



## Reconstruction of the Aortic Valve and Root A practical approach

# How to start an aortic valve repair program?

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Hospital Vithas Xánit Internacional. Málaga, Spain





## Reconstruction of the Aortic Valve and Root A practical approach

November 2008

169 pts

May 2015







90  
Reconstruction of the Aortic Valve and Root  
A practical approach



**Combined surgery (24/169 - 14,2%)**





## Reconstruction of the Aortic Valve and Root A practical approach

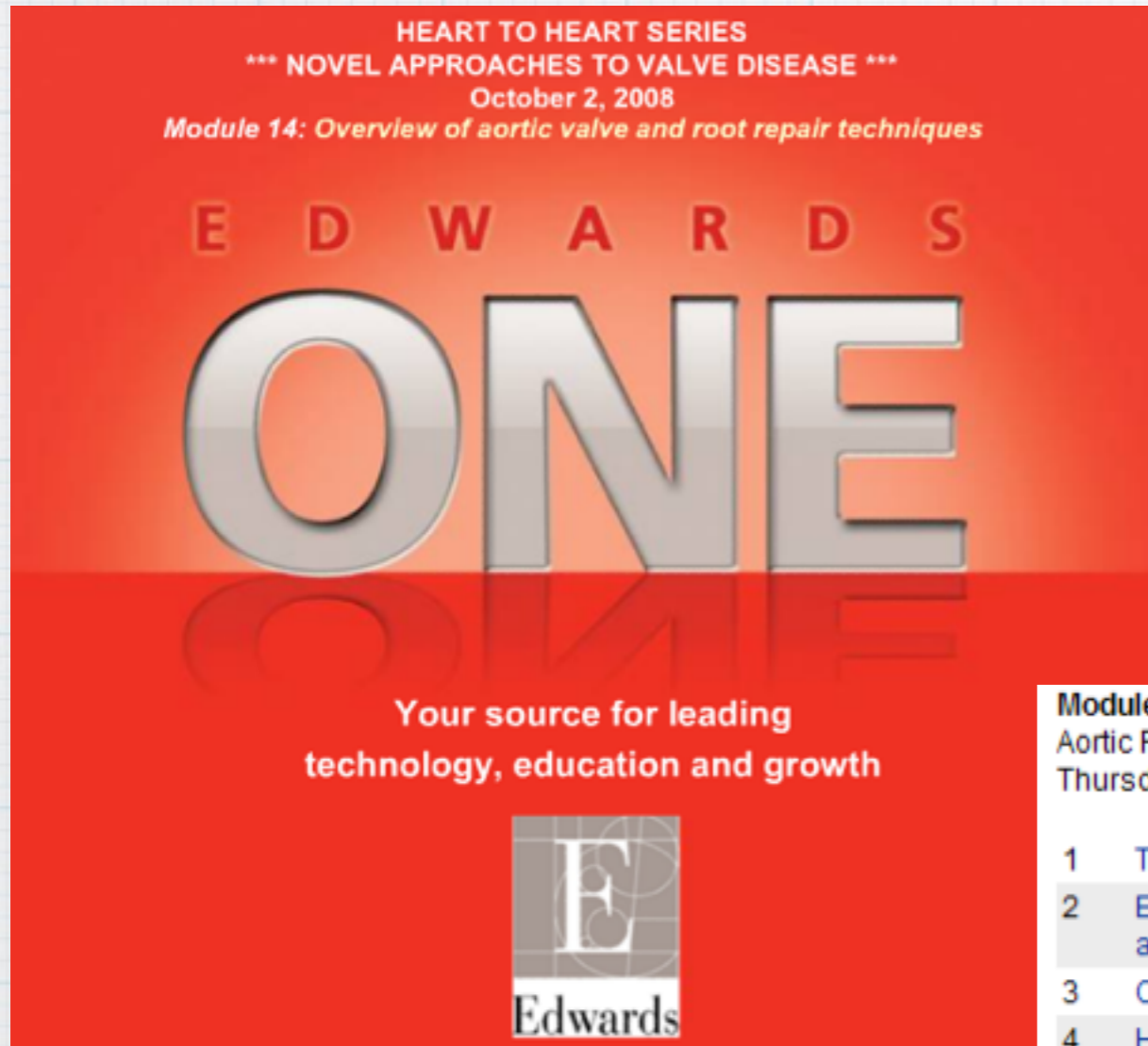


**THE KEY TO SUCCESS IS TO BE AT THE  
RIGHT PLACE AT THE RIGHT TIME, AND  
READY**  
And frequently is fortuitous





## Reconstruction of the Aortic Valve and Root A practical approach



**Module 14**  
Aortic Regurgitation: Guidelines, Timing, Repair  
Thursday, October 2<sup>nd</sup>, 2008

1	Timing of surgery in asymptomatic AR	Raphael Rosenhek
2	Echo assessment of feasibility of aortic valve repair: the functional approach	Alain Berrebi
3	Overview of aortic valve and root repair techniques	H.-J. Shafers
4	How to sessions prolapse, bicuspid, endocarditis	G. El Khoury
5	Surgical techniques and results in aortic conduit surgery	Roberto Di Bartolomeo
6	Ross, Homografts: indications and results	Alain Serraf





## Reconstruction of the Aortic Valve and Root A practical approach







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A prac

## Reconstruction of the Aortic Valve and Root: A Practical Approach

Module 2:

Aortic Root Repair (2 Days)  
November 6<sup>th</sup> / 7<sup>th</sup>, 2008







la pratica dev' essere edificata sopra la buona teoria  
(Practice must always be founded on sound theory)  
Leonardo Da Vinci

