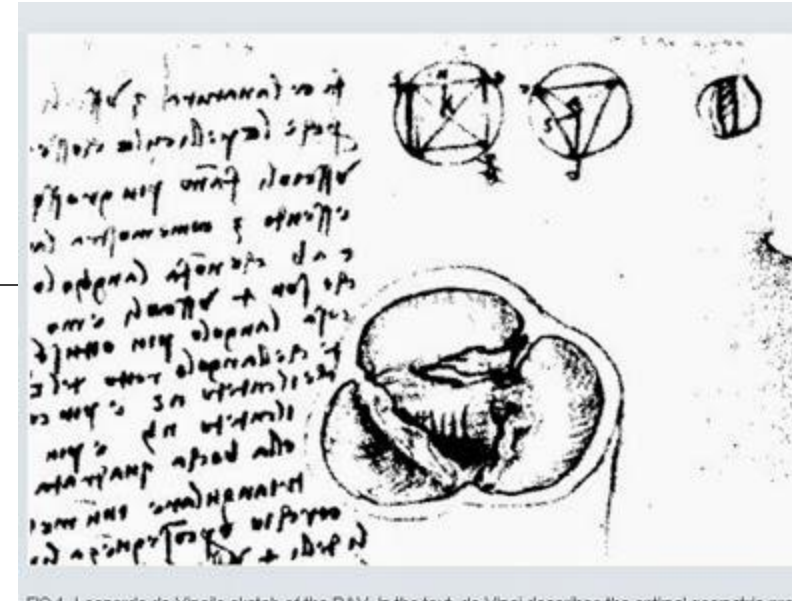
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Surgical Anatomy

Classification of AI

Common Surgical Strategies

Evidence for Aortic Valve Repair



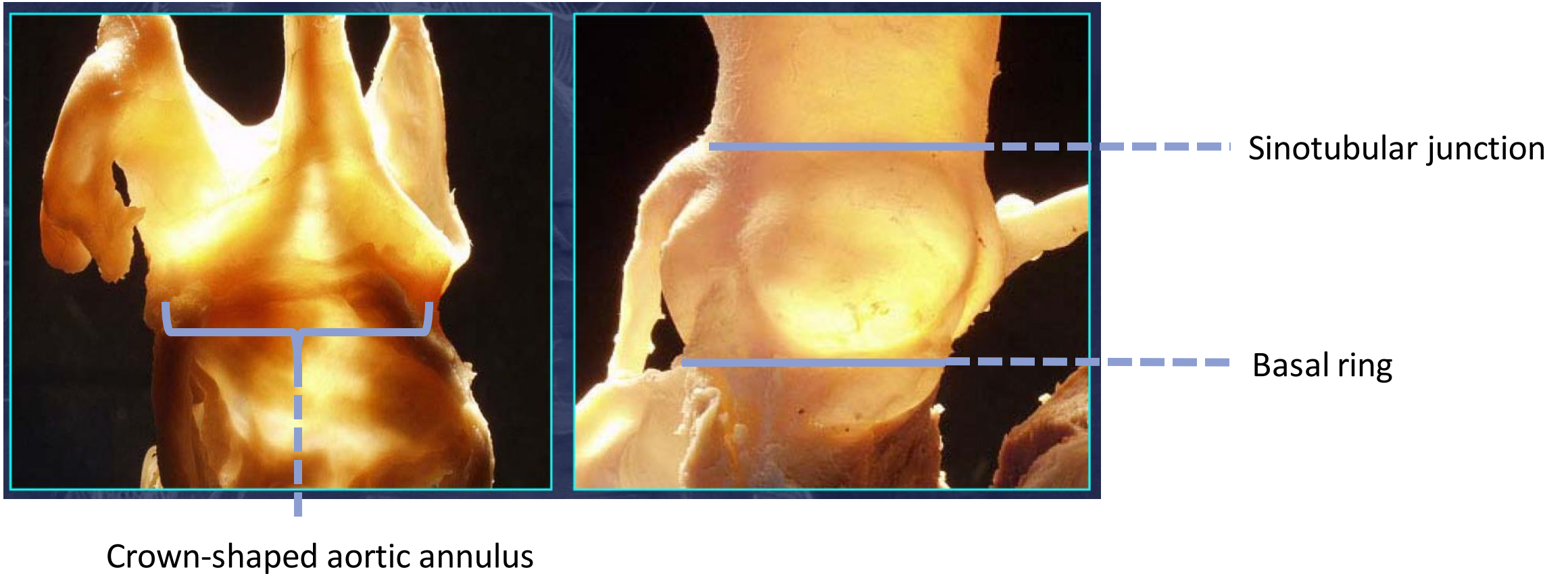
# Surgical Anatomy

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LET'S SPEAK THE SAME LANGUAGE

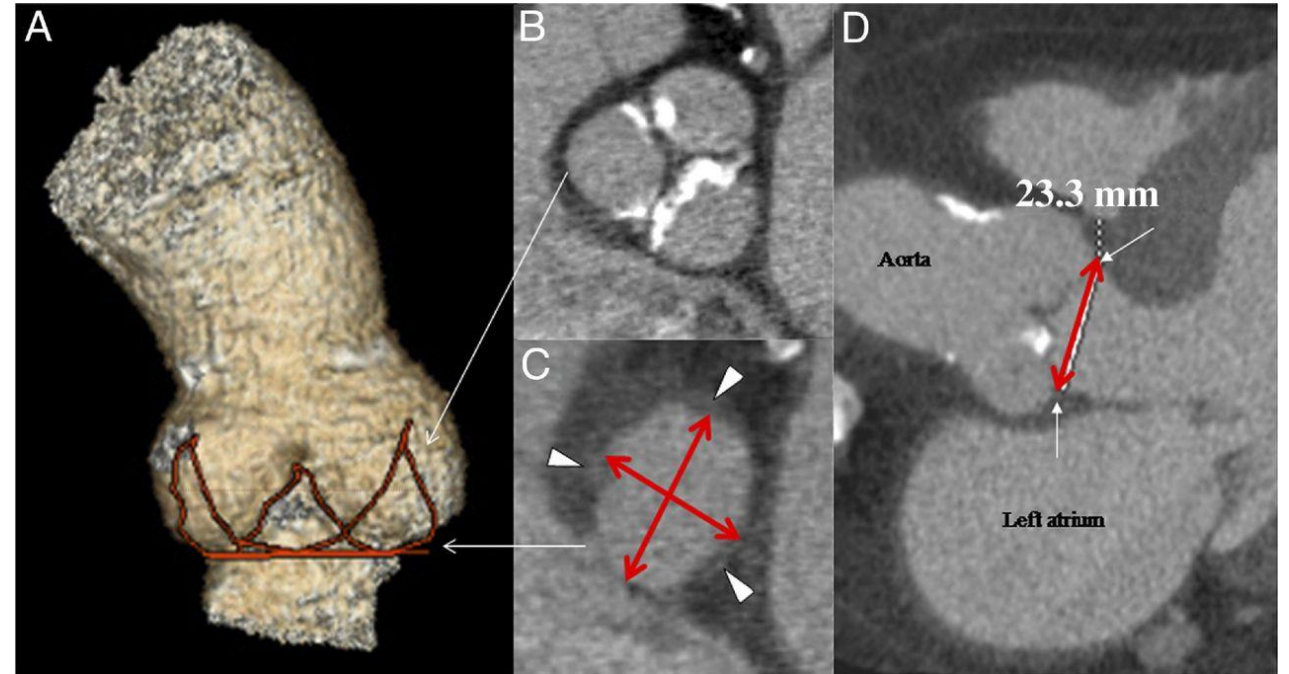
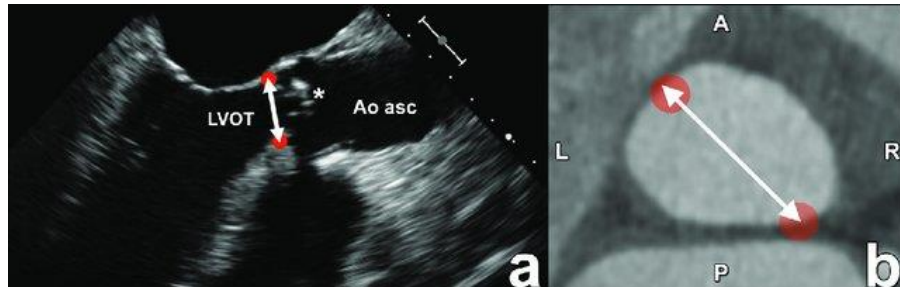
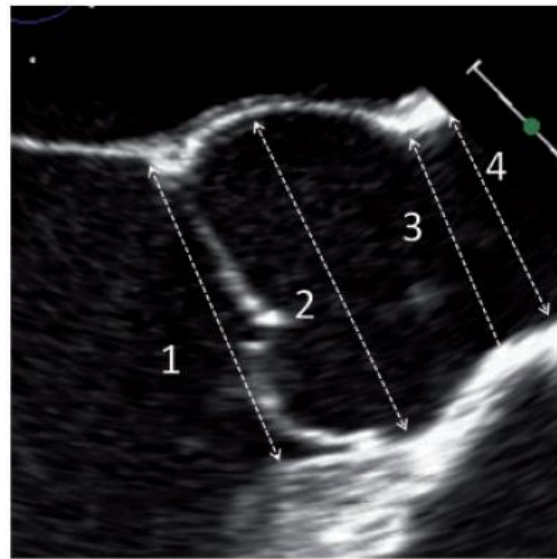
# The Functional Aortic Annulus

