Aortic Valve Repair - Alternative to Replacement

An Introduction

H.-J. Schäfers
Dept. of Thoracic and Cardiovascular Surgery
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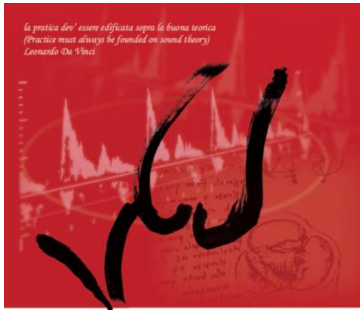


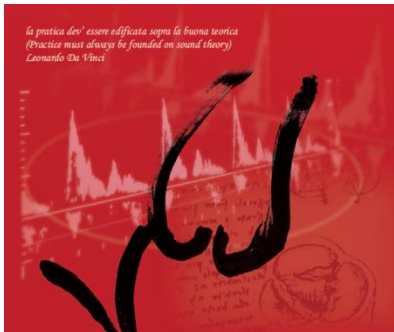
12.09.2018

Leonardo da Vinci:

Trattato della Pittura (da Vinci)/Parte seconda/77. Dell'errore di quelli che usano la pratica senza la scienza

«Sempre la pratica dev'essere edificata sopra la buona teorica, della quale la prospettiva è guida e porta, e senza questa nulla si fa bene.»

"Practice should always be based upon a sound knowledge of theory. Without this guidance and door nothing will be done well"

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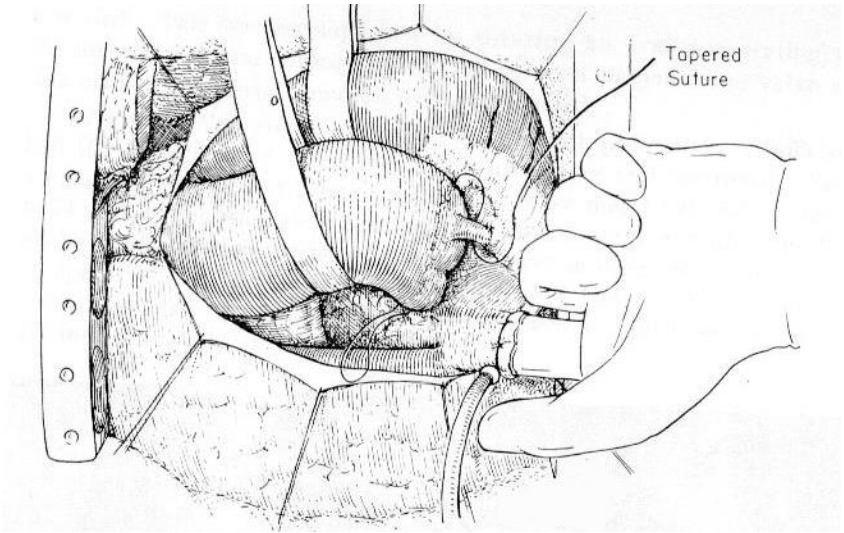
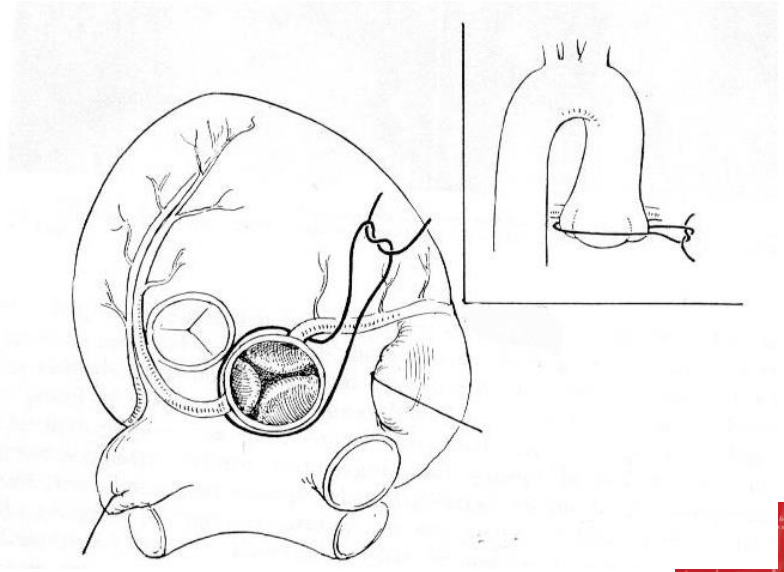
Aortic Valve - Historic Repair Attempts

THE SURGICAL CORRECTION OF AORTIC INSUFFICIENCY BY CIRCUMCLUSION

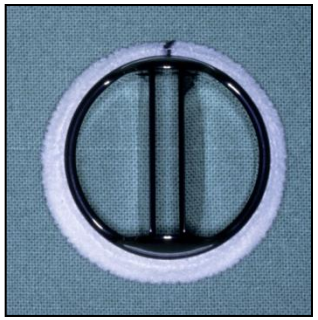
WARREN J. TAYLOR, M.D. (BY INVITATION), WENDELL B. THROWER, M.D. (BY INVITATION), HARRISON BLACK, M.D., AND DWIGHT E. HARKEN, M.D.
BOSTON, MASS.