# Reconstructing A practical



## Valve repair for aortic insufficiency: surgical classification and techniques\*

H. Sam Hayler\*, Guo-Wai Ho, Hany Hwangjiumin, David M. Melvin, Douglas H. King, Albert Starr

Abstract: Valve repair for aortic insufficiency may provide an alternative to aortic valve replacement in selected patients. This repair can be an attempt at permanent correction of pathology to allow the aortic annulus to grow and avoid the use of anti-thrombotic therapy. Based upon a literature synthesis, we proposed a classification according to relative anatomy which could be a guide to patient and procedure selection. Methods: Between September 2007 and February 2009, 50 consecutive patients with aortic insufficiency were repaired for aortic insufficiency at our institution. Patients' ages ranged from 35 months to 78 years with a mean of 55 years. The etiology of aortic insufficiency was congenital in 30 patients, degenerative in 7 patients, traumatic in 9 patients, and infective endocarditis in 4. Aortic valve lesions were classified into three distinct types: type 1, aortic annular dilatation in patients; type 2, excessive aortic leaflet tissue; type 3, aortic valve annular dilatation in patients with or without aortic leaflet tissue. Type 1 needed commissural plication in 7 patients and valve annuloplasty, which was simple in 9 patients, and commissural resection in 7. Type 2 required aortic leaflet resection in 15 patients and valve annuloplasty in 13 patients, degenerative commissuroplasty in 5, leaflet shaving in 4, and repair of leaflet perforations in 2. Repair of Traumatic annuloplasty revealed a significant decrease in the annular diameter. The mortality rate was 13.0% (6/46). There was no mortality. Patients repaired as indicated by MVARA had a mean follow-up length of the last 15 patients (67.0% needed reoperation. Three of those operations were leaflet resection and 2 patients (10.0% who underwent the leaflet annular annuloplasty needed reoperation after 10 months to 1 year from repair. Finally, 27 patients with infectious endocarditis had a 12.6% mortality rate for combined aortic insufficiency, Infective Endocarditis, and Aortic Valve Disease. Conclusions: Aortic valve repair provides aortic insufficiency and aortic insufficiency in appropriately selected patients. Patient and procedure selection may be based upon the anatomic classification of the aortic valve, and a conservative risk benefit approach with valve repair. © 2009 Elsevier Inc.

Introduction: Every malfunctioning aortic valve may ultimately require replacement. However, the unique challenges presented by growing children, elderly patients or patients desiring pregnancy necessitate a search for an alternative to valve replacement. Multicenter valve repair valve substituting in young children because they repair normal growth of the native annulus and...

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**Arctic Invasions 2009**  
Dordrecht and Elkhart

## Principles of aortic valve repair

Mauro Bonifant, MD, MChD,\* and Oshin El Khayat, MD\*

During the past 10 years, important advances in the field of aortic valve (AV) repair have transformed it from an elusive goal to a clinical reality. The second series in this series is a review of the principles of AV repair, with particular emphasis on the surgical approach to AV repair. This review is intended to provide a comprehensive overview of the field, including the historical background, the current status of AV repair, and the future directions of this field.

**KEYWORDS:** Aortic valve repair, aortic insufficiency, aortic stenosis, aortic regurgitation, aortic valve disease, aortic valve surgery.

**GENERAL PRINCIPLES OF AORTIC VALVE REPAIR:** The goal of AV repair is to restore a competent valve that is free of aortic regurgitation (AR) and aortic stenosis (AS). The principles of AV repair are based on the anatomy and pathophysiology of the AV, and the goals of repair are to restore normal anatomy and function.

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## Aortic root surgery: from valve sparing to 'spare and plasty'

Abstract: Valve sparing procedures, while not first-line options...

In the last decade, the aortic root has been receiving increasing attention with the aim of preserving as much as possible a patient's aortic root. The second series in this series is a review of the principles of aortic root surgery, with particular emphasis on the surgical approach to aortic root surgery.

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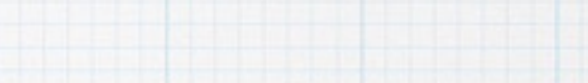
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## Proactive on Aortic Valve Repair

Abstract: valve-sparing aortic root replacement... active concepts...

Abstract: valve-sparing aortic root replacement may provide an alternative to aortic valve replacement in selected patients. This repair can be an attempt at permanent correction of pathology to allow the aortic annulus to grow and avoid the use of anti-thrombotic therapy.

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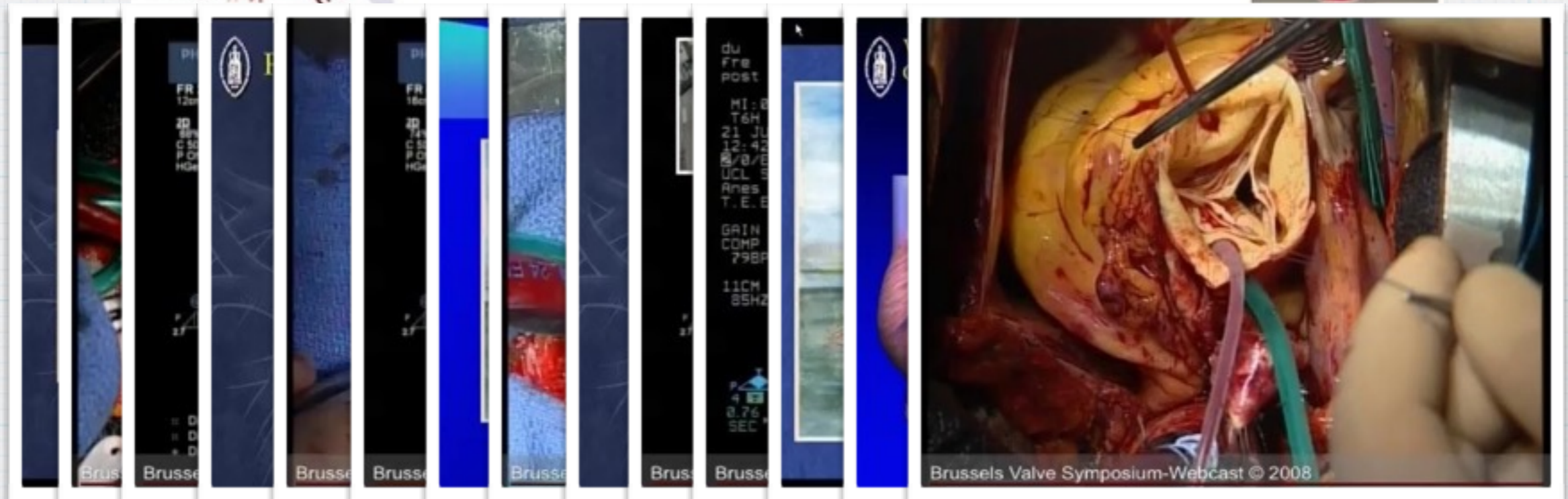
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# “How to start an aortic valve repair program”





## Reconstruction of the Aortic Valve and Root A practical approach



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“How to start an aortic valve repair program”





valve symposium 9th Symposium on Aortic and Mitral Reconstructive Surgery  
May 29 - 30, 2009 / Brussels - Belgium  
Surgical Techniques


**INVITATION** April 7-8, 2011  
**AORTIC VALVE REPAIR :  
 A STEP BY STEP APPROACH**



Dear Colleagues,  
 We are pleased to invite you to this two day session. Program will focus on interactive lectures from international faculty, enriched with live and video cases. Aim of the session is to propose a standardized management of dystrophic aortic roots, from echo analysis to a physiological approach, in aortic valve repair. We look forward to seeing you.