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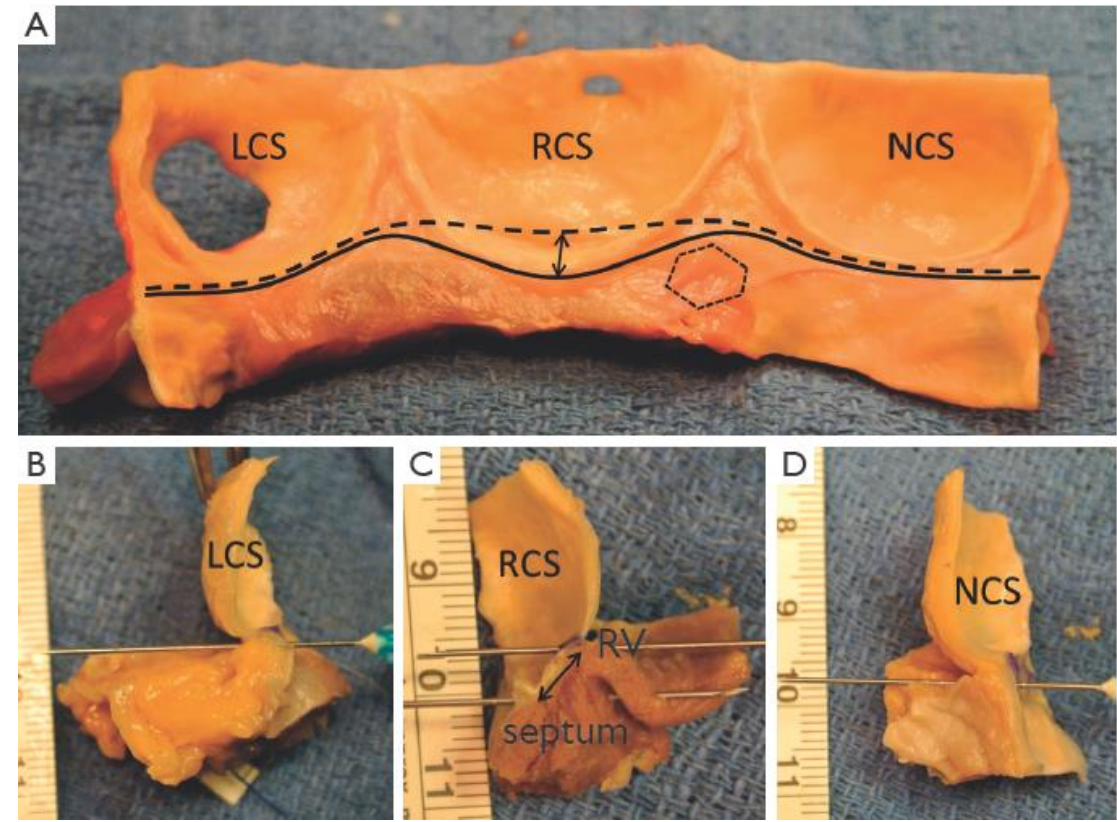
# The Functional Aortic Annulus

Aortic Annulus  
*The Virtual Basal Ring*



# The Functional Aortic Annulus

Ventricular-aortic junction  
*the VAJ*



## The Myth of the Aortic Annulus: The Anatomy of the Subaortic Outflow Tract

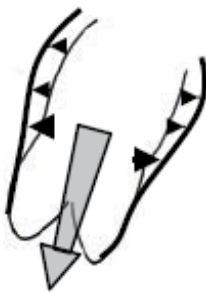
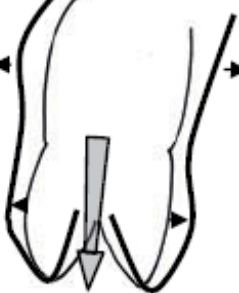
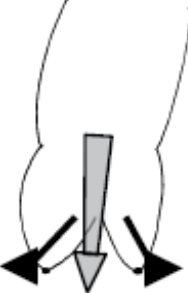



Robert H. Anderson, MD, FRCPath, William A. Devine, BS, Siew Yen Ho, PhD, Audrey Smith, PhD, and Roxane McKay, MD, FRCS

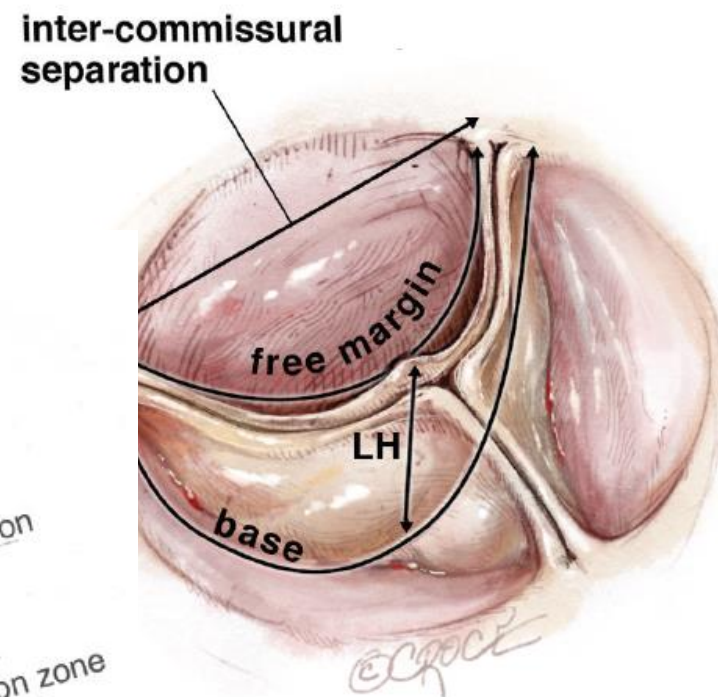
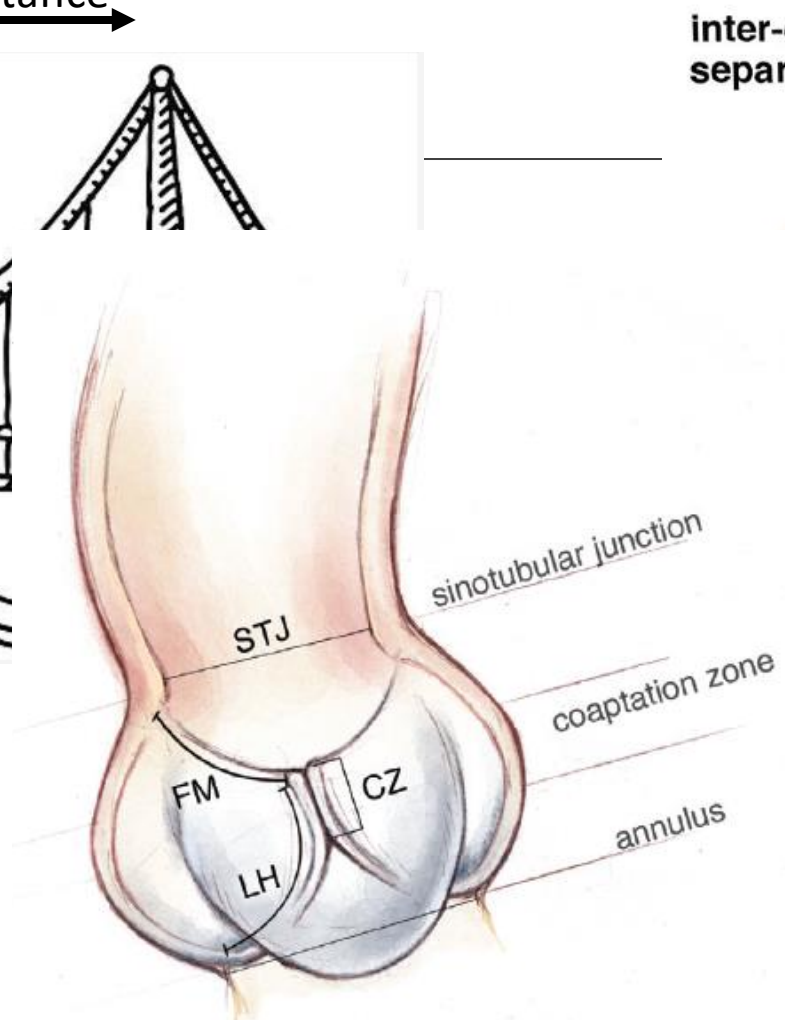
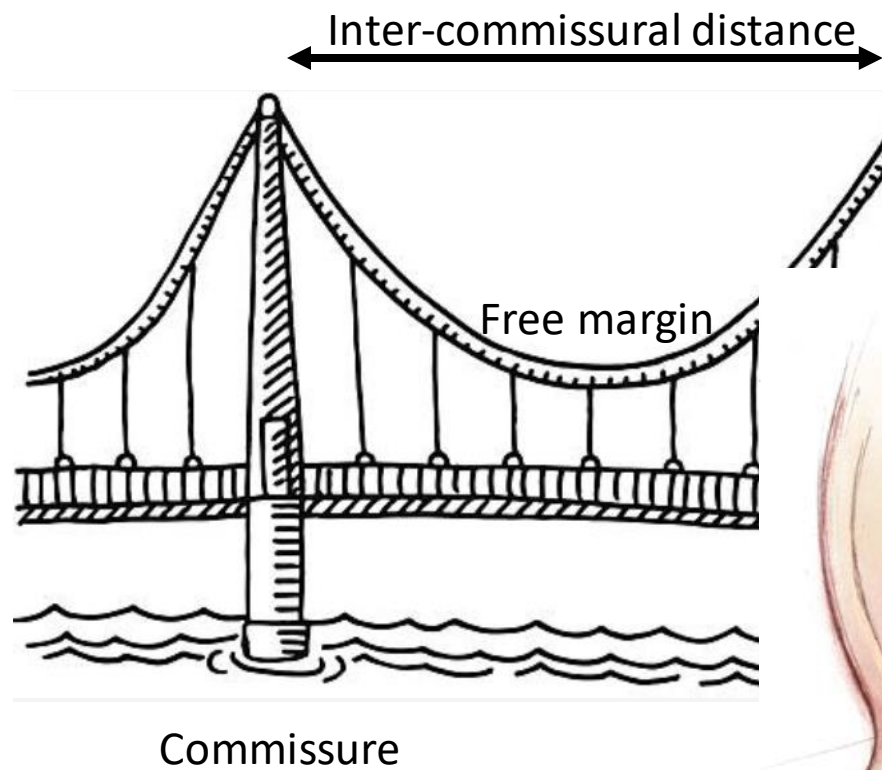
Department of Paediatrics, National Heart and Lung Institute, London, United Kingdom; Department of Pathology, Children's Hospital of Pittsburgh, Pittsburgh, Pennsylvania; and Department of Surgery, Institute of Child Health, University of Liverpool, Liverpool, United Kingdom