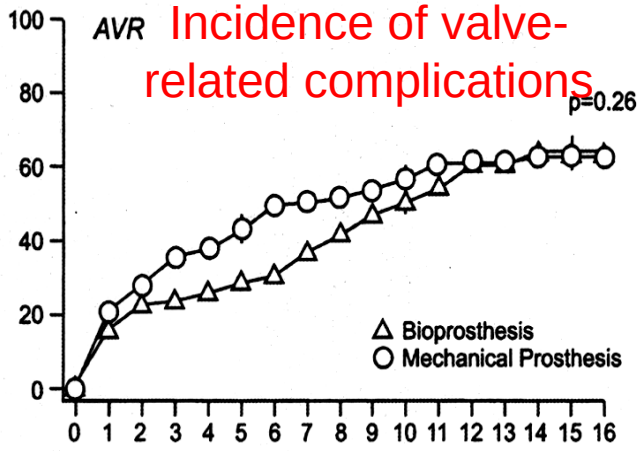


Taylor et al., J Thorac Surg 1958

Aortic Valve Replacement

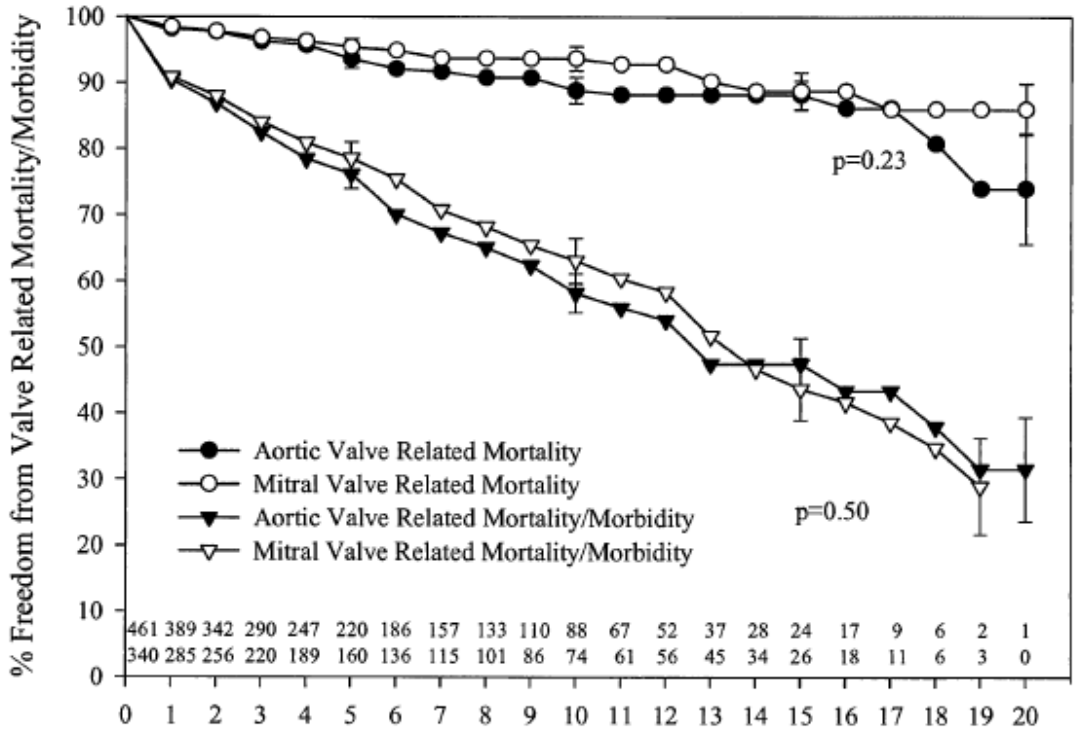


Thromboembolism
Anticoagulation/Hemorrhage
Structural failure
PV endocarditis



Hammermeister et al, JACC 2000

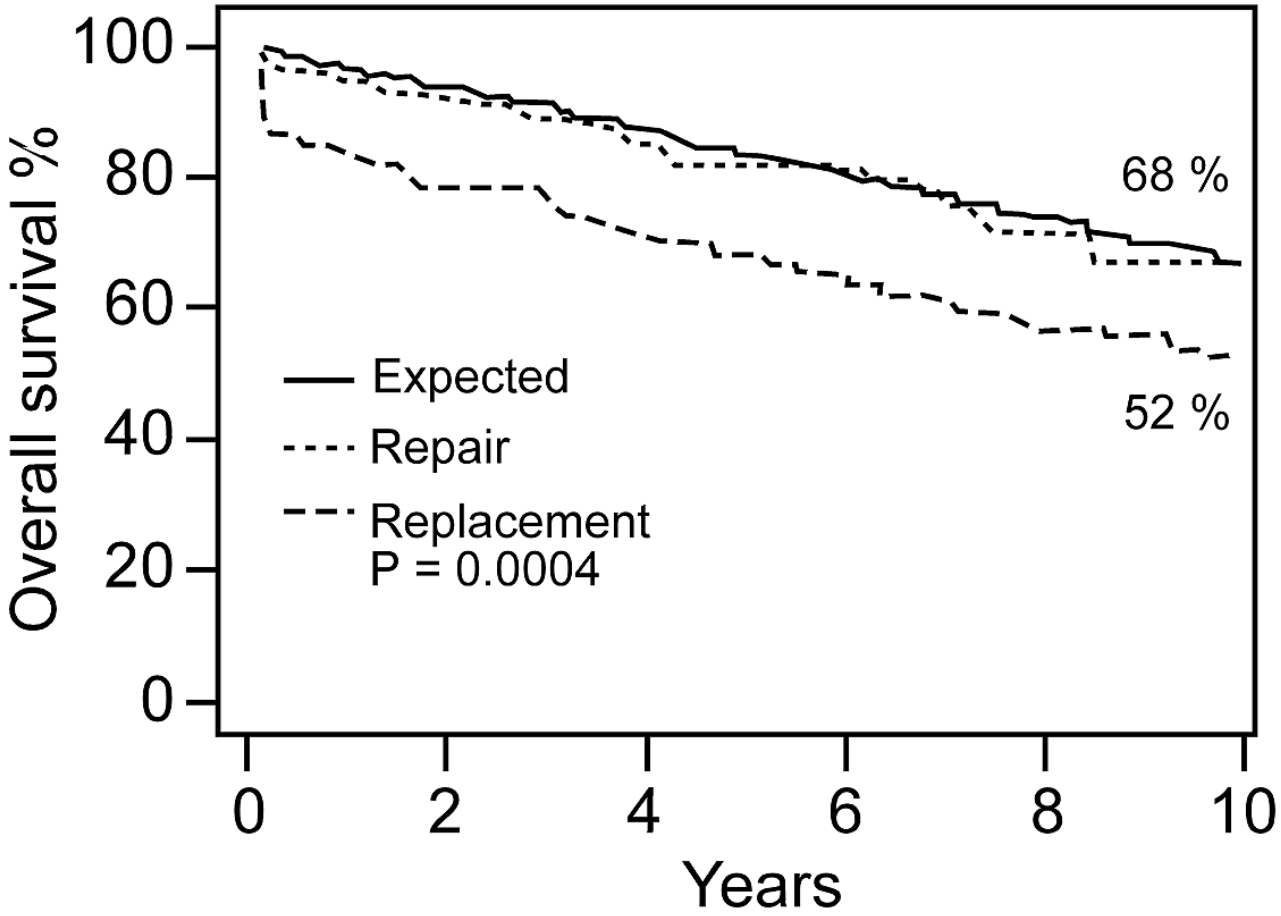
AVR - Mechanical Prosthesis-Related Complications



Years after valve replacement

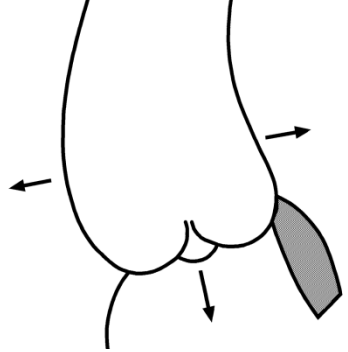
Ikonomidis JS, JTCVS 2003

Repair vs. Replacement (Mitral)

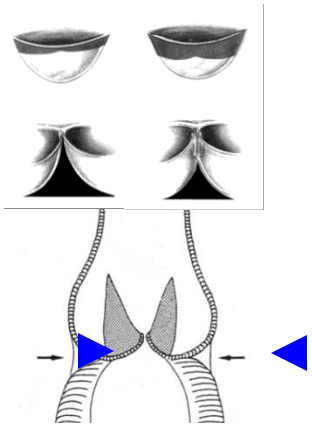


Mohty D, Curr. Card. 2002

Root Repair – Technical Options

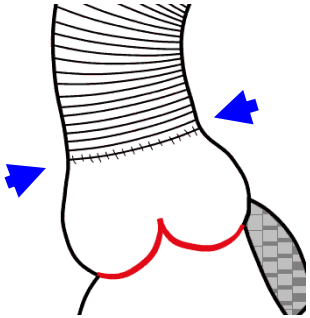


Subcommissural Plication



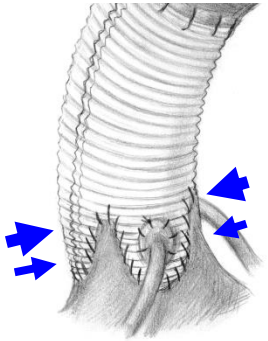
(Cabrol 1966)

ST Junction Remodelling



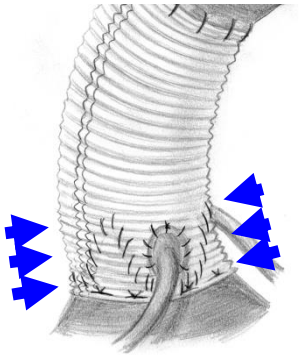
(Frater 1986)
(Sinus < 45 mm)

Root Remodeling

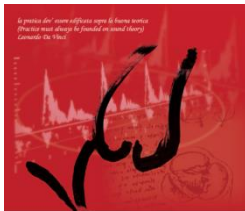


(Yacoub 1993)

Reimplantation of Aortic Valve



(David 1992)



Aortic Valve Repair

Operative Techniques in
Cardiac & Thoracic Surgery
A Comparative Atlas

Editors - James L. Cox, MD Thoralf M. Sundt III, MD

Vol 1, No 1 July 1996

Valve-Sparing Operation in Aortic Root Ectasia

Hans-Joachim Schäfers and Hans G. Borst

Aortic valve regurgitation caused by aortic root ectasia is a common finding.[1,2] The most common cause for this pathological complex is a diffuse degenerative process of connective tissue involving the media of the aortic wall, such as in Marfan's syndrome. Fragmentation and dissarray of elastic fibers, formally described as cystic media necrosis, leads to hyperelasticity and decreased mechanical stress resistance. In addition to Marfan's syndrome, root ectasia has also been observed in other patients with or without apparent association to connective tissue disease.[3]

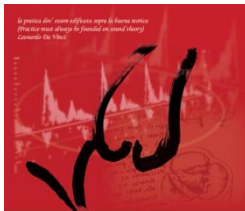
The risk of dissection or rupture of the ascending aorta and left ventricular volume overload caused by aortic regurgitation define the need for surgical intervention in patients with advanced stages of the disease. Insertion of a valved conduit is still regarded the gold standard for treatment of root ectasia.[4,5] However, despite favorable perioperative results, the typical long-term risks of alloprosthetic valve replacement

ated fibrous parts of the aortic root are preserved and resuspended within a vascular graft. Compared with mechanical prostheses, the long-term risks and disadvantages of anticoagulation are avoided. Originally, this operation was proposed for elective correction of root ectasia. We have also used it in root ectasia in conjunction with acute or chronic type I aortic dissection.

Indications for Surgery

In most patients, the decision for surgical intervention is made on the basis of the diameters of the aortic root and/or ascending aorta. A diameter of more than 5 cm has been shown to be associated with an increased risk of perforation or dissection and has been the standard cut-off point for decision making in replacement of the ascending aorta. Clinical observations indicate that, in patients with connective tissue disease (eg, Marfan syndrome) or familial history of aortic dissection, an

Aortic Valve Repair



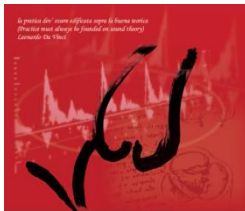
Aortic Valve Repair

VALVE-PRESERVING REPLACEMENT OF THE ASCENDING AORTA: REMODELING VERSUS REIMPLANTATION

H.-J. Schäfers, MD, PhD[a]
R. Fries, MD[b]
F. Langer, MD[a]
N. Nikoloudakis, MD[a]
T. Graeter, MD[a]
U. Grundmann, MD[c]

Objective: **Aortic valve regurgitation in combination with dilatation of the ascending aorta and root requires a combined procedure to restore valve function and eliminate pathologic dilatation of the proximal aorta. Two techniques have been proposed for this purpose; the aortic root may be either remodeled with an especially configured vascular graft or replaced with reimplantation of the aortic valve within the graft. We have used both techniques depending on the individual pathologic condition of the aortic root.** ***Methods:*** **Of 107 patients undergoing operation for proximal aortic disease between October 1995 and November 1997, 40 patients had morphologically intact aortic valve leaflets in conjunction with dilatation of the aortic root. Of these, 15 patients underwent an operation as a surgical emergency for acute aortic dissection type A.**

(J Thorac Cardiovasc Surg 1998;116:990-6)



In vitro comparison of aortic valve movement after valve-preserving aortic replacement

Roland Fries, MD,[a] Thomas Graeter, MD,[b] Diana Aicher, MD,[b] Helmut Reul, MD,[c] Christoph Schmitz,[c] Michael Bö
and Hans-Joachim Schäfers, MD[b]

Objective: In aortic valve regurgitation and aortic dilatation, preser
aortic valve is possible by means of root remodeling (Yacoub proce
reimplantation (David procedure). In vivo studies suggest that reimpla
substantially influence aortic valve-motion characteristics. Evaluat
valve movement in vivo, however, is technically limited and is dif
dardize. We evaluated the aortic valve-motion pattern echocardiograph
after reimplantation and remodeling.