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**Reconstruction of the Aortic Valve and Root:  
 A Practical Approach**



**Module 2: Aortic Root Repair**  
 University Hospital of Saarland  
 Homburg/Saar, Germany  
 September 9<sup>th</sup>/10<sup>th</sup>, 2010

**BRUSSELS  
 SYM**



**Reconstruction of the Aortic Valve and Root  
 A practical approach**

Wednesday, June 8<sup>th</sup> to Friday, June 10<sup>th</sup>, 2011  
 Location  
 University Hospital of Saarland, Homburg/Saar, Germany  
 Chairman  
 Prof. Hans-Joachim Schäfers






**June 25 - 26, 2010**  
 Live surgery transmission / Video presentation  
 Case discussions

May 2010

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# What do you need?

Reconstruction of the Aortic Valve and Root  
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Commitment

Trust

Sweat

Study

Team work

Learn from the experts

Luck

Look for a Proctor!!!





## Reconstruction of the Aortic Valve and Root A practical approach

# Team Play

Clinical cardiologists

Image Cardiologists

BAV clinic

Marfan clinic

Surgeons

Anesthesiologists





# Important issues

**Reconstruction of the Aortic Valve and Root**  
**A practical approach**

**Should the patient be repaired?**

**Can the valve be repaired?**





# Important issues

Reconstruction of the Aortic Valve and Root  
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**Should the Patient be repaired?**

**Good LV**

**Young**

**No serious comorbidities**

**Isolated procedures**





# Important issues

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**Can the Valve be repaired?**

Tissue quality

Calcium

Rheumatic disease





# Important issues

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**Can the Valve be repaired?**



**BAV**  
**Aneurysm**  
**Leaflet prolapse**  
**Acute dissection**  
**Autograft failure**  
**Endocarditis**





# Important issues

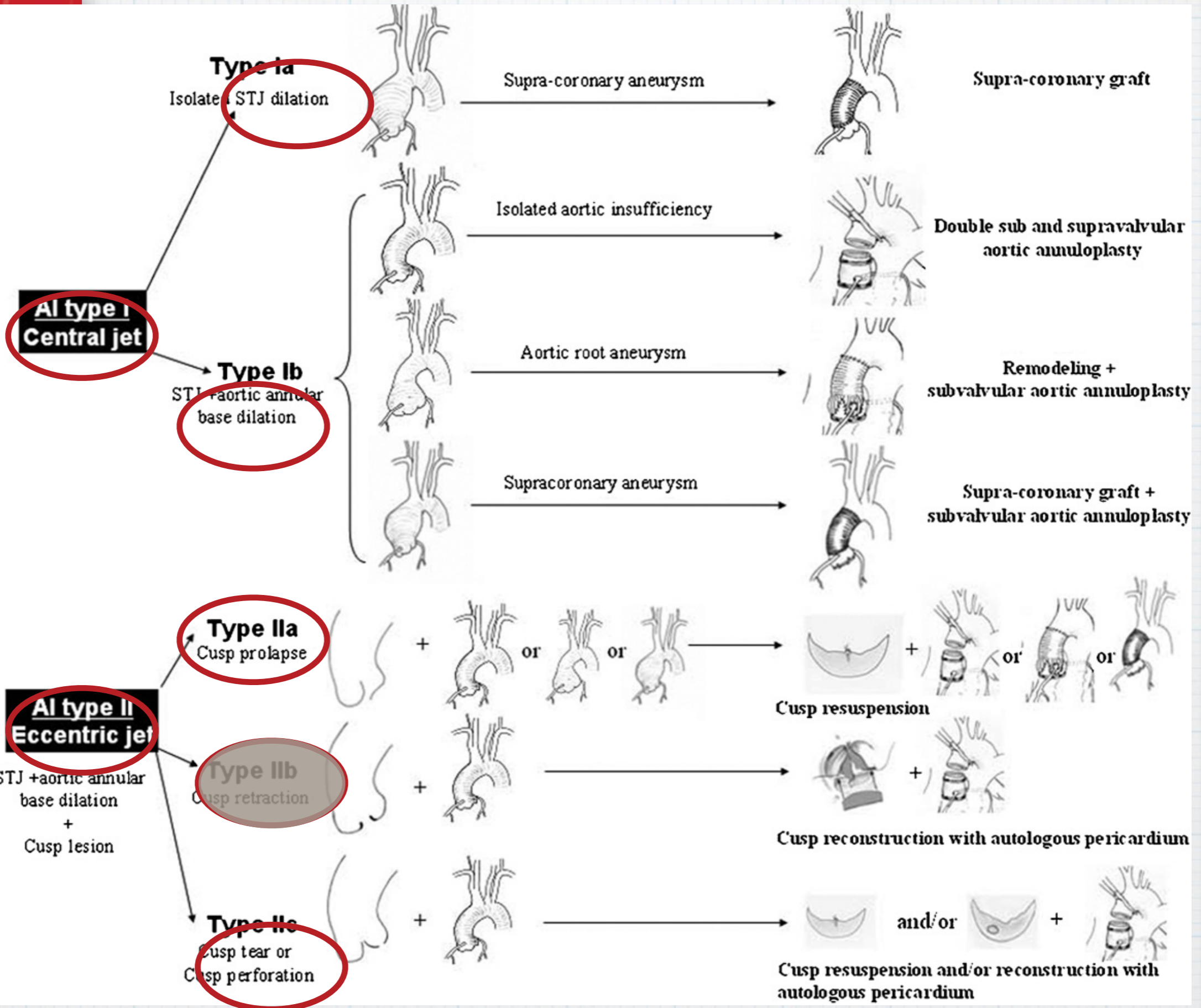
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## Can the Valve be repaired?

AI Class	Type I Normal cusp motion with F/A 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