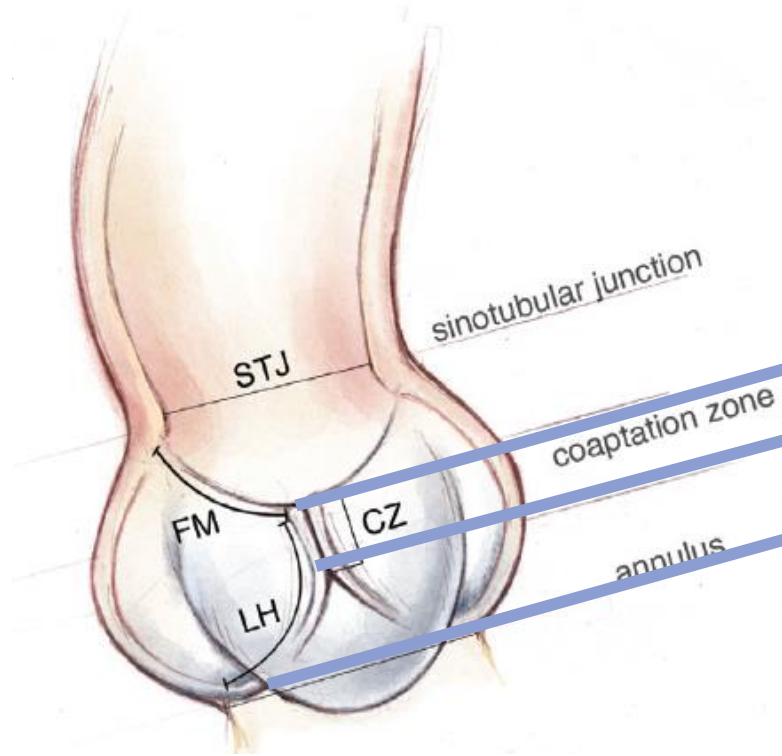
# Classification of Aortic Insufficiency

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INFORMS SURGICAL REPAIR CHOICES

AI Class	Type I Normal cusp motion with FAA dilatation or cusp perforation				Type II Cusp Prolapse	Type III Cusp Restriction
	Ia	Ib	Ic	Id		
Mechanism						
Repair Techniques (Primary)	STJ remodeling <i>Ascending aortic graft</i>	Aortic Valve sparing: <i>Reimplantation or Remodeling with SCA</i>	SCA	Patch Repair <i>Autologous or bovine pericardium</i>	Prolapse Repair <i>Plication Triangular resection Free margin Resuspension Patch</i>	Leaflet Repair <i>Shaving Decalcification Patch</i>
(Secondary)	SCA		STJ Annuloplasty	SCA	SCA	SCA

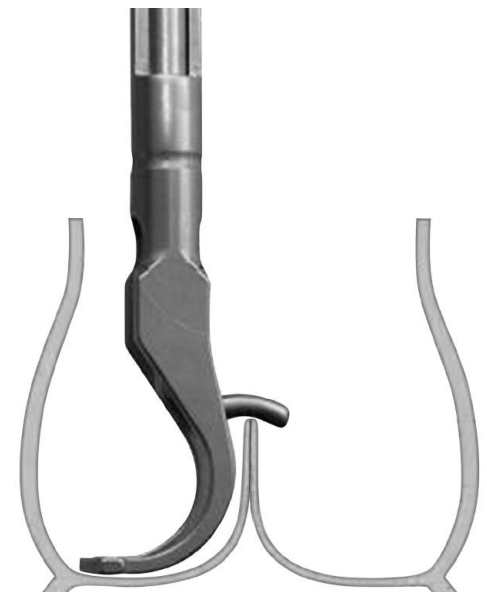




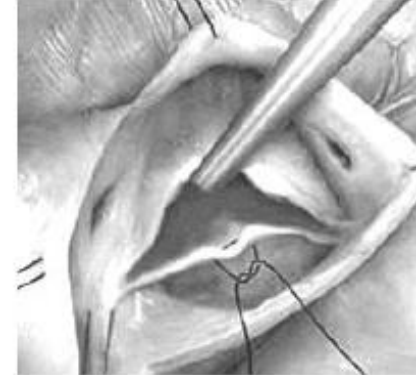
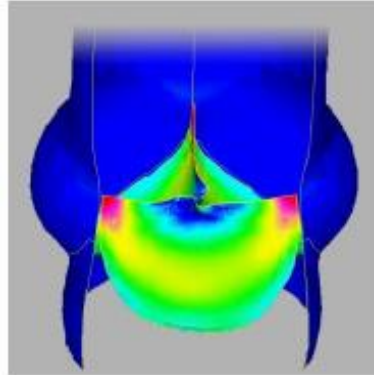
COAPTATION LENGTH

EFFECTIVE HEIGHT

The diagram shows two vertical double-headed arrows. The left arrow is purple and labeled 'COAPTATION LENGTH'. The right arrow is red and labeled 'EFFECTIVE HEIGHT'.



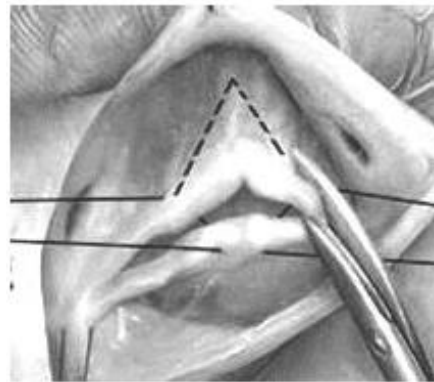
# Q1: What is the condition of the leaflets



Thin and pliable

Small fenestrations

Long and prolapsing



let

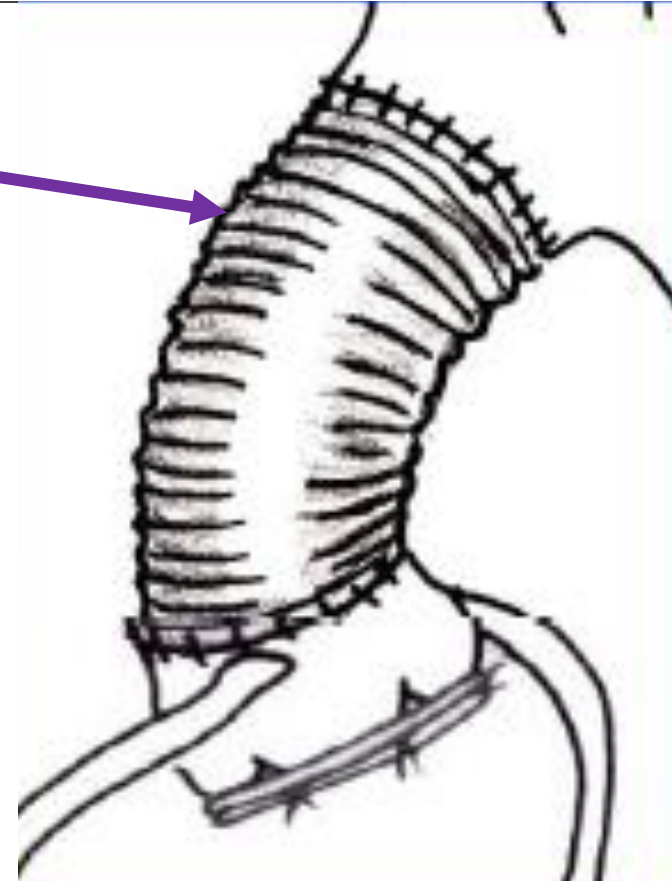
Schafers, Homburg, Germany

## Q2: What is the condition of the FAA?

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➤ STJ dilated?

*Then STJ remodeling*



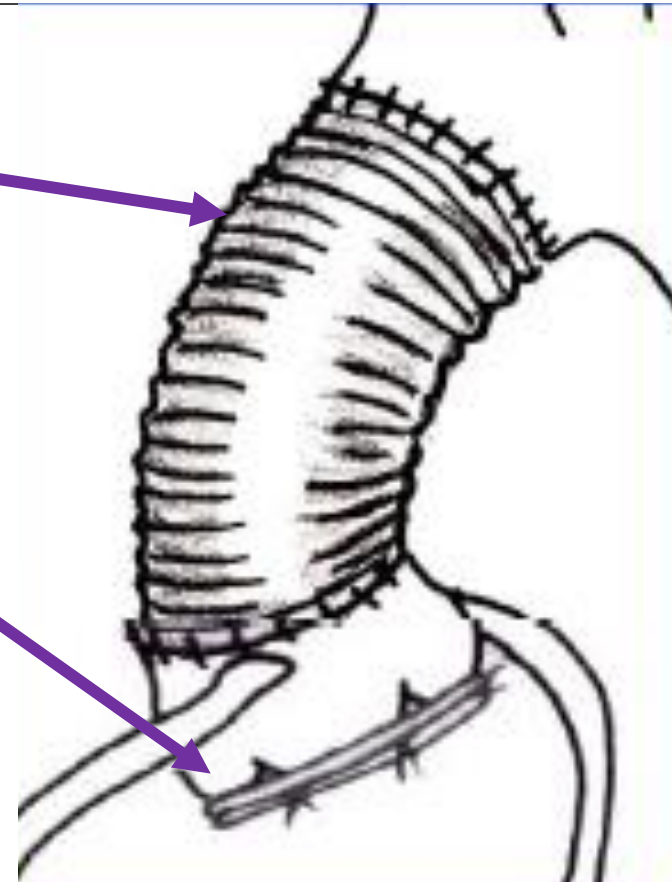
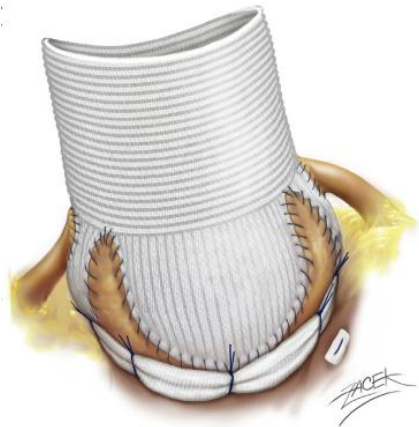
## Q2: What is the condition of the FAA?