The Journal of Thoracic and Cardiovascular Surgery • July 2006

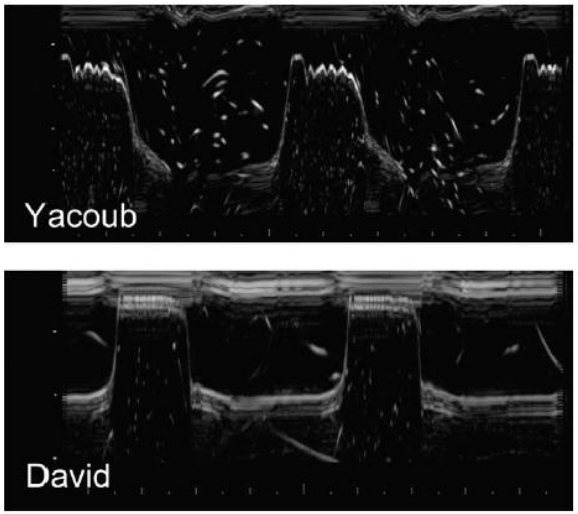


Figure 3. Typical M-mode recording of aortic valve motion after reimplantation *(David)* and remodeling *(Yacoub)*.

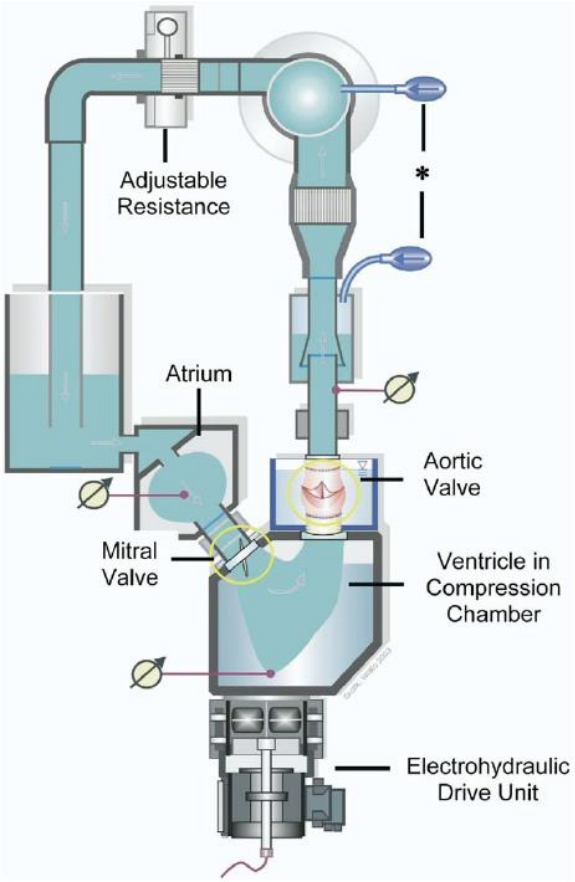
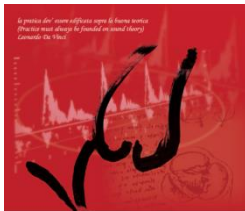
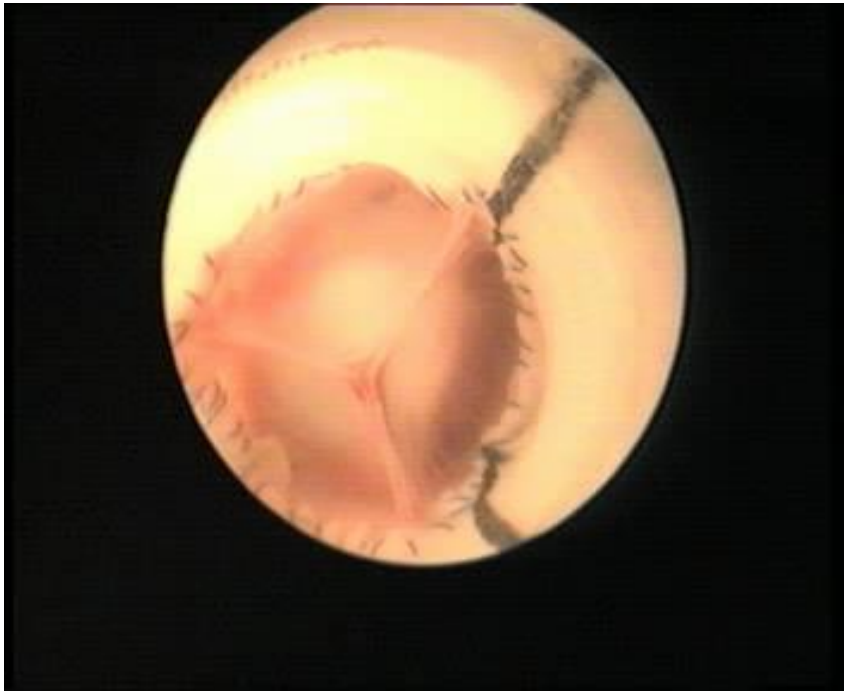


Figure 1. Schematic of the pulse duplicator. *Adjustable compliances.



Reimplantation

Remodeling



2 l/min

Aortic Valve Reimplantation in Ascending Aortic Aneurysm: Risk Factors for Early Valve Failure

Klaus Pethig, MD, Andrea Milz, Christian Hagl, MD, Wolfgang Harringer, MD, and Axel Haverich, MD

Department of Thoracic and Cardiovascular Surgery, Division of Surgery, Hannover Medical School, Hannover, Germany

Background. Aortic root reconstruction by reimplantation of the native valve represents a new therapeutic option for ascending aortic aneurysms. Information about long-term follow-up is limited, and possible predictors for failure of reconstruction have not been evaluated so far.

Methods. After aortic valve reimplantation 101 patients were followed in a prospective observational study. From this cohort the first 75 consecutive patients with a complete 1-year follow-up were chosen for further analysis. Clinical and echocardiographic data were obtained preoperatively, intraoperatively, and early postoperatively, as well as after 1 year of follow-up.

Results. No mortality was observed within the first 30 days. There were 52 male patients, mean age was 49.1 ± 20.6 years, observation period was 35.6 ± 20.6 months, and Marfan's syndrome was present in 22 patients. Although in 67 patients a stable valve function could be demonstrated, 5 patients presented with mild aortic insufficiency or had to be operated on again for secondary valve failure (n = 3). Analyzing possible demographic, disease-related, and procedure-related risk factors in a multivariable approach, only level of coaptation within the graft (as assessed by echocardiography) could be identified as being related to the subsequent development of aortic insufficiency. Coaptation level within the tube graft (type A) resulted in a mean aortic regurgitation grade of 0.3 ± 0.5 as compared with a mean grade of 2.5 ± 0.6 for a coaptation type C (below the prosthesis; $p < 0.001$).

Conclusions. Aortic valve reimplantation is a promising alternative to alloprosthetic composite replacement. A level of coaptation within the tube graft is essential to achieve valve competence.

(Ann Thorac Surg 2002;73:29–33)

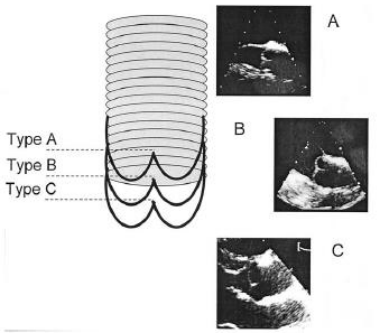


Fig 1. Type of coaptation of the aortic valve as assessed by echocardiography. Type A has the coaptation point ≥ 2 mm within the prosthesis. Type B has coaptation close to the lower border of the Dacron graft. Type C has coaptation ≥ 2 mm below the prosthesis.

Preservation of the Bicuspid Aortic Valve

Hans-Joachim Schäfers, MD, PhD, Diana Aicher, MD, Frank Langer, MD, and Henning F. Lausberg, MD

Department of Thoracic and Cardiovascular Surgery, University Hospitals of Saarland, Homburg/Saar, Germany

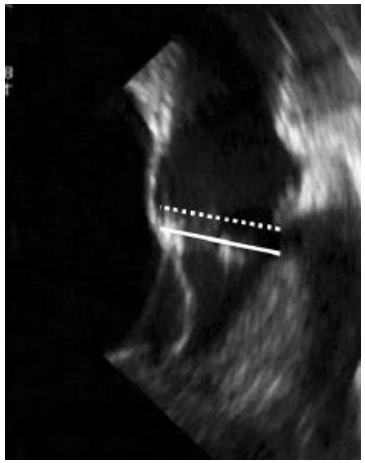
Background. Bicuspid anatomy of the aortic valve is a common reason for aortic regurgitation and is associated with aortic dilatation in more than 50% of patients. We have observed different patterns of aortic dilatation and used different approaches preserving the valve.

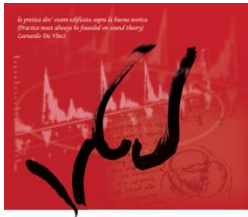
Methods. Between October 1995 and February 2006, a regurgitant bicuspid valve was repaired in 173 patients. The aorta was normal in 57 patients who underwent isolated repair. Aortic dilatation mainly above commissural level (n = 38) was treated by separate valve repair plus supracommissural aortic replacement. In 78 patients, aortic dilatation involved the root and was treated by root remodeling.

Results. Hospital mortality and perioperative morbidity were low in all three groups. Myocardial ischemia was significantly shorter in repair plus aortic replacement than remodeling ($p < 0.001$). Freedom from aortic regurgitation II or greater at 5 years varied between 91% and 96%. Freedom from reoperation at 5 years was 97% after remodeling, but only 53% after repair plus aortic replacement ($p = 0.33$). Symmetric prolapse was the most frequent cause for reoperation.