Reconstruct  
 A practical a

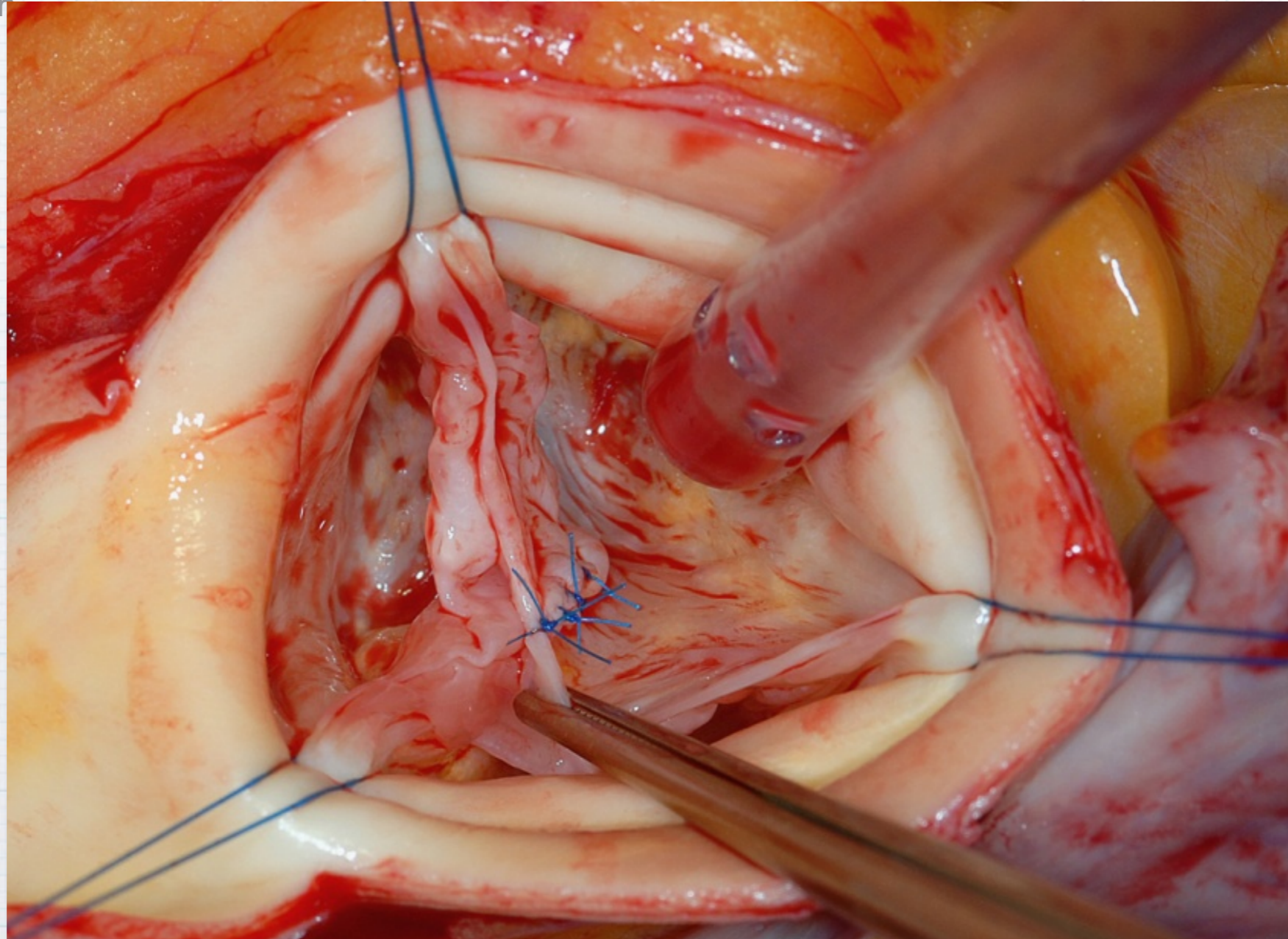






# Technical Pitfalls for Beginners

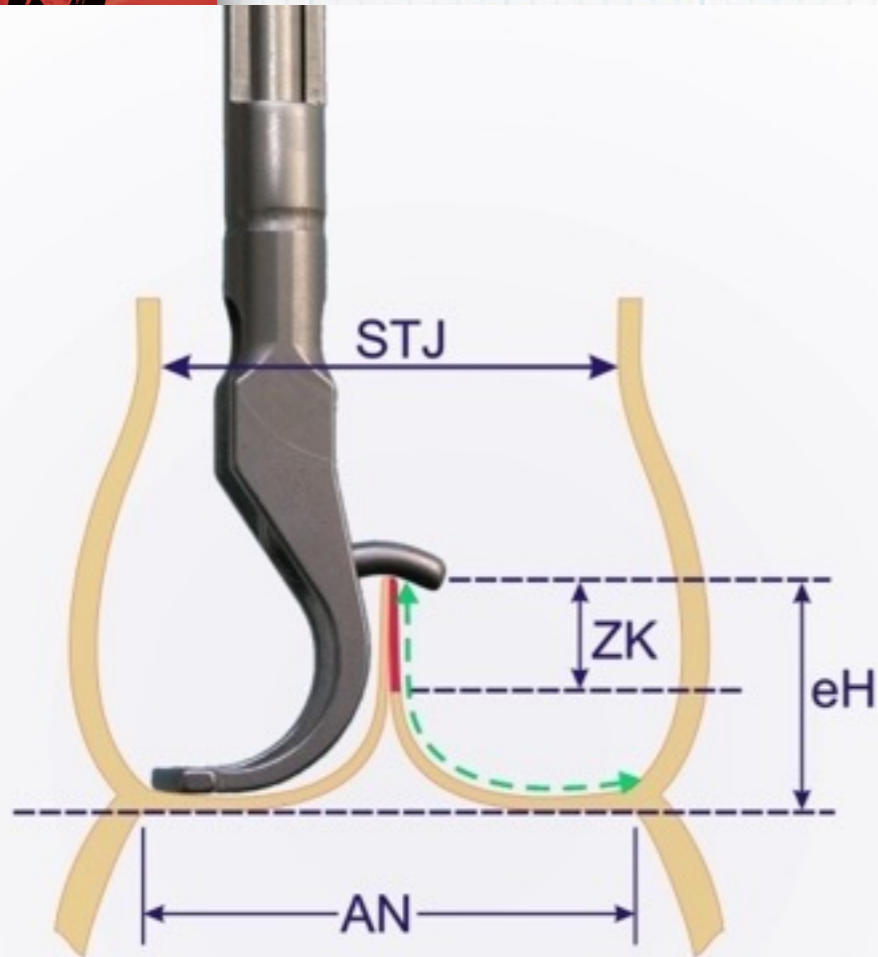
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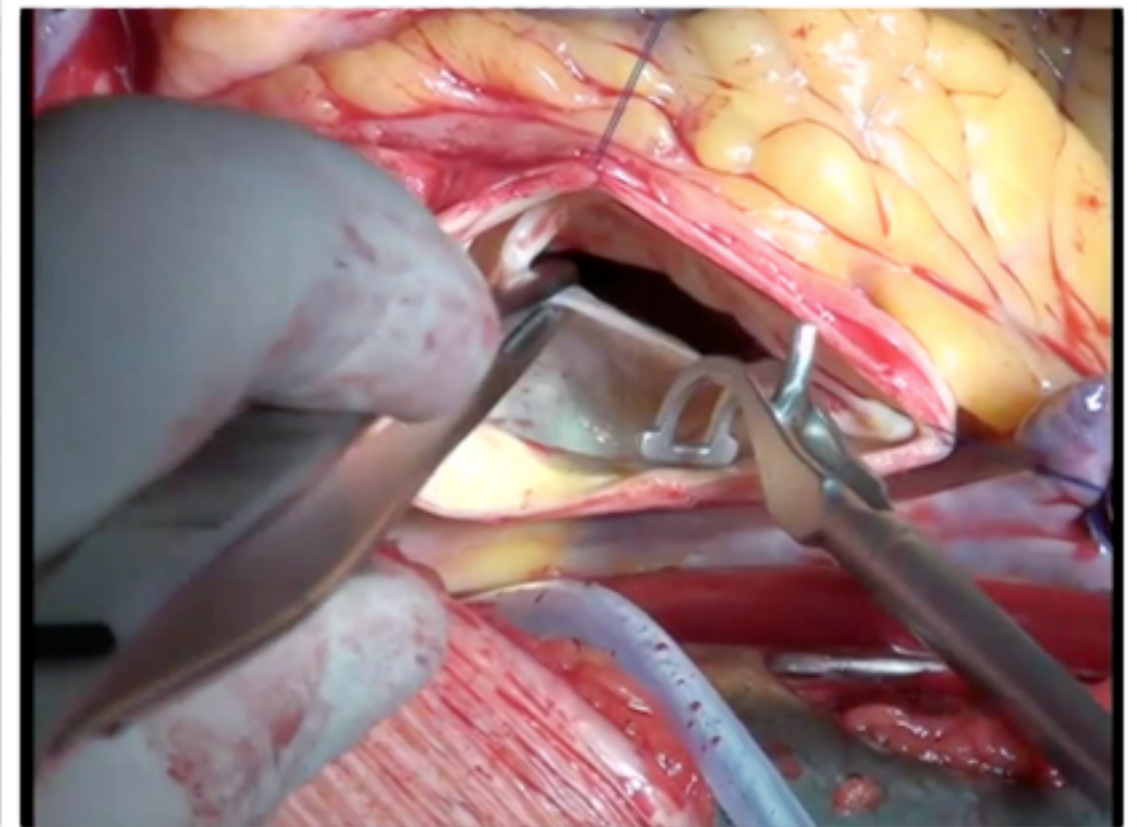