➤ STJ dilated?

*Then STJ remodeling*

➤ Annuloaortic ectasia?

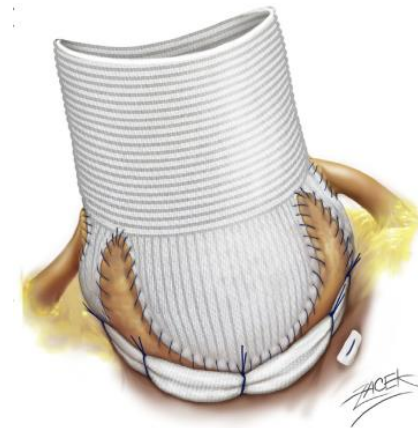
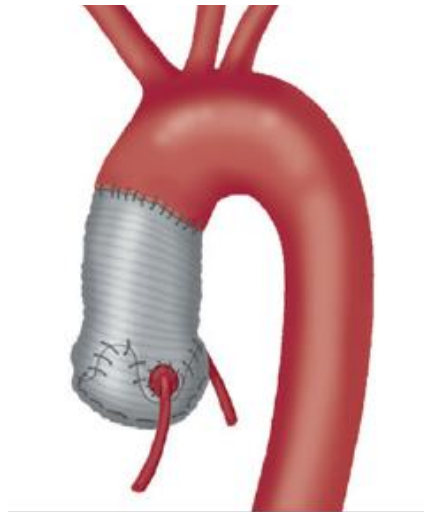
*Then basal ring remodeling*



## Q2: What is the condition of the FAA?

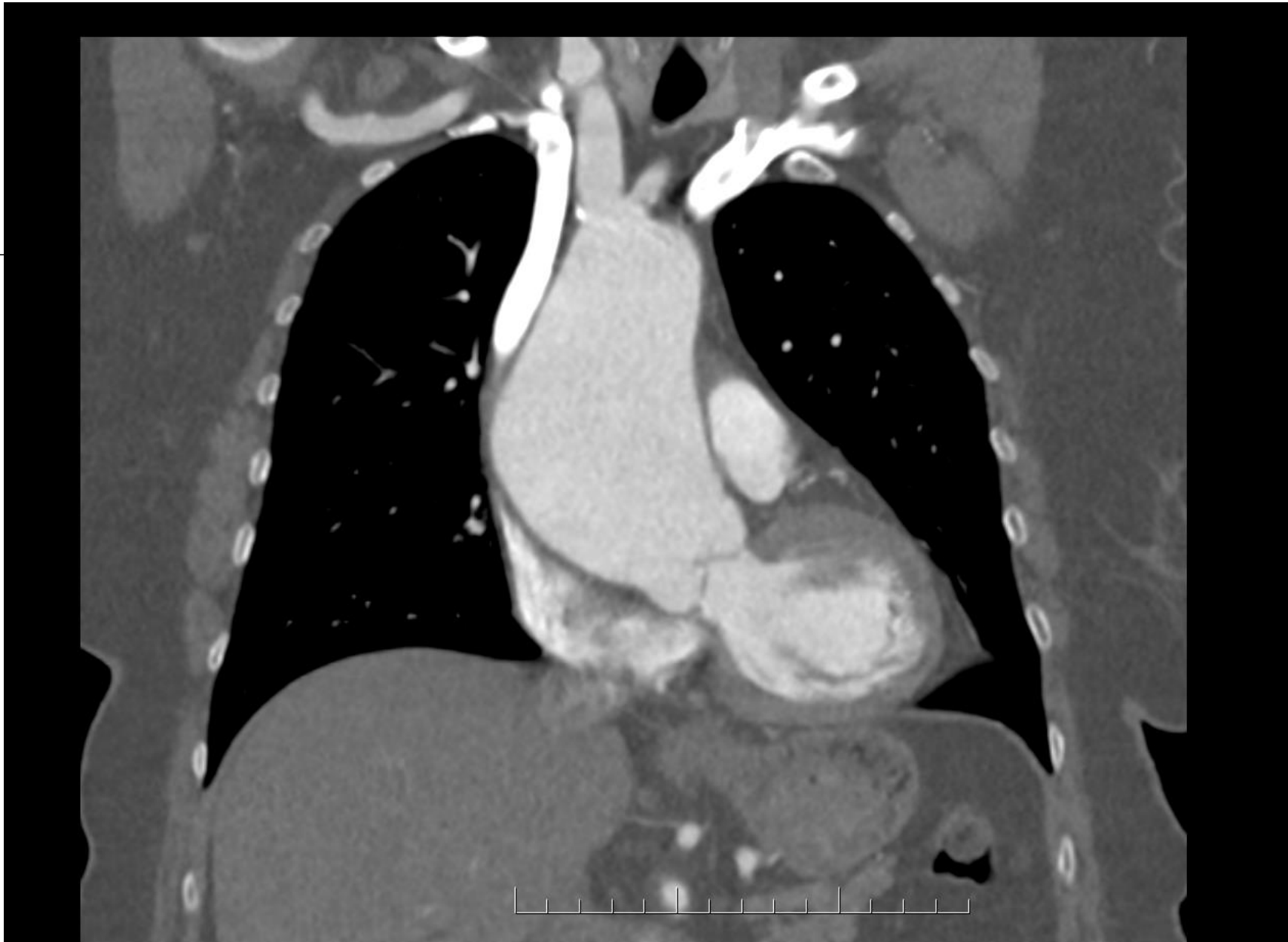
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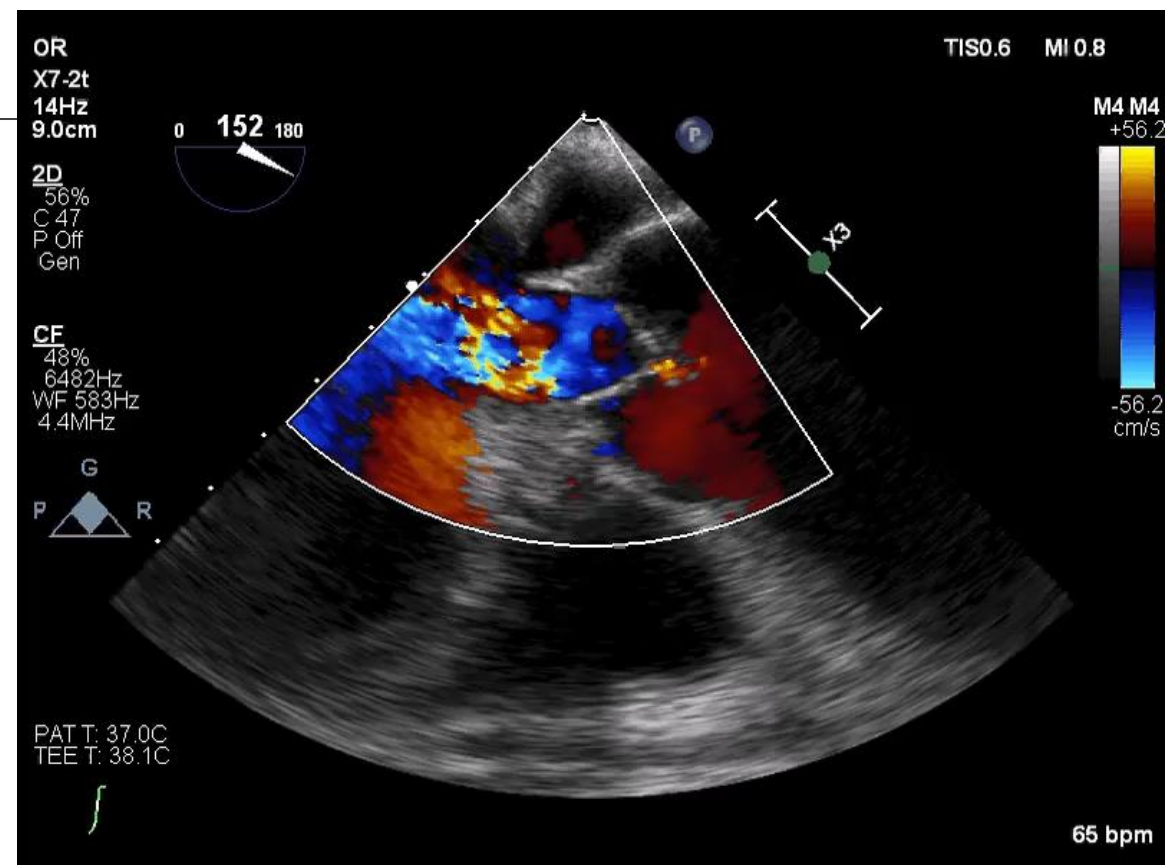
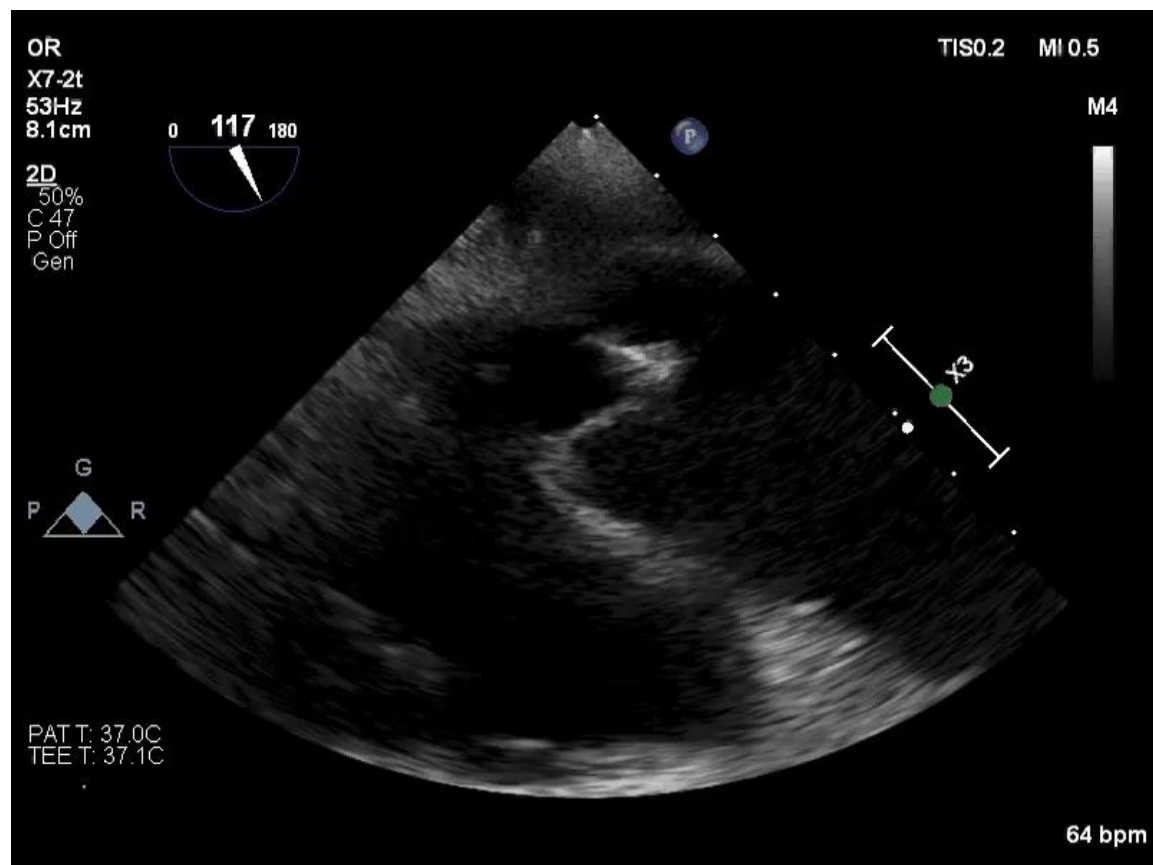
- STJ dilated? *Then STJ remodeling*
- Annuloaortic ectasia? *Then basal ring remodeling*
- Sinuses of Valsalva? *Then the root should be replaced (VSRR versus Bentall)*