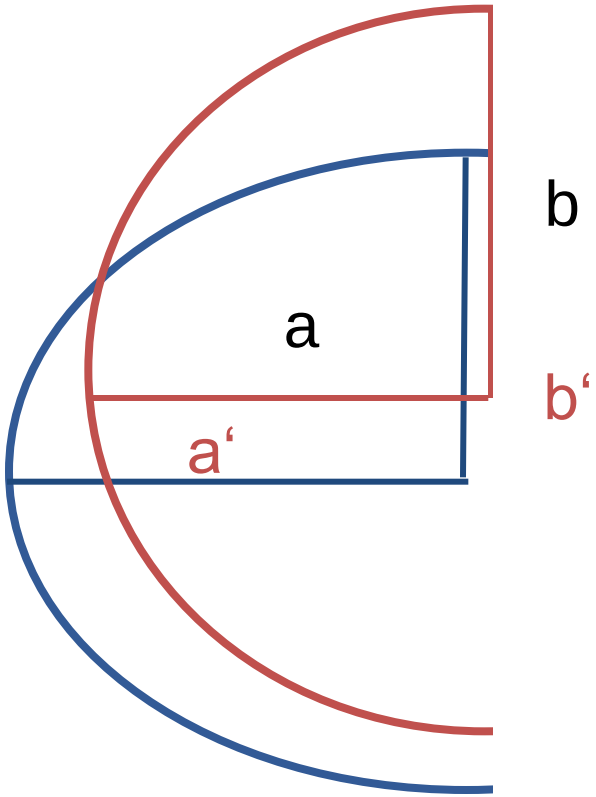
Conclusions. The long-term stability of bicuspid aortic valve repair is excellent in the absence of aortic pathology. In the presence of aortic dilatation, root remodeling leads to equally stable valve durability. In patients with less pronounced root dilatation, separate valve repair plus aortic replacement may be a less complex alternative. Symmetric prolapse should be avoided if the ascending aorta is replaced.

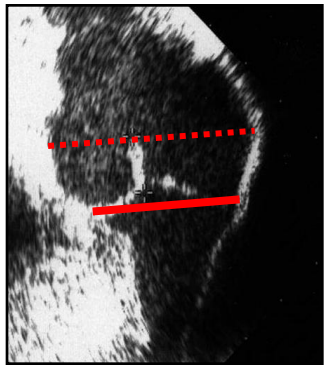
(Ann Thorac Surg 2007;83:S740–5)





Reduction of STJ and Cusp Prolapse





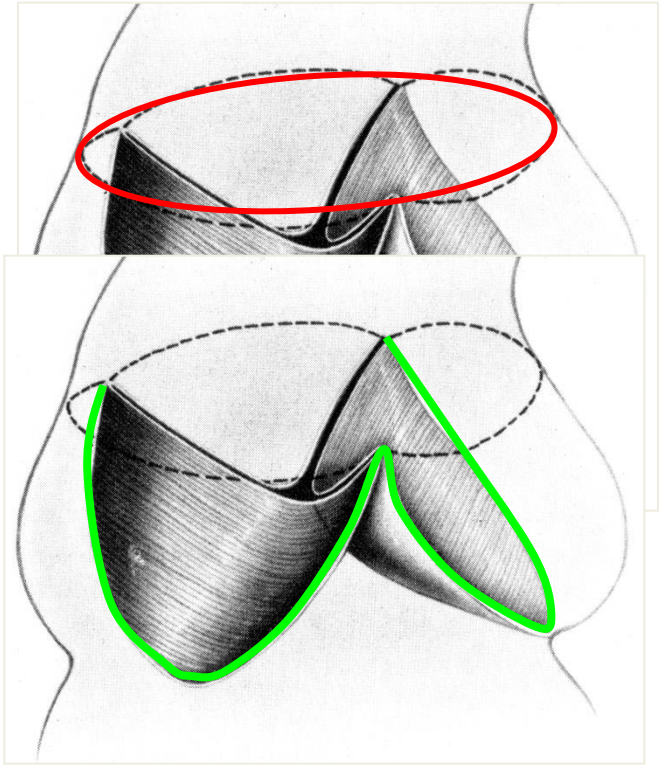
$$C_E = \pi \times \left[3/2\times(a+b) - \sqrt{a\times b}\right]$$

$$b \approx r_{aorta}$$

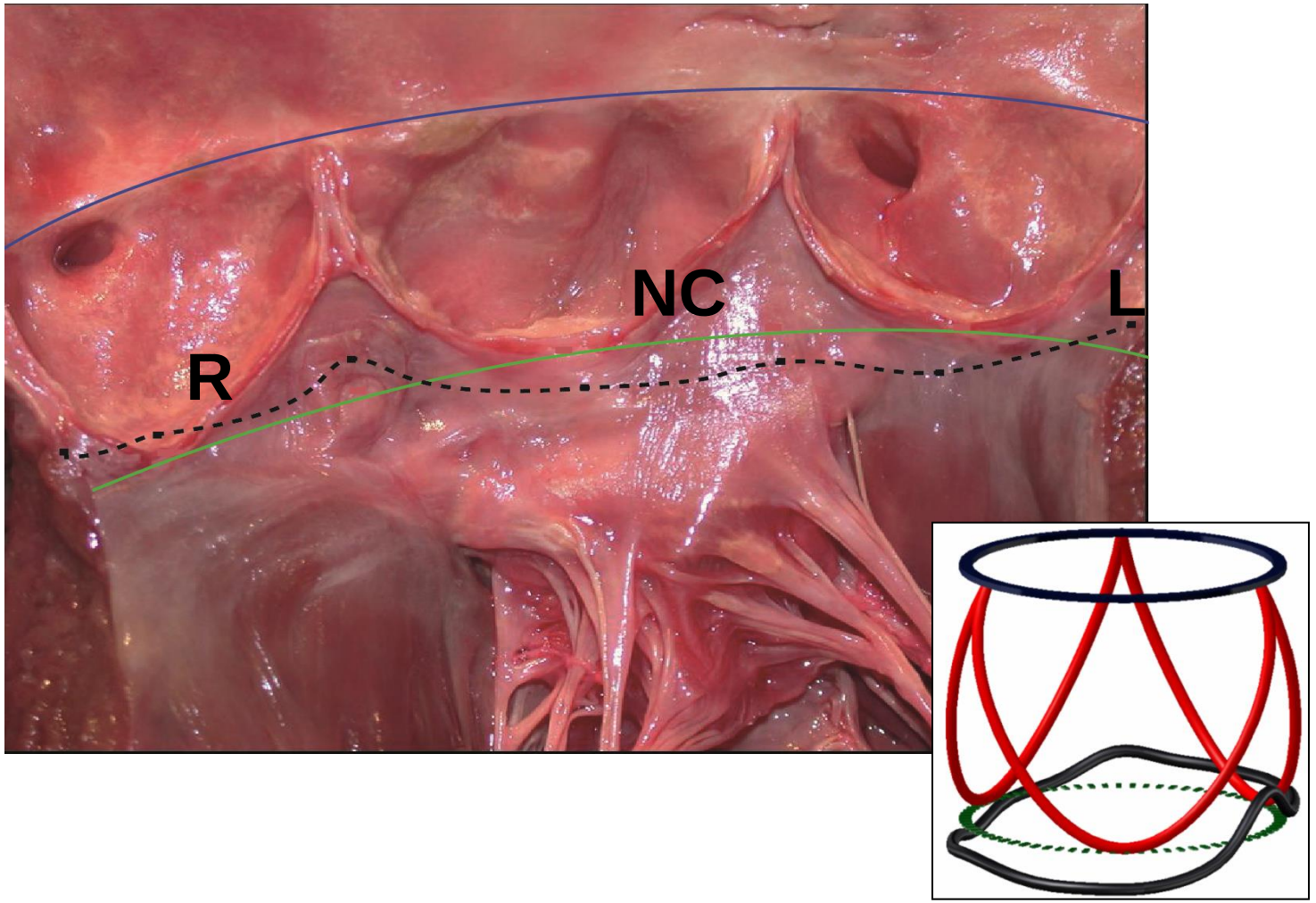
$$a \approx r_{cusp} \quad \Longrightarrow \quad r_{cusp} \approx 1 / r_{aorta}$$

Aortic Valve Repair - Difficulties

Dimensions- of aortic root/(ring)