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Control group.

	Adults, n = 100
Age (years)	33.8 ± 14 (19–76)
Body height (m)	1.75 ± 0.09 (1.5–2)
Body weight (kg)	71.9 ± 12.6 (42–105)
Body surface area (m <sup>2</sup> )	1.87 ± 0.2 (1.35–2.4)
Effective height (mm)	9.5 ± 1.4 (7–12)
Aortoventricular diameter (mm)	21 ± 2.8 (13.5–30.6)
Sinus Valsalva diameter (mm)	28.5 ± 3.5 (21.1–40)
Sinotubular junction (mm)	25 ± 3.7 (16–36.6)
Sinus height (mm)	22.4 ± 4.2 (33.9)



Bierbach et al. / Eur J Cardiothorac Surg 38 (2010) 400-406

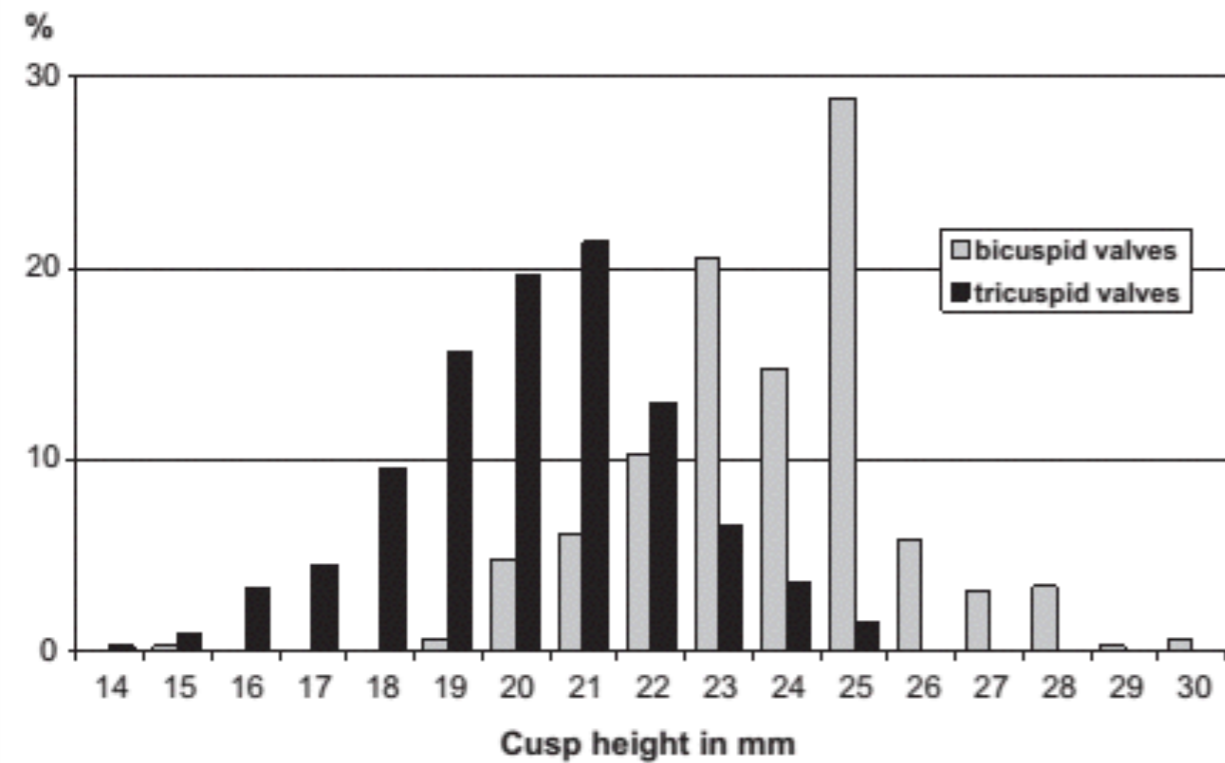
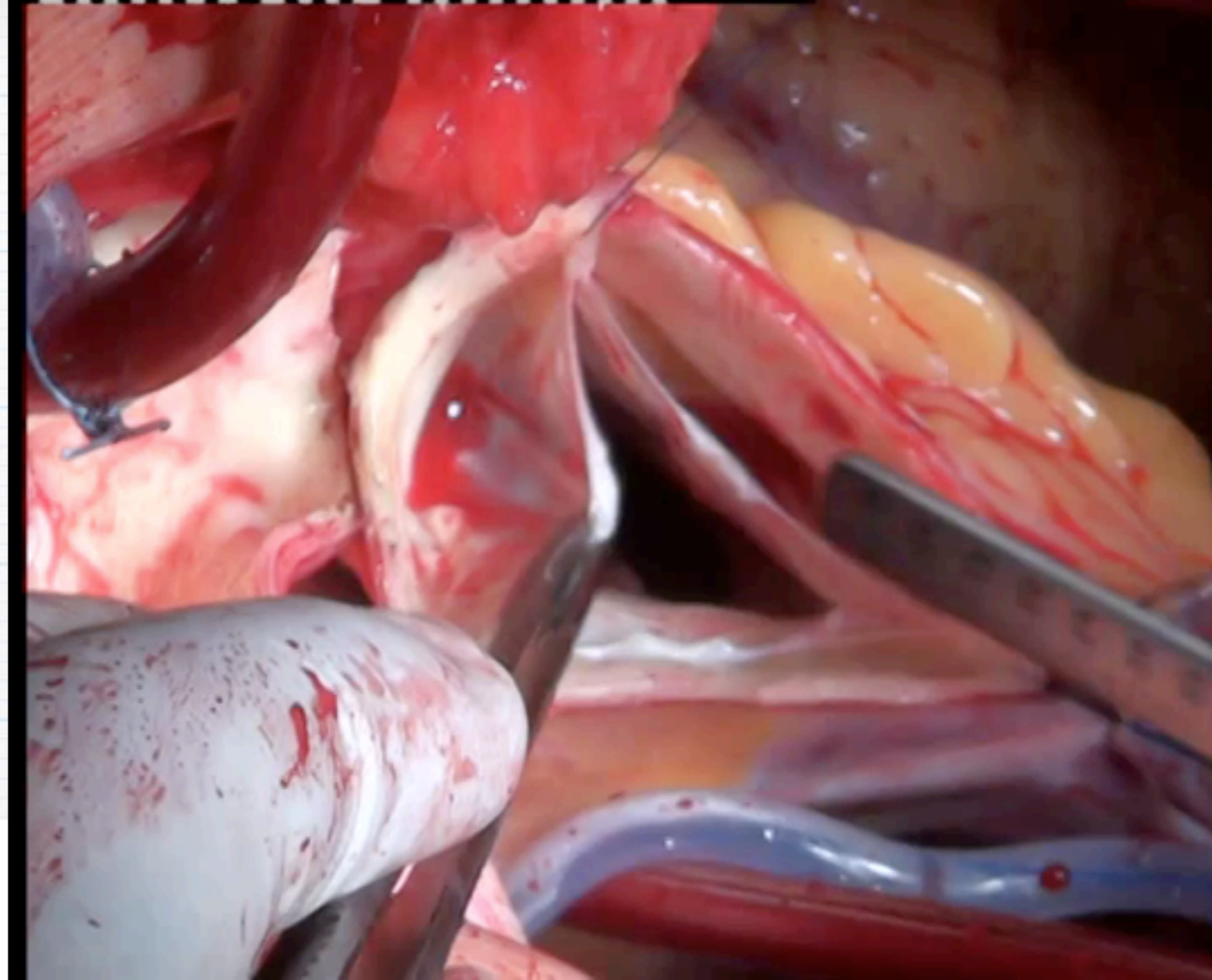
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## Reconstruction of the Aortic Valve and Root A practical approach