# Quick case example

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# Repair strategy

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Aneurysm – needs replacement of the ascending aorta and hemiarch replacement

But what about the severe AI?

Q1: Leaflet quality: Thickened, Geometric height 17mm

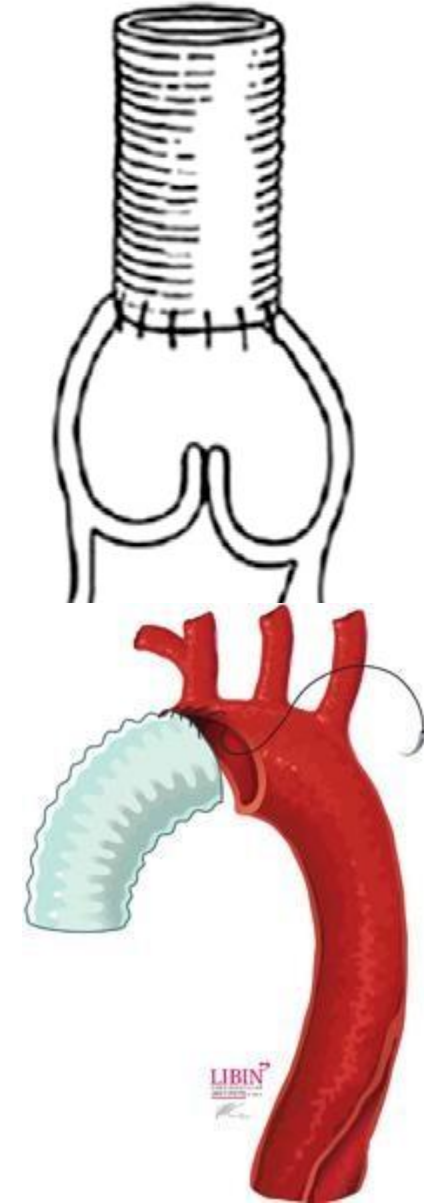
Q2: Basal ring is small, Root not dilated, STJ is distracted