Functional Aortic Annulus / Basal Ring

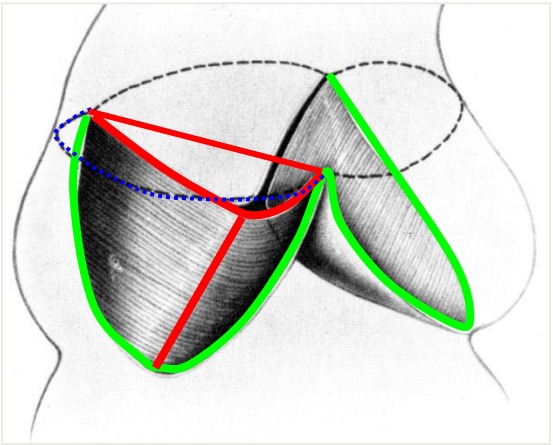


Lansac E et al. ATS 2015

Aortic Valve Repair - Difficulties

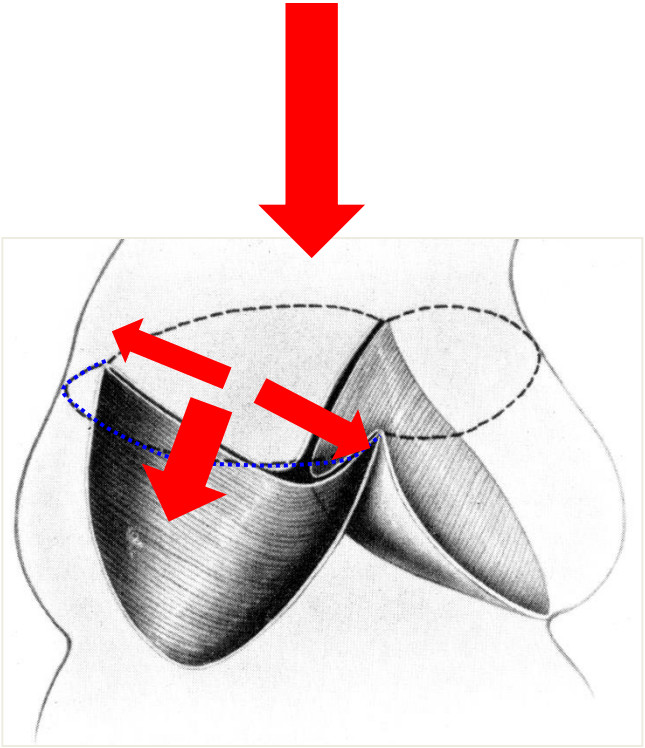
Configuration/coaptation of cusps

Vision from outflow



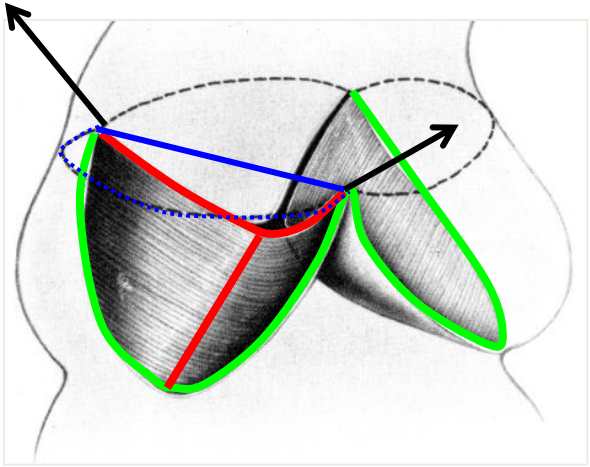
Aortic Valve Repair - Difficulties

Geometry altered by non-pressurized state

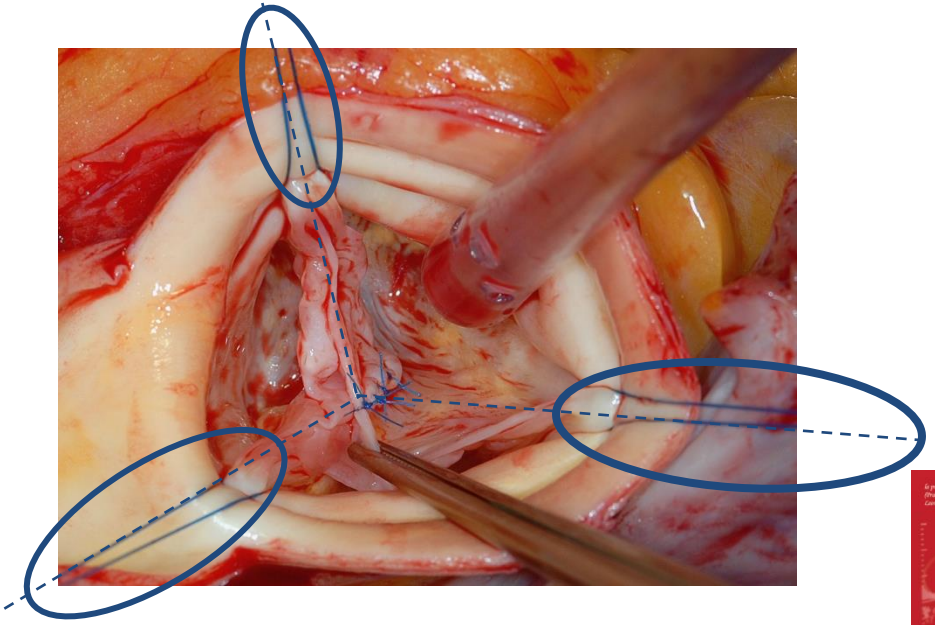


Solutions

Geometry altered by non-pressurized state!



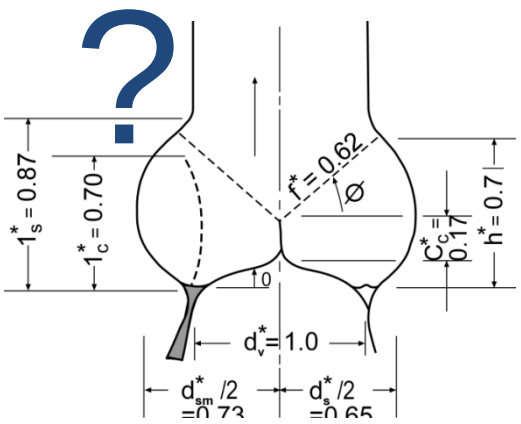
Stay sutures!

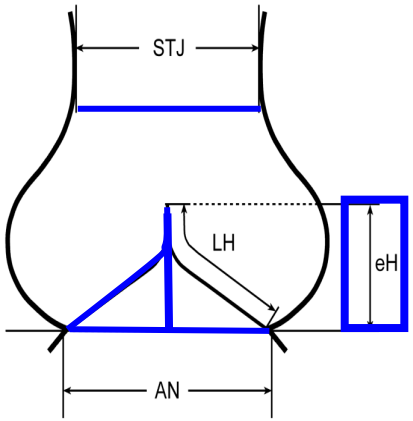


Aortic Valve Repair - Assessment

Solutions

Configuration/coaptation of cusps

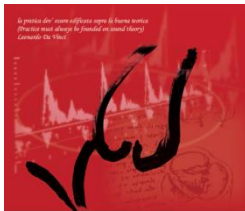




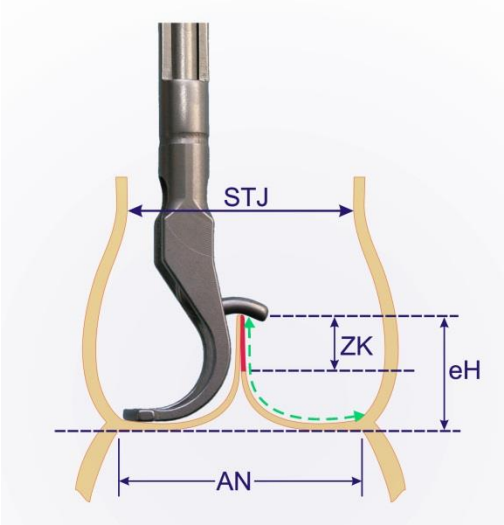
Swanson, Circ Res 1974

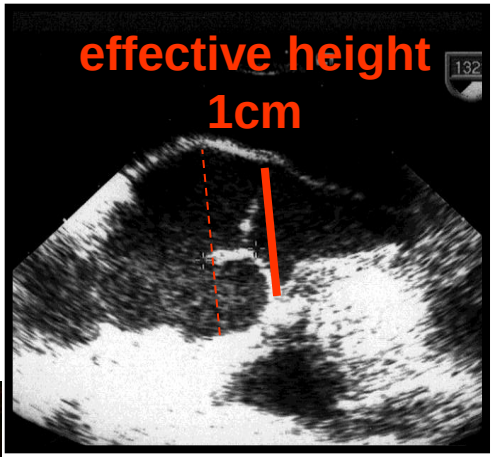
A new approach to the assessment of aortic cusp geometry

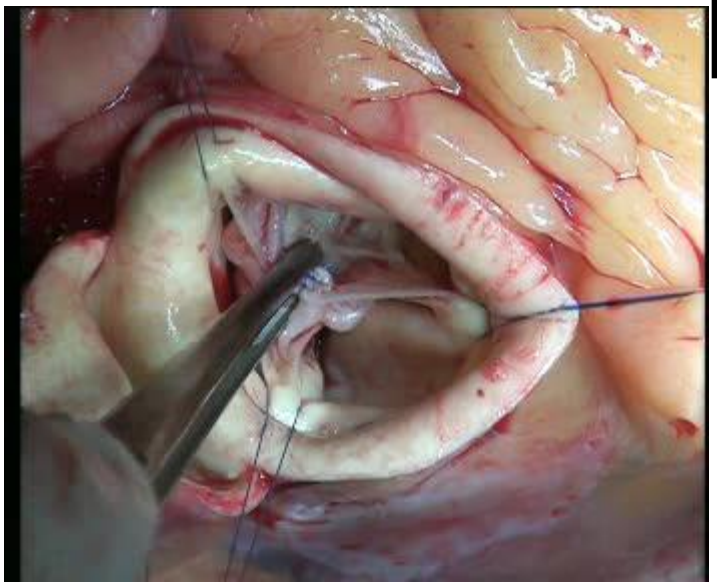
Hans-Joachim Schäfers, MD, PhD, Benjamin Bierbach, MD, and Diana Aicher, MD, Homburg/Saar, Germany



Cusp Configuration

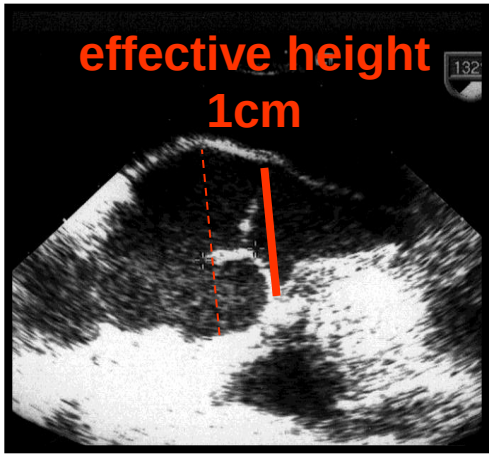






Schäfers HJ et al, JTCVS 2006

Effective Height



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European Journal of Cardio-thoracic Surgery 38 (2010) 400—406