**FIGURE 3.** Distribution of geometric height in bicuspid (n = 289; nonfused cusps) and tricuspid (n = 332; mean of all 3 cusps) aortic valves.

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“From the results of our measurements, we have arbitrarily defined retraction in the adult as a cusp height of **16 mm** or less in TAVs and **19 mm** or less in the BAVs”

Schäfers et al. / J Thorac Cardiovasc Surg 146 (2013) 269-274

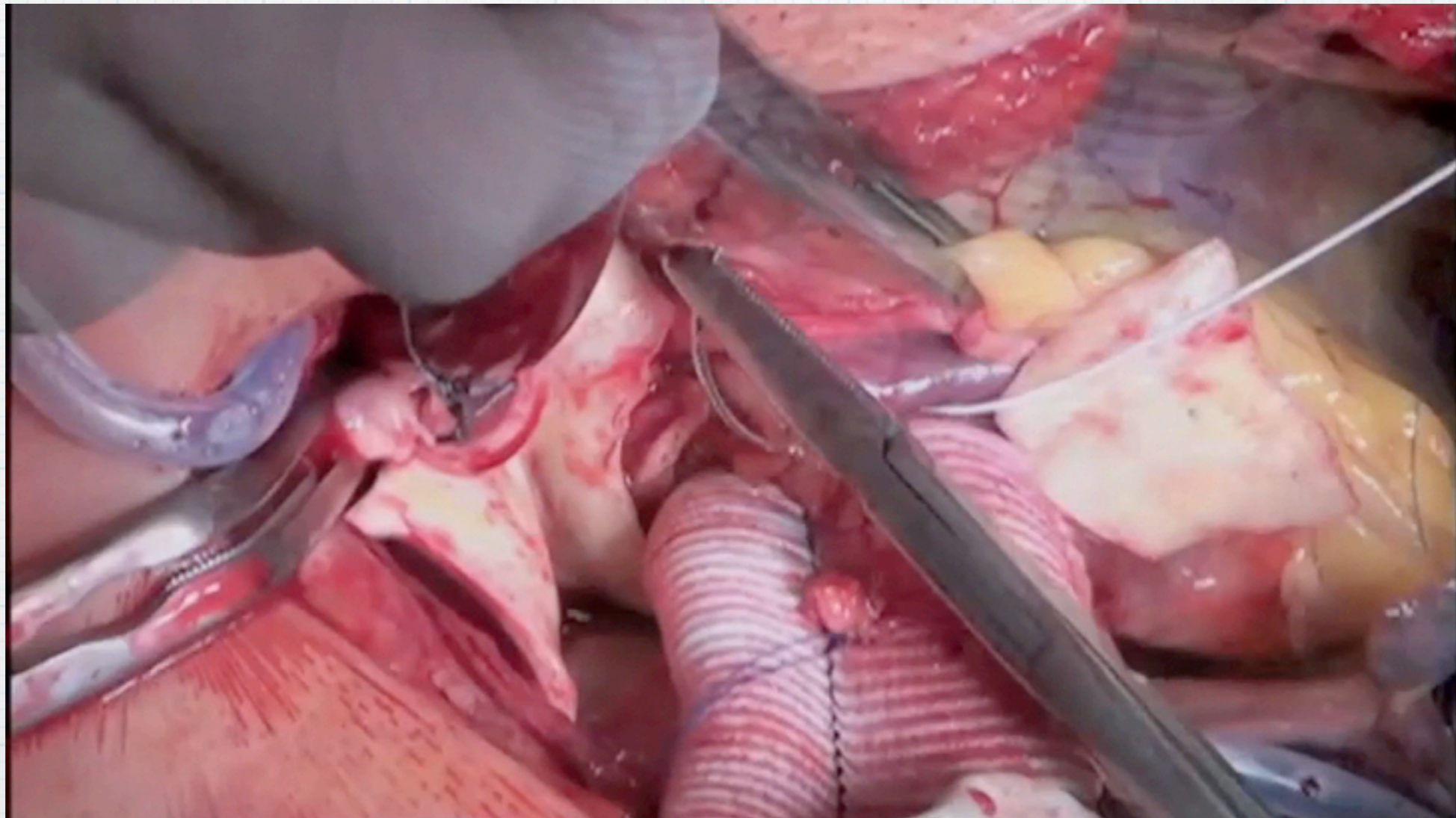
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# Don't forget the Annulus!!!