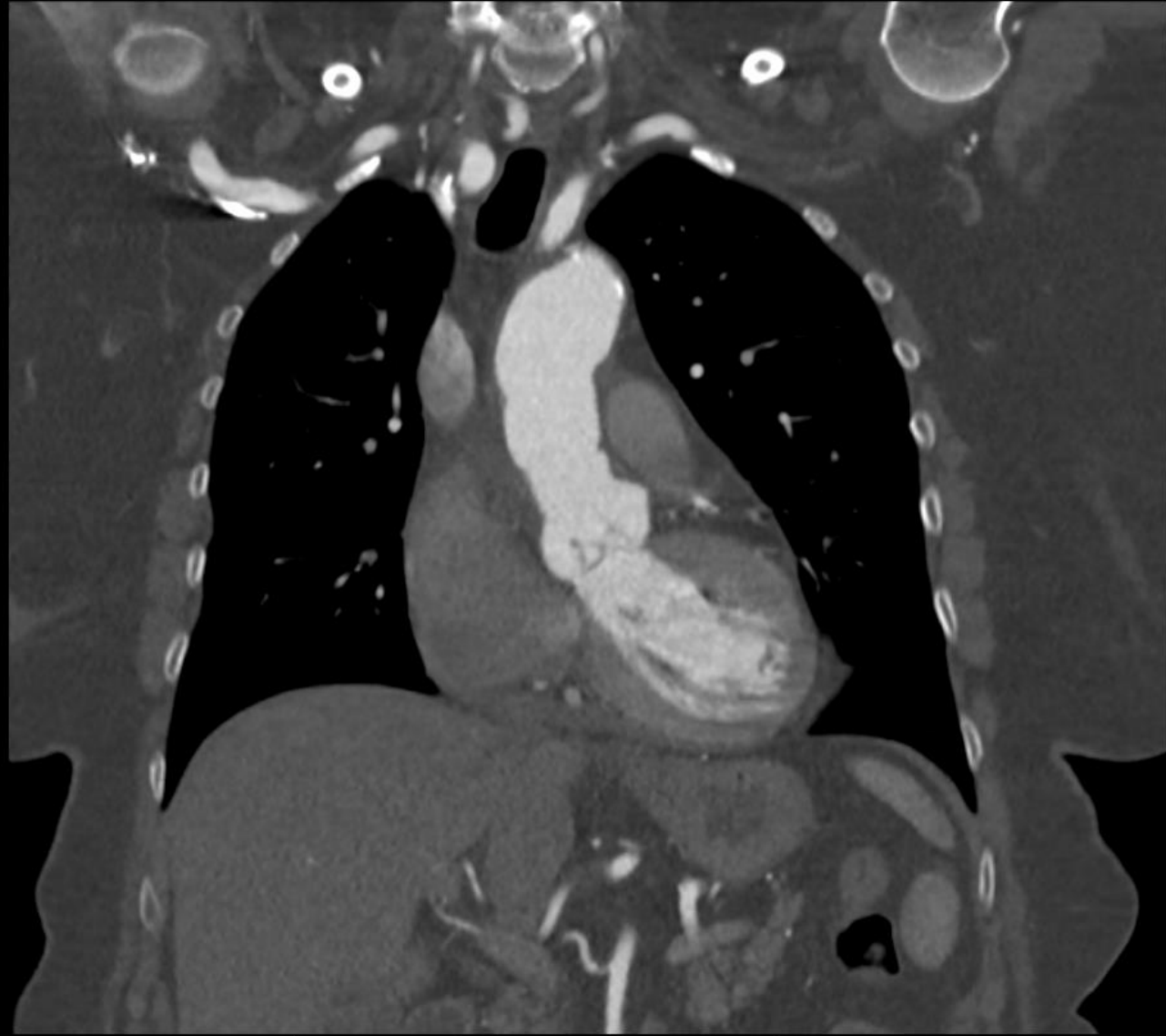
*STJ remodeling!*

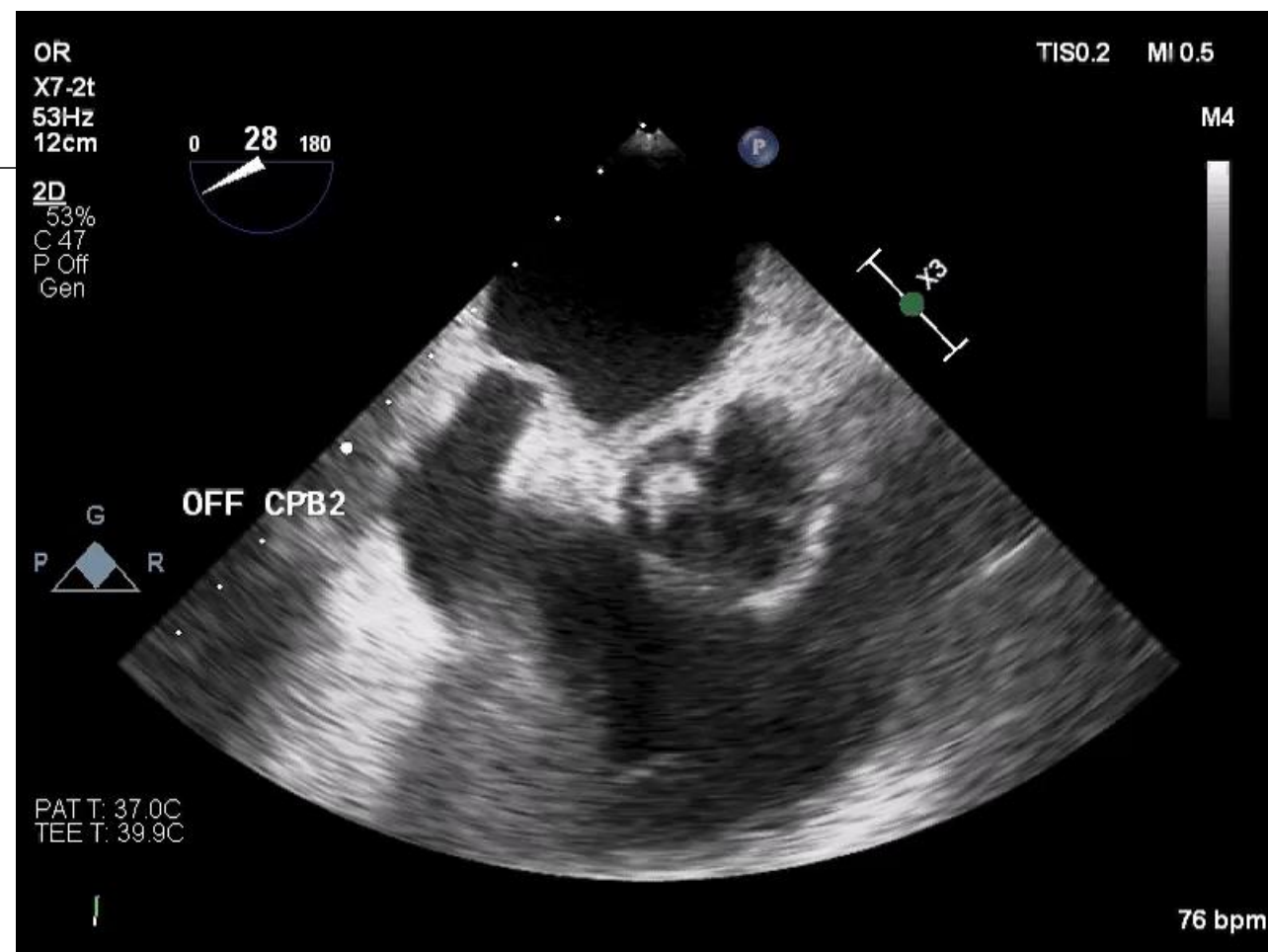
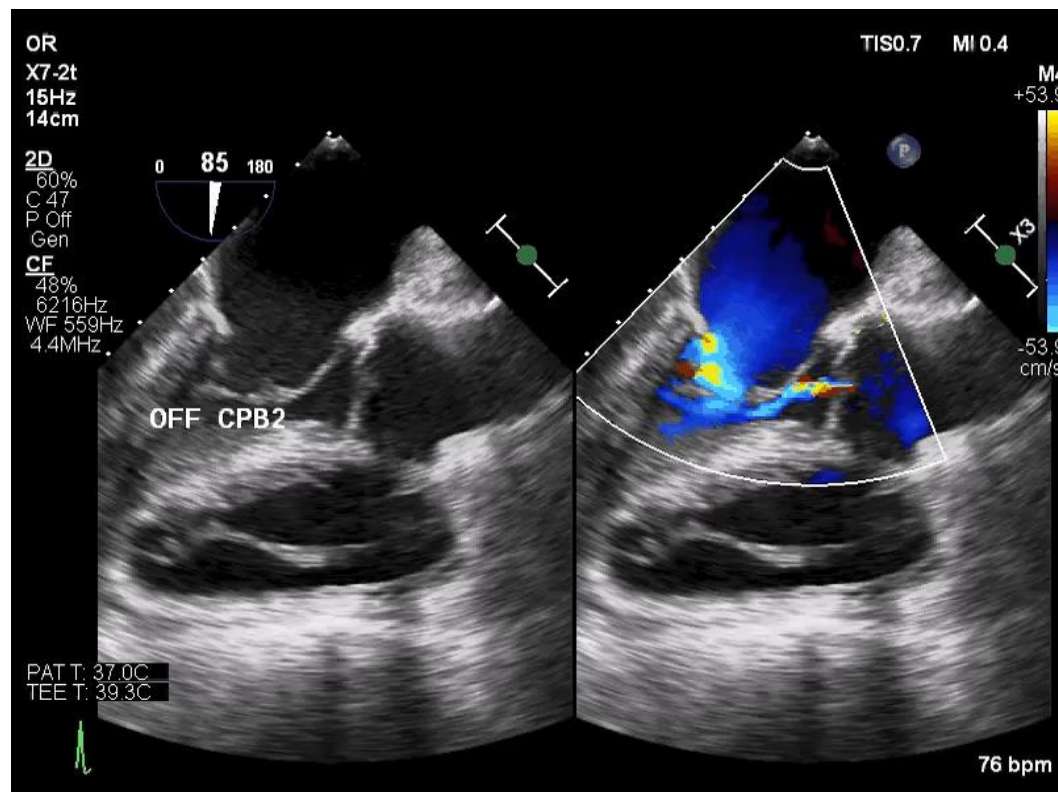
# Finer points

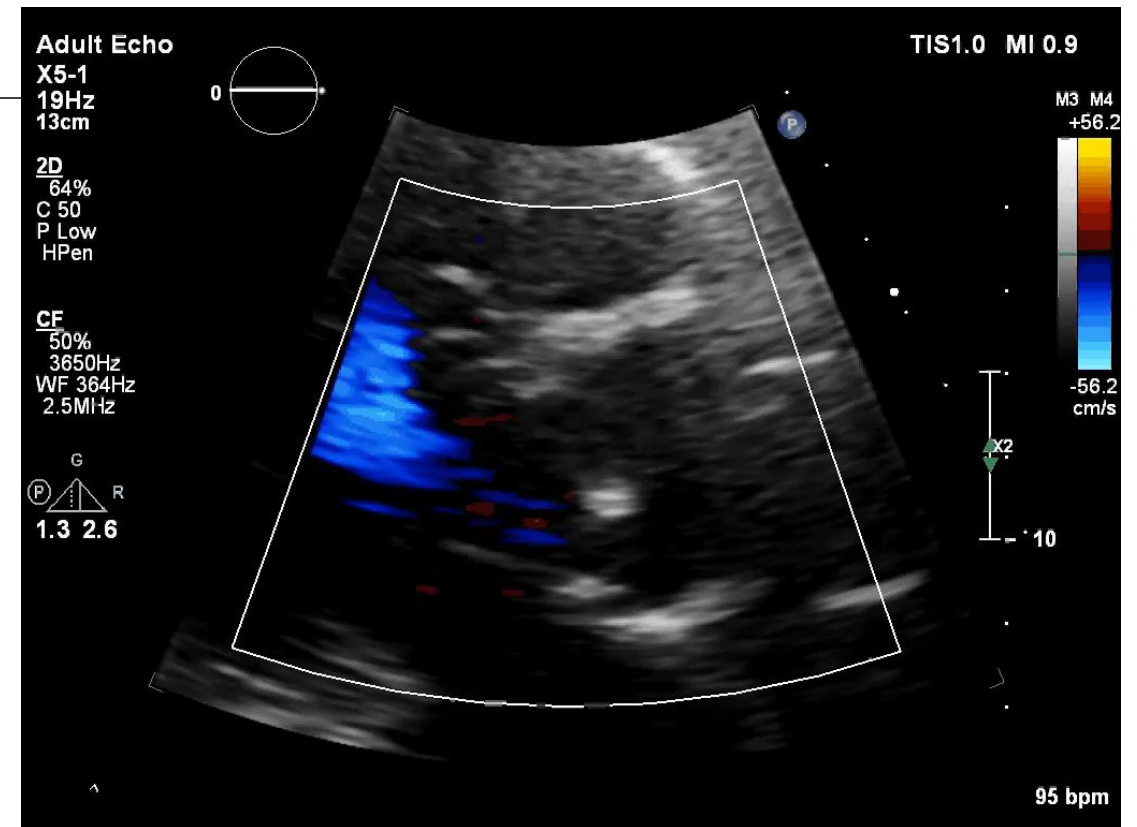
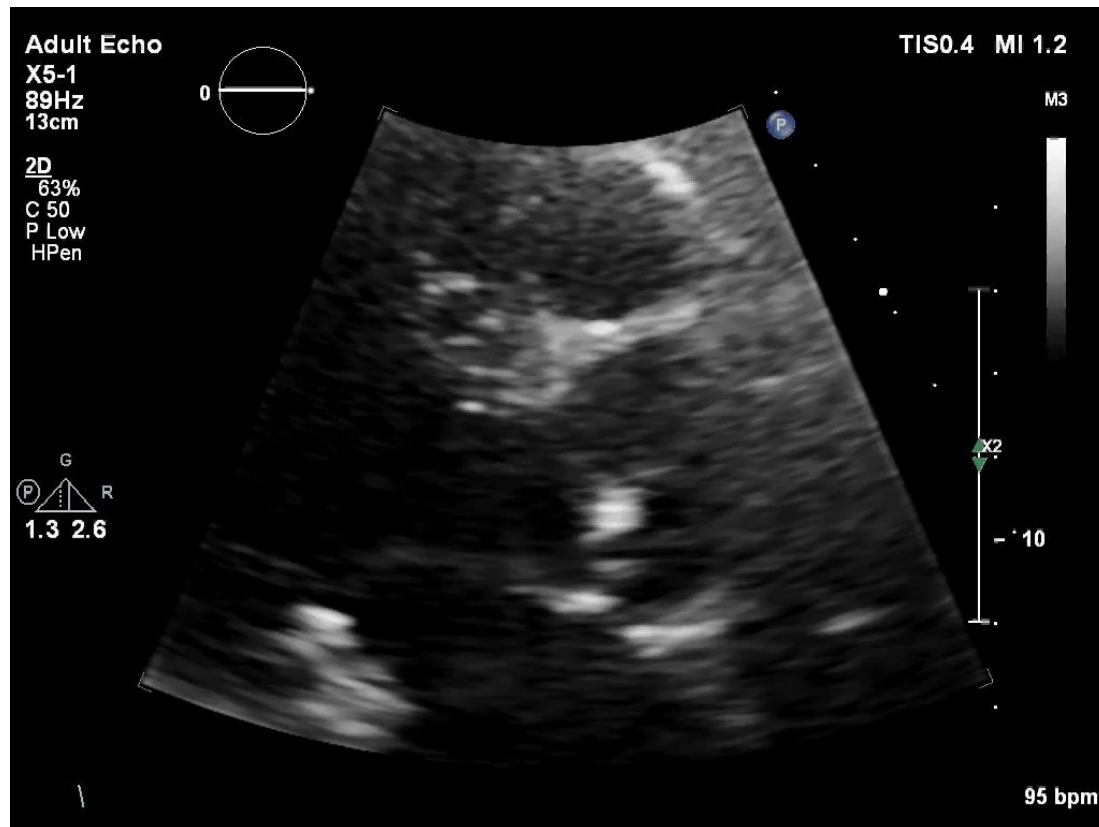
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- Small basal ring, short leaflets, 26 mm graft chosen
- Anticipate central jet given thickened leaflets
- Best practice to reinspect the valve after STJ remodeling
- Separate graft for hemiarch replacement, and then graft to graft