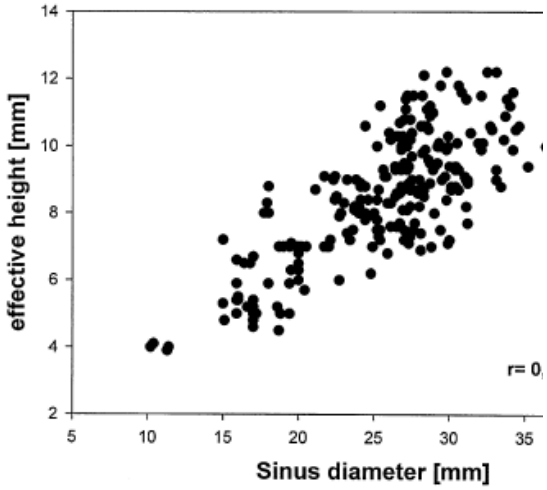
CARDIO-THORACIC SURGERY

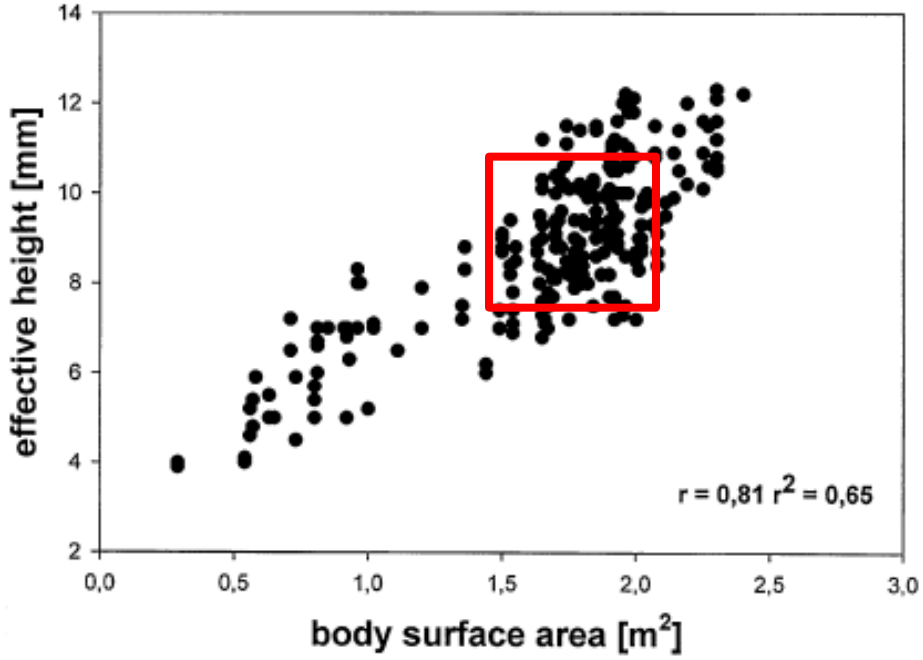
www.elsevier.com/locate/ejcts

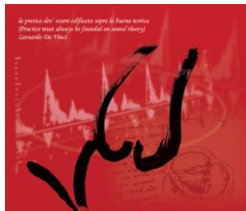
Aortic root and cusp configuration determine aortic valve function☆

Benjamin Oliver Bierbach [a], Diana Aicher [a], Omar Abu Issa [a], Hagen Bomberg [a], Stefan Gräber [b], Petra Glombitza [a], Hans-Joachim Schäfers [a,*]

[a] Department of Thoracic and Cardiovascular Surgery, University Hospitals of Saarland, Kirrberger Strasse 1, 66421 Homburg/Saar, Germany
[b] Institute for Medical Biometry, Epidemiology and In



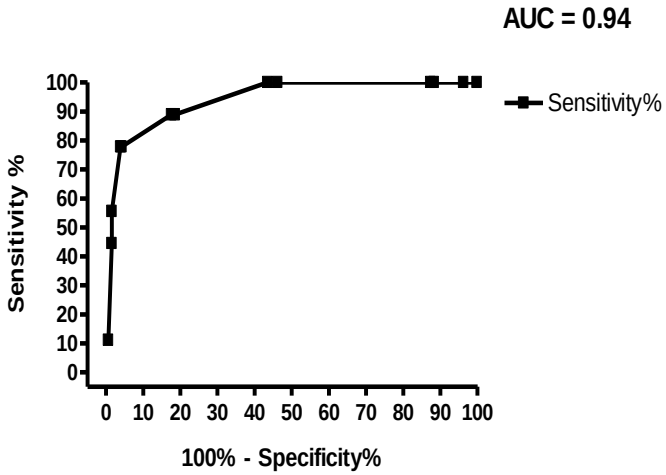




Aortic Valve Repair

Hypothesis: eH ≥ 9mm = predictor of near-normal av function

Receiver Operating Characteristic Curve



497 patients with eH ≥ 9mm

No / trivial AR:	235 patients
Mild AR :	186 patients
Moderate AR:	2 patients

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European Journal of Cardio-thoracic Surgery 38 (2010) 400–406

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Aortic root and cusp configuration determine aortic valve function☆

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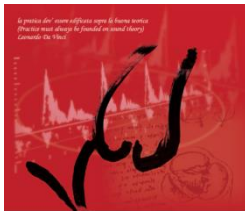

JACC: CARDIOVASCULAR IMAGING VOL. 2, NO. 8, 2009

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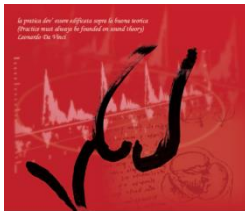
Mechanisms of Recurrent Aortic Regurgitation After Aortic Valve Repair

Predictive Value of Intraoperative Transesophageal Echocardiography

Table 3. Pre-Operative and Intraoperative TEE Measurements of the Study Population

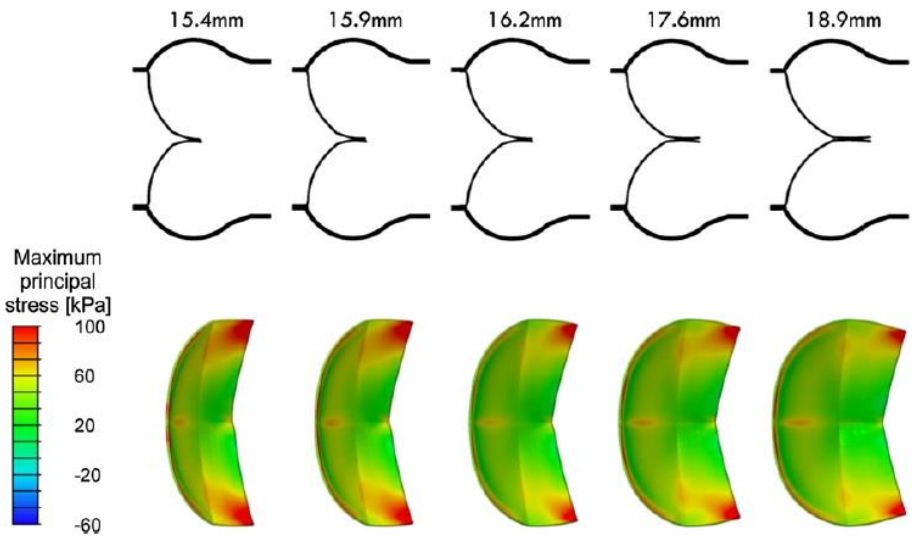
	No/Trivial AR (n = 122)	1+ to 2+ AR (n = 23)	≥3+ AR (n = 41)	p Value (F or Chi-Square)
Pre-operative (mm)				
Aortic annulus	25.4 ± 4.1	23.7 ± 3.5	25.8 ± 5.9	0.27
Sinus of Valsalva	39.4 ± 7.6	39.0 ± 8.6	41.0 ± 13.4	0.61
Sino-tubular junction	34.8 ± 8.9	34.7 ± 8.6	34.1 ± 8.9	0.93
Ascending aorta	41.6 ± 11.4	39.5 ± 8.2	37.2 ± 12.6	0.14
Height of the sinus	25.3 ± 7.5	25.4 ± 5.8	27.3 ± 11.5	0.64
Symmetry of coaptation	1.9 ± 2.2	2.3 ± 1.9	2.2 ± 2.3	0.23
Post-operative				
Aortic annulus (mm)	21.4 ± 3.8	21.0 ± 3.5	25.7 ± 4.4	<0.001
Sinus of Valsalva (mm)	29.1 ± 5.3	29.6 ± 5.0	31.4 ± 5.4	0.04
Sino-tubular junction (mm)	25.6 ± 4.1	23.9 ± 3.7	27.2 ± 3.8	<0.01
Ascending aorta (mm)	27.4 ± 5.1	27.7 ± 5.2	28.4 ± 4.6	0.47
Coaptation length (mm)	6.6 ± 2.8	3.2 ± 1.4	2.2 ± 1.6	<0.001
Coaptation length <4 mm (%)	11	52	85	<0.001
Cusp to annulus distance (mm)	−1.2 ± 2.8	−1.5 ± 3.2	−3.9 ± 4.8	<0.001
Distance from tips to annulus (mm)	6.9 ± 4.3	3.0 ± 3.1	0.6 ± 4.2	<0.001
Tips below the aortic annulus (%)	4	13	49	<0.001
Vena contracta width (mm)	0.6 ± 1.1	2.4 ± 1.7	2.6 ± 1.4	<0.001
Eccentric jet (%)	9	30	73	<0.001



Higher effective height leads to improved coaptation height

Aortic root numeric model: Correlation between intraoperative effective height and diastolic coaptation

Gil Marom, MSc,[a] Rami Haj-Ali, PhD,[a] Moshe Rosenfeld, DSc,[a] Hans Joachim Schäfers, MD,[b] and Ehud Raanani, MD,[c] Tel Aviv and Tel Hashomer, Israel; and Homburg, Germany