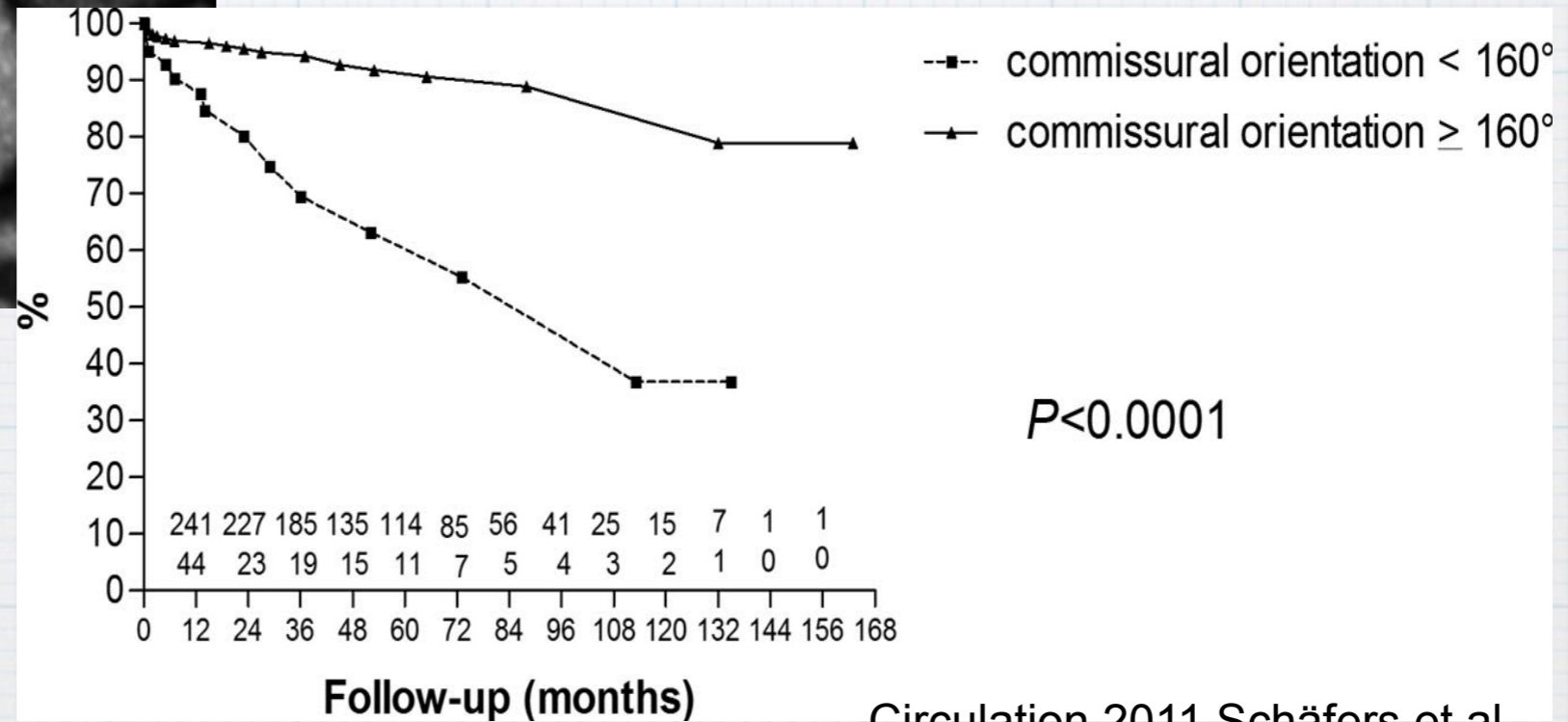
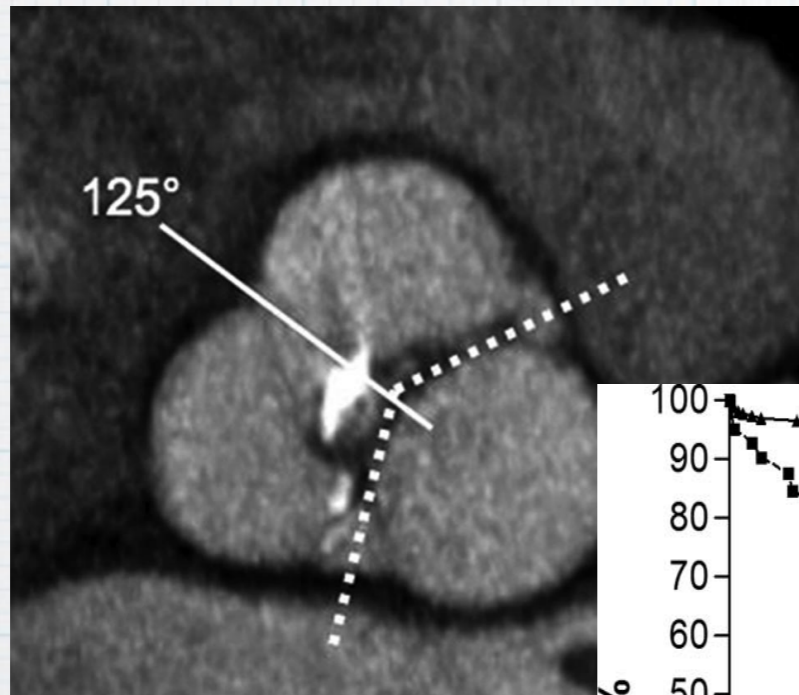
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# Reconstruction of the Aortic Valve and Root A practical approach