# Evidence for Aortic Valve Repair

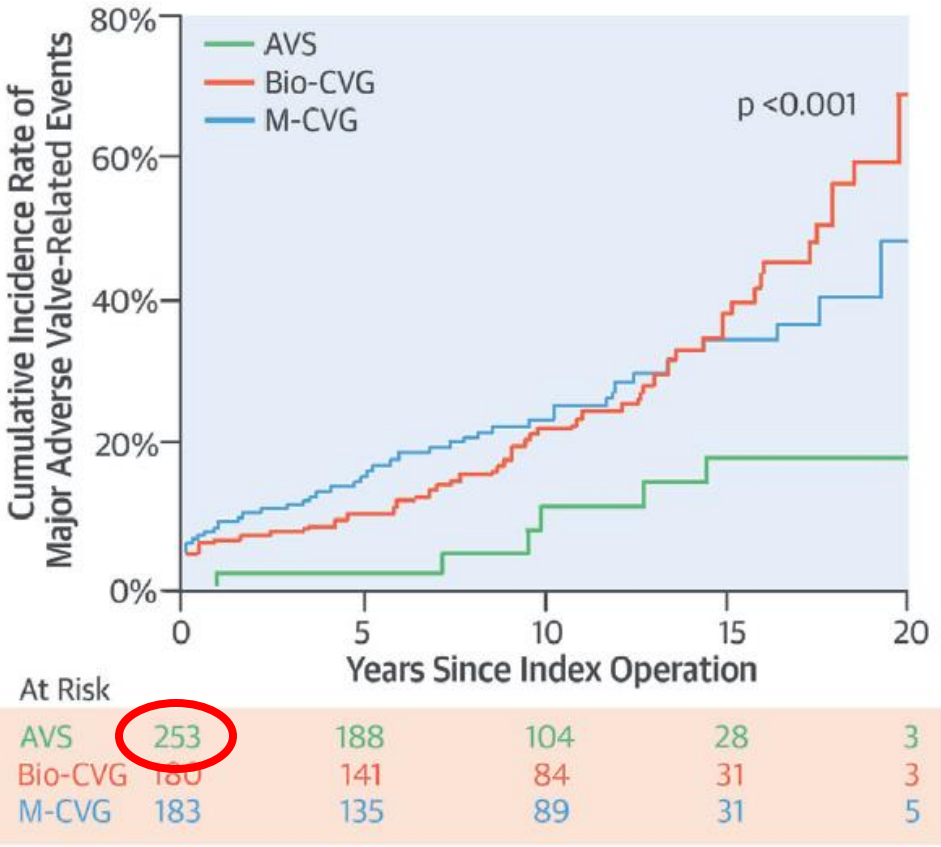
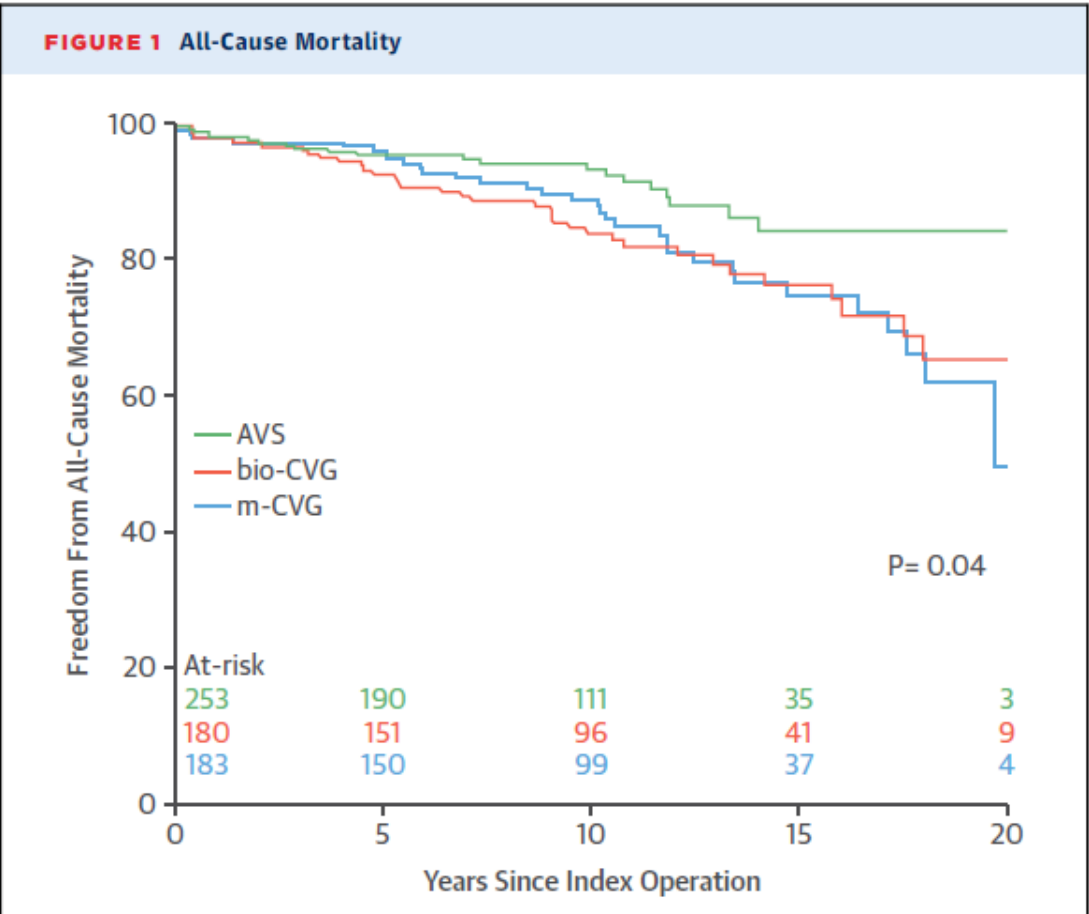
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LONG-TERM OUTCOMES

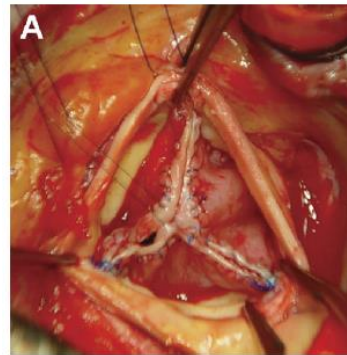
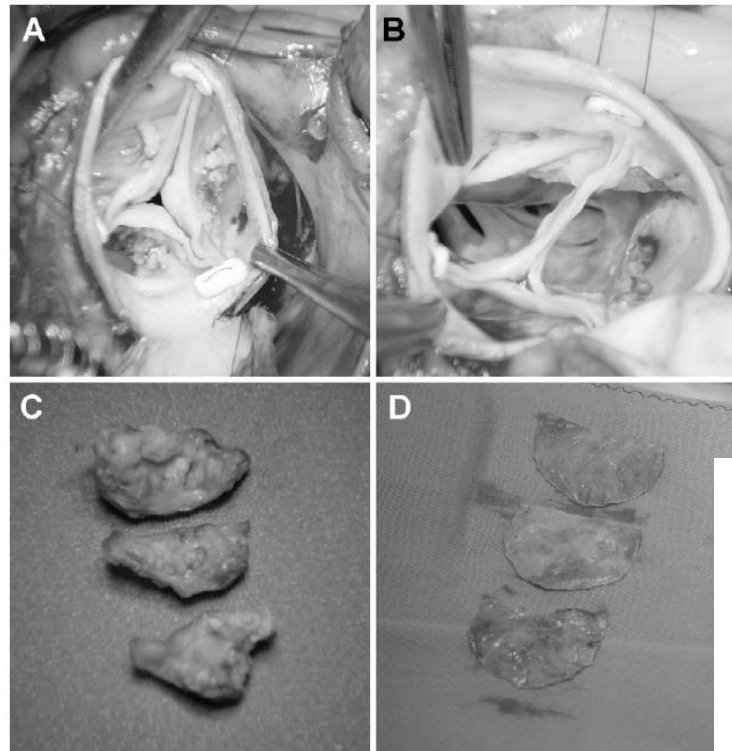
# Valve-Sparing Root Replacement Compared With Composite Valve Graft Procedures in Patients With Aortic Root Dilation



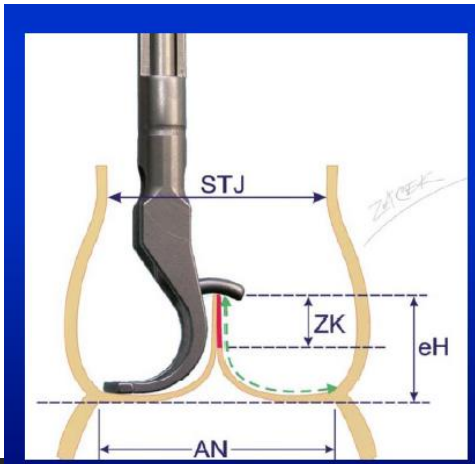
Maral Ouzounian, MD, PhD, Vivek Rao, MD, PhD, Cedric Manlhot, PhD, Nachum Abraham, MSc, Carolyn David, RN, Christopher M. Feindel, MD, MSc, Tirone E. David, MD



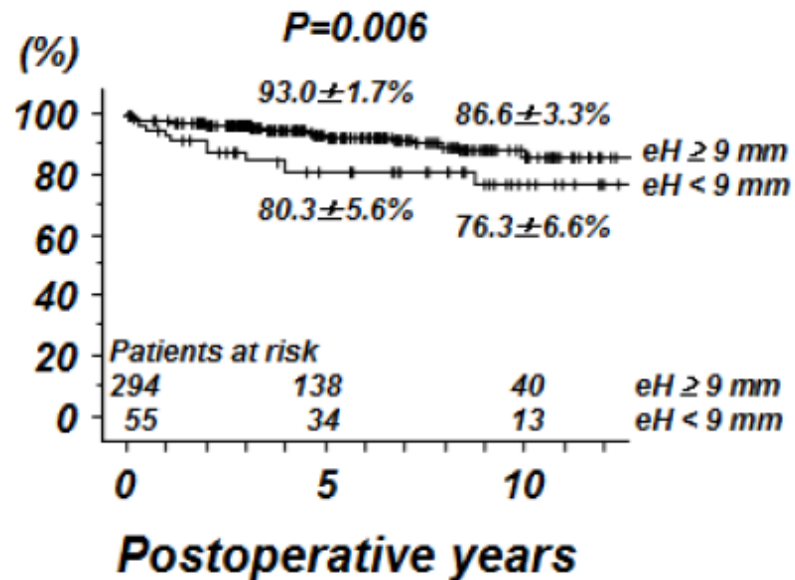
Beware patients who require  
**significant de-calcification** or  
**extensive patch-work**



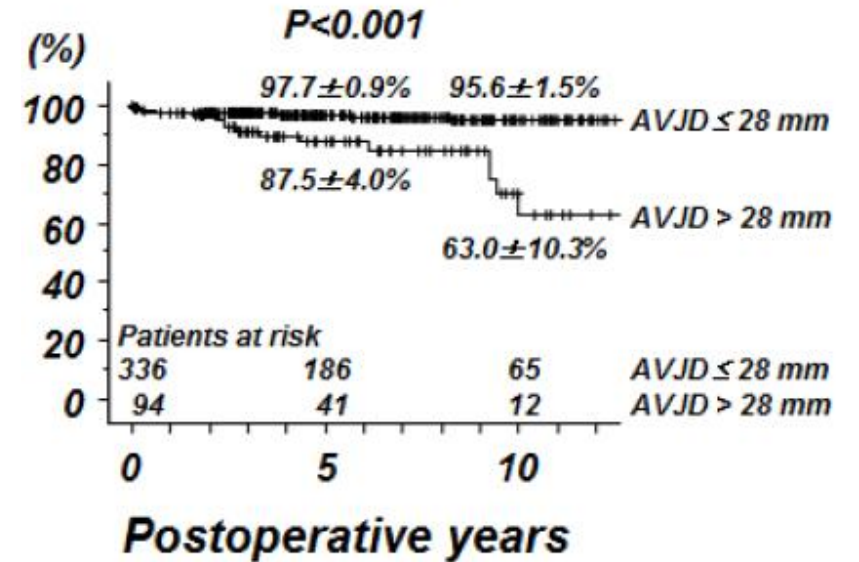
# Technique optimizes long-term durability



**Stratified by effective height**



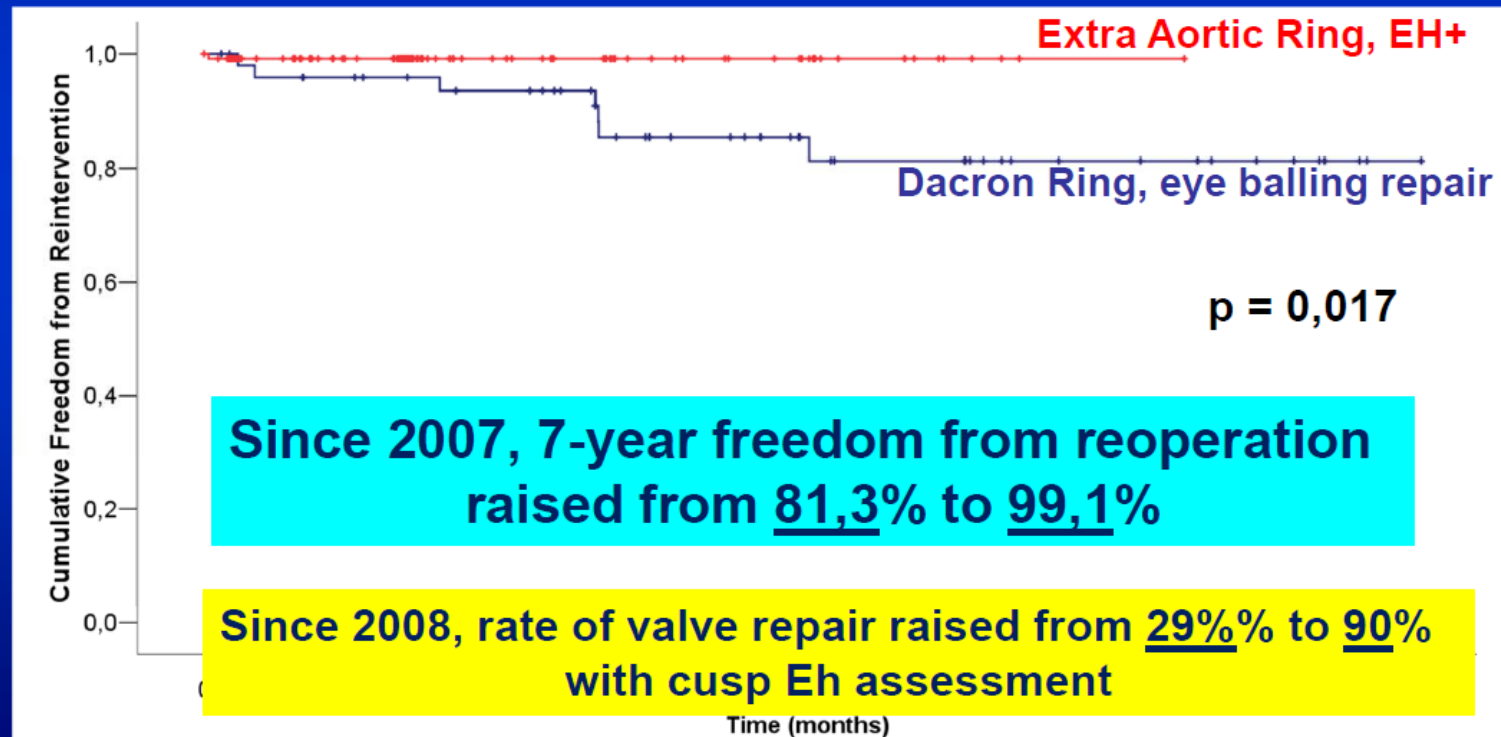
**Stratified by AVJD**



# Technique optimizes long-term durability

**2007 : calibrated expansible Extra-Aortic™ ring annuloplasty**

**2008 : cusp effective Height caliper assessment (Fehling)**



# Take-Home Messages

UNDERSTANDING THE FUNCTIONAL AORTIC ANNULUS INFORMS  
SURGICAL REPAIR STRATEGIES

EXCELLENT LONG-TERM RESULTS FOR AORTIC VALVE REPAIR FOR  
AORTIC INSUFFICIENCY IF CHOOSE THE RIGHT PATIENTS AND THE  
RIGHT TECHNIQUES

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THANK-YOU FOR YOUR ATTENTION