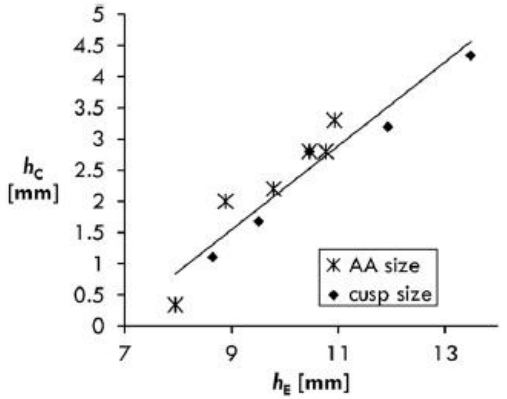
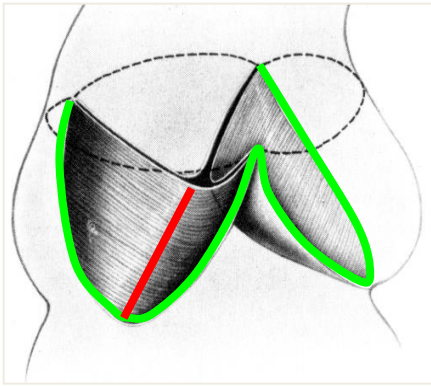
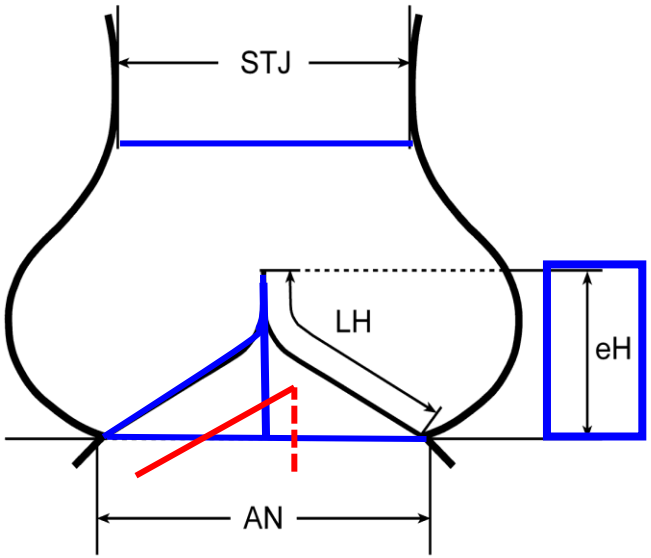


FIGURE 2. The average coaptation heights (h_C) as a function of the effective height (h_E). *AA*, Aortic annulus.

J Thorac Cardiovasc Surg 2013;145:303-4

Configuration/coaptation of cusps





Anatomical Limitations of Aortic Valve Repair

Functional Anatomy of Aortic Regurgitation

Accuracy, Prediction of Surgical Repairability, and Outcome Implications of Transesophageal Echocardiography

Jean-Benoît le Polain de Waroux, MD*; Anne-Catherine Pouleur, MD*; Céline Goffinet, MD; David Vancraeynest, MD; Michel Van Dyck, MD; Annie Robert, PhD; Bernhard L. Gerber, MD, PhD; Agnès Pasquet, MD, PhD; Gébrine El Khoury, MD; Jean-Louis J. Vanoverschelde, MD, PhD

Background—For patients with aortic regurgitation (AR), aortic valve sparing or repair surgery is an attractive alternative to valve replacement. In this setting, accurate preoperative delineation of aortic valve pathology and potential repairability is of paramount importance. The aim of the prese transesophageal echocardiography (TEE) in defining the mec in predicting repairability, by using the final surgical approac

Methods and Results—One hundred and sixty-three consecutive AR surgery were included. Mechanisms of AR were categor aortic dilatation; type 2, cusp prolapse; and type 3, restrictive AR were type 1 in 41 patients, type 2 in 62, and type 3 in 60. A (κ=0.90). Valve sparing or repair was performed in 125 pati predicted the final surgical approach in 108/125 (86%) pa undergoing replacement. The gross anatomic classification of and postoperative outcome (4-year freedom from > grade 2

Conclusions—TEE provides a highly accurate anatomic assessm anatomy of AR defined by TEE is strongly and independe outcome. (***Circulation***. **2007;116[suppl I]:I-264–I-269.**)

Key Words: echocardiography ■ surgery ■ valve

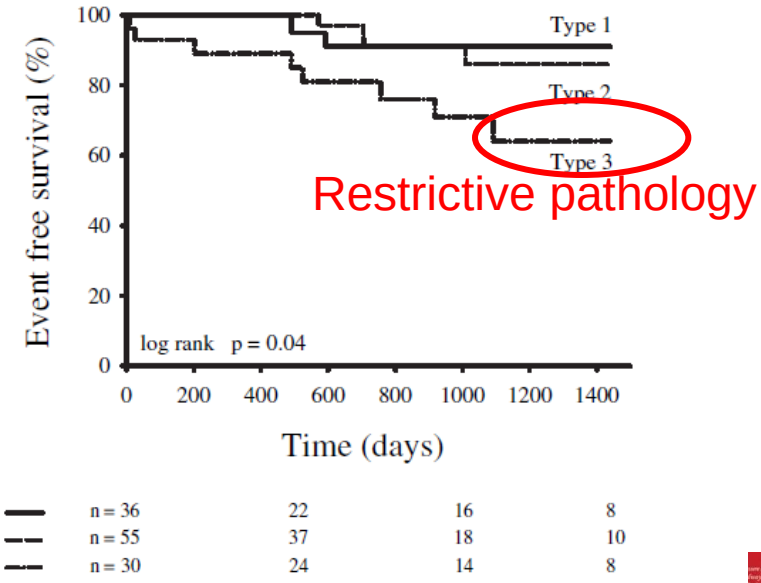
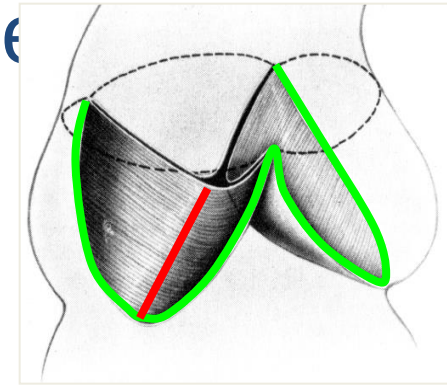


Figure 4. Kaplan–Meier estimates of event-free survival in patients undergoing valve sparing or repair surgery, according to anatomic classification by TEE.

Aortic Valve Repair - Assessme

Solutions



Configuration/coaptation of cusps

Cusp height in aortic valve

Hans-Joachim Schäfers, MD,[a] Wolfram S

Objectives: Successful aortic valve rep
available on the normal dimensions of t

Methods: The cusp height was measure
A tricuspid anatomy was present in 329
height, weight, preoperative degree of a
analyzed for possible interrelation betw

Results: In the bicuspid valves, the geon
± 2.0). Significant correlations were fo
valves, the height of the noncoronary c
left coronary cusp varied from 12 to 25
to 25 mm (mean, 20.0 ± 2.1). The nonco
cusp ($P = .000$). No difference was fou
between the geometric height and clini
degree of aortic regurgitation.

Conclusions: We found the cusp height
correlates with the clinical variables. T
repair. (J Thorac Cardiovasc Surg 2012;

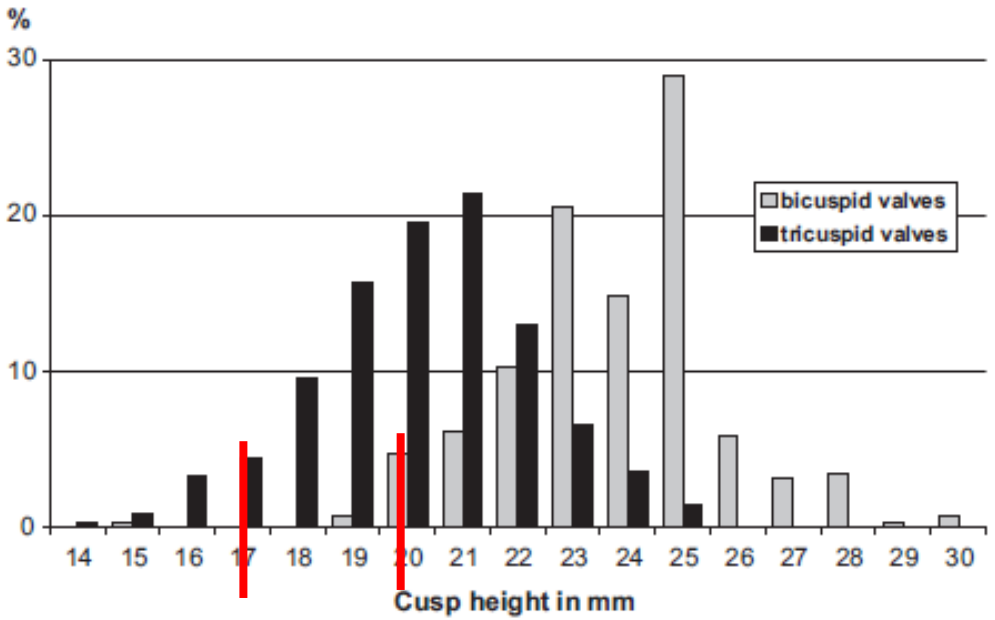
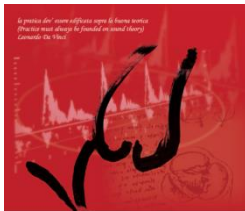
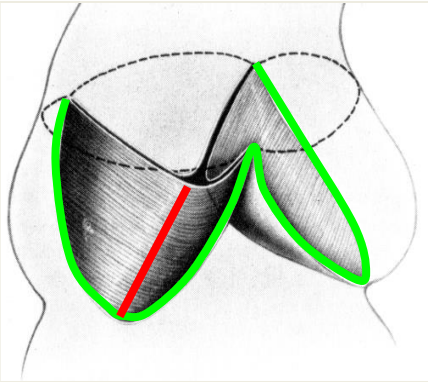


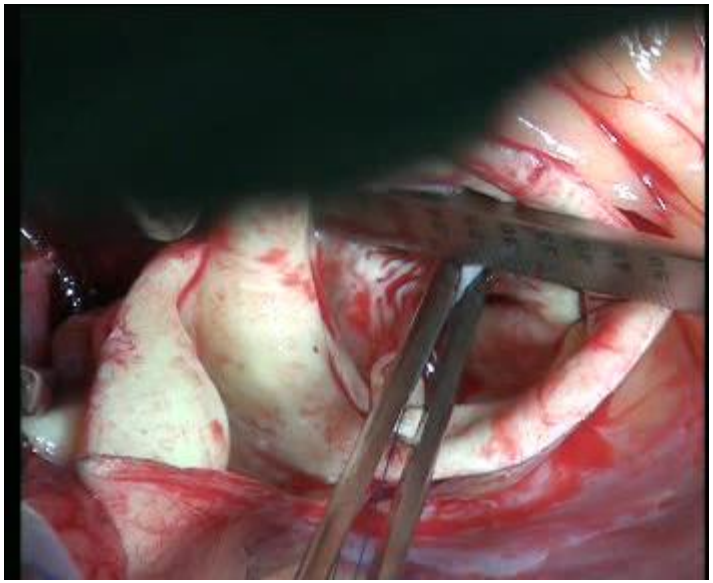
FIGURE 3. Distribution of geometric height in bicuspid (n = 289; nonfused cusps) and tricuspid (n = 332; mean of all 3 cusps) aortic valves.



Aortic Valve Repair - Assessment

Configuration/coaptation of cusps

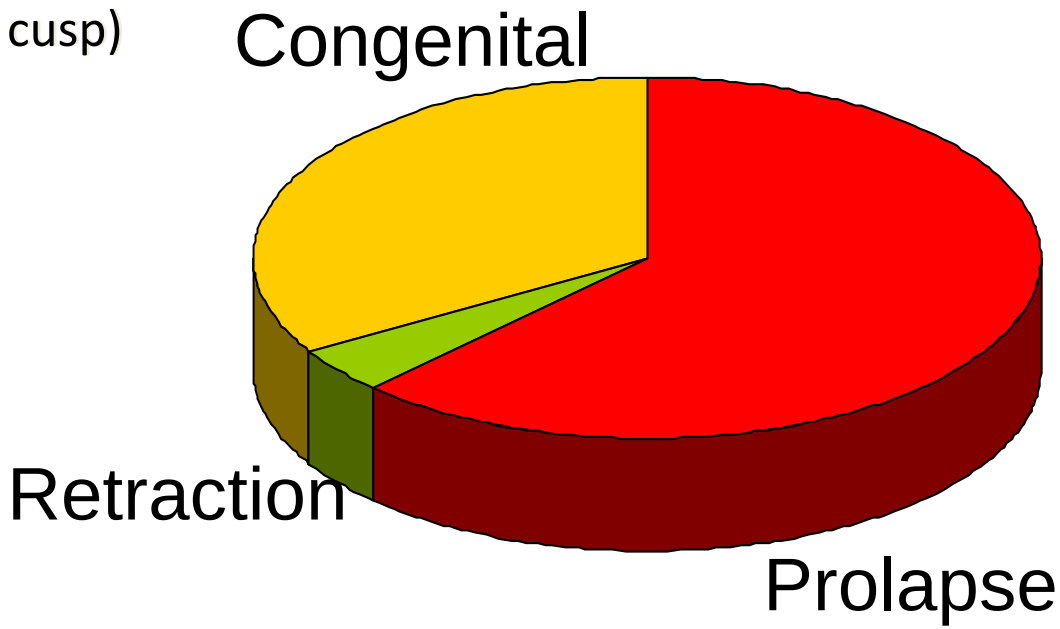




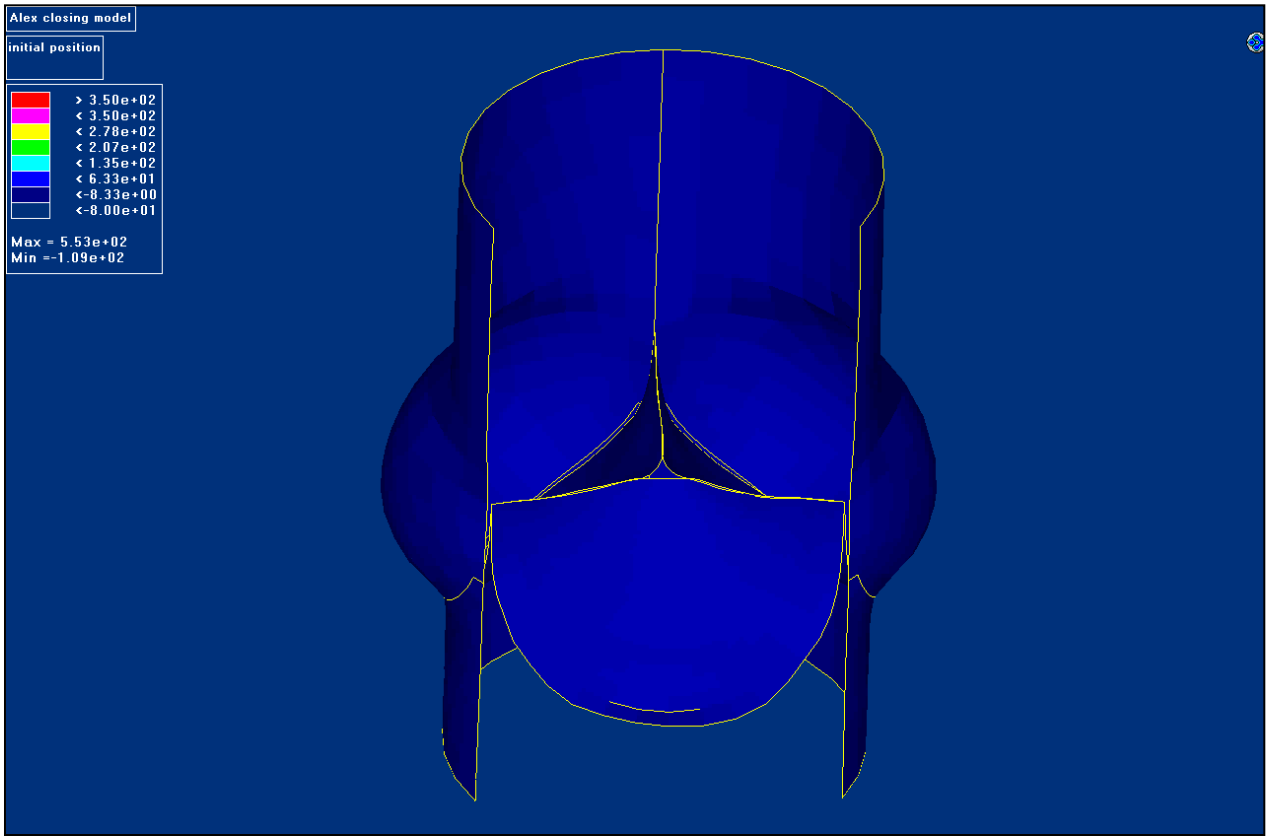
TAV: 18-22 mm
BAV: 20-25 mm

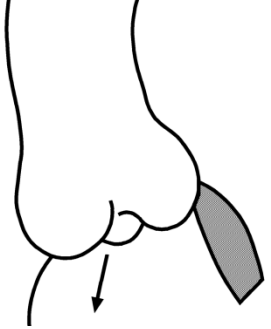
Causes of Cusp Pathology

- Prolapse n=606/826 =73%
  (right > non > left-coronary cusp)
- Congenital malformation
  - bicuspid n=276
  - unicuspid n =50
  - quadricuspid n =3
- Retraction / Calcium n=42



Aortic Valve – Stress Distribution

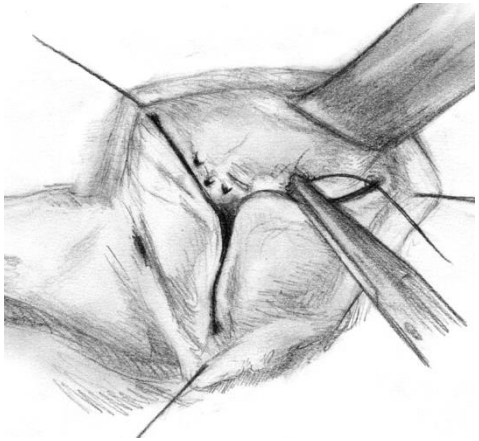


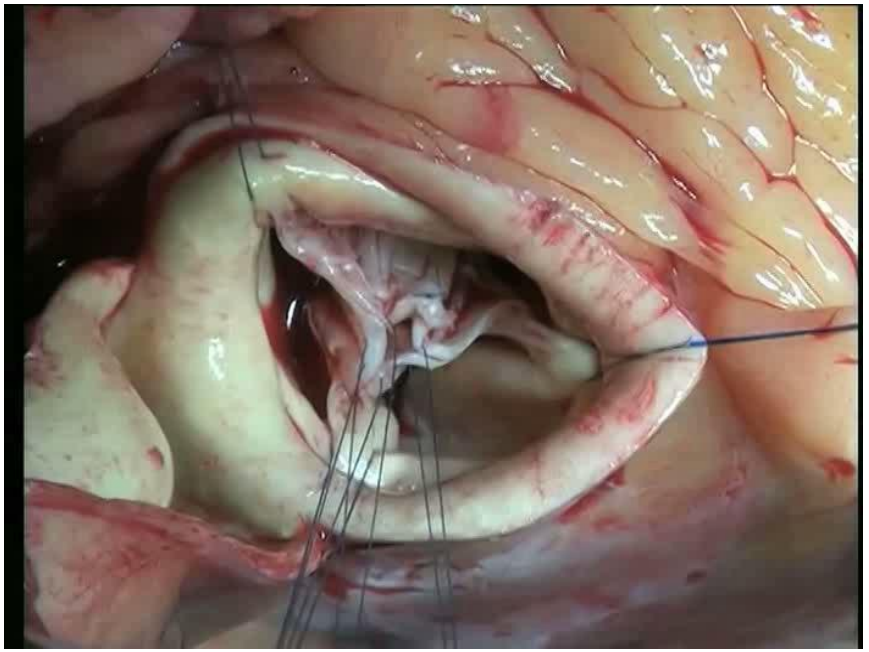


Reconstructive Techniques

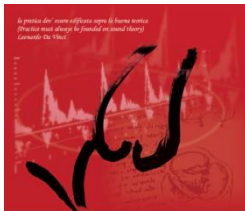
Cusp Pathology

Prolapse