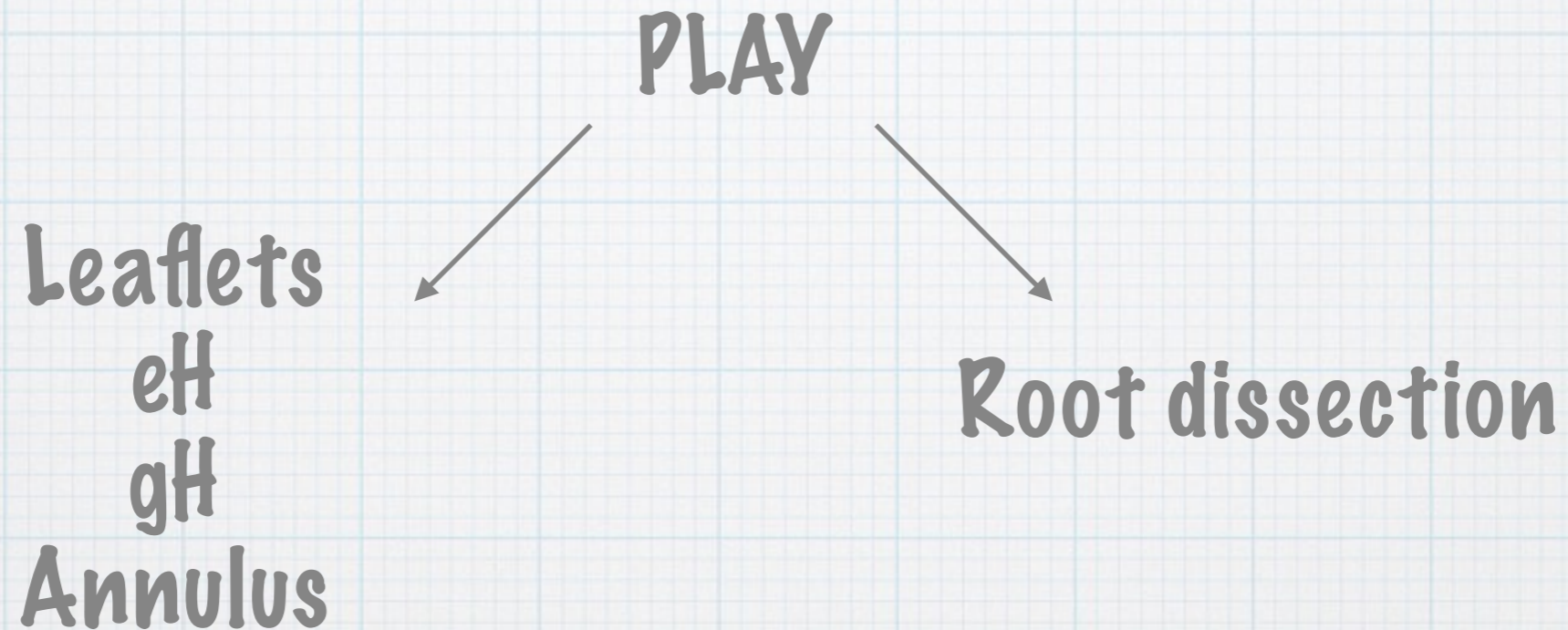
Circulation 2011 Schäfers et al





# What to do first?

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Look at the valve & the root





# Which valves first?

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Bicuspid valves

Isolated

+ supra replacement

Remodelling





# And after the BAVs?

Reconstruction of the Aortic Valve and Root  
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+ supra replacement

Tricuspid valves

Remodelling

Isolated





## And what else?

Reconstruction of the Aortic Valve and Root  
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Unicuspid valves

Isolated

+ supra replacement

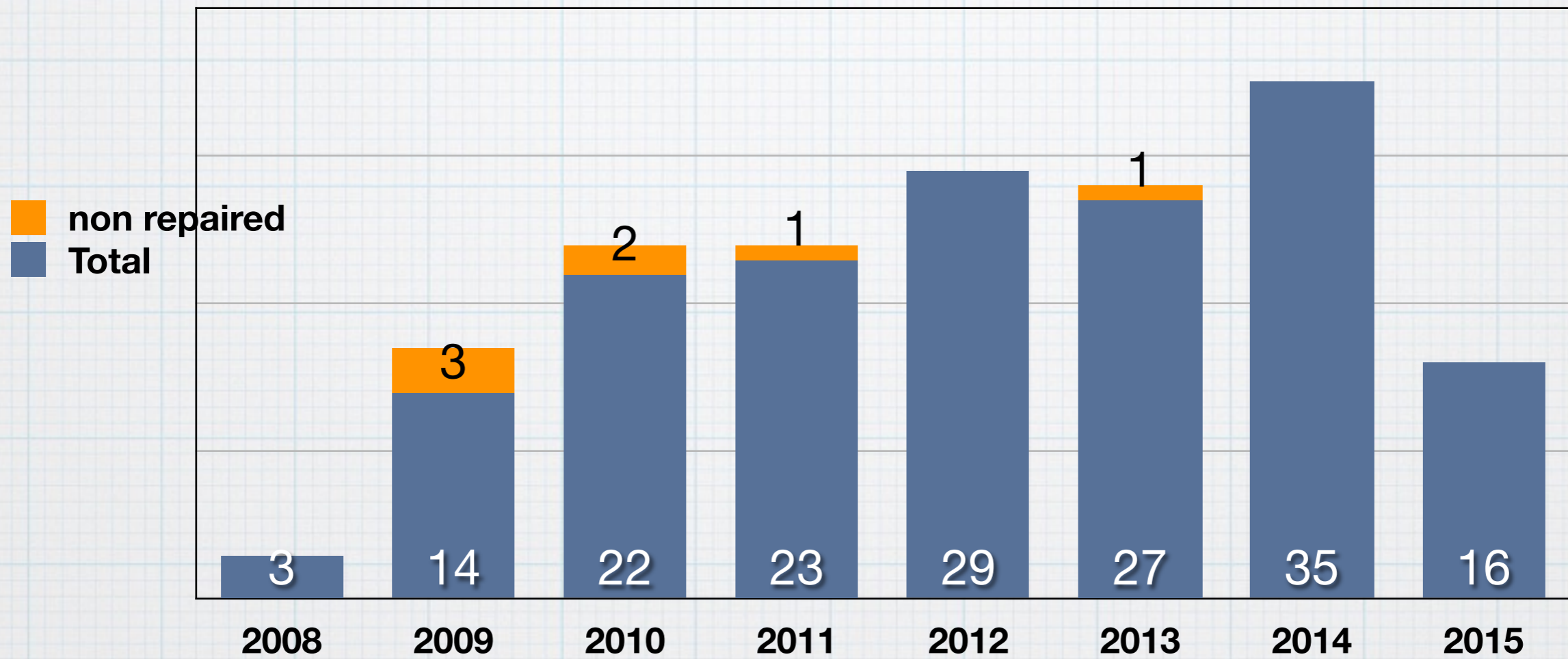
Remodelling





2009: 1 de las prótesis es Félix Serrano (endocarditis)

## Reconstruction of the Aortic Valve and Root A practical approach



Conversion to prosthesis 7 - 5% <04/2011 6 - 14,7%

>04/2011 1 - 0,95%

p<0,001





# Our Failures - Why?

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Technical mistakes

No caliper

Lack of gH concept

Lack of expertise





# Our Redos - Why?

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Suture disruption (BAV) x 2

Restrictive pathology (gH) x 3





# CONCLUSIONS - the key to success

Reconstruction of the Aortic Valve and Root  
A practical approach

You don't need to be a super-surgeon

You have to study, travel, be committed

This is a Team effort

Look for a Proctor







## Reconstruction of the Aortic Valve and Root A practical approach

If I can do it  
Thank you very much  
you can do it!!!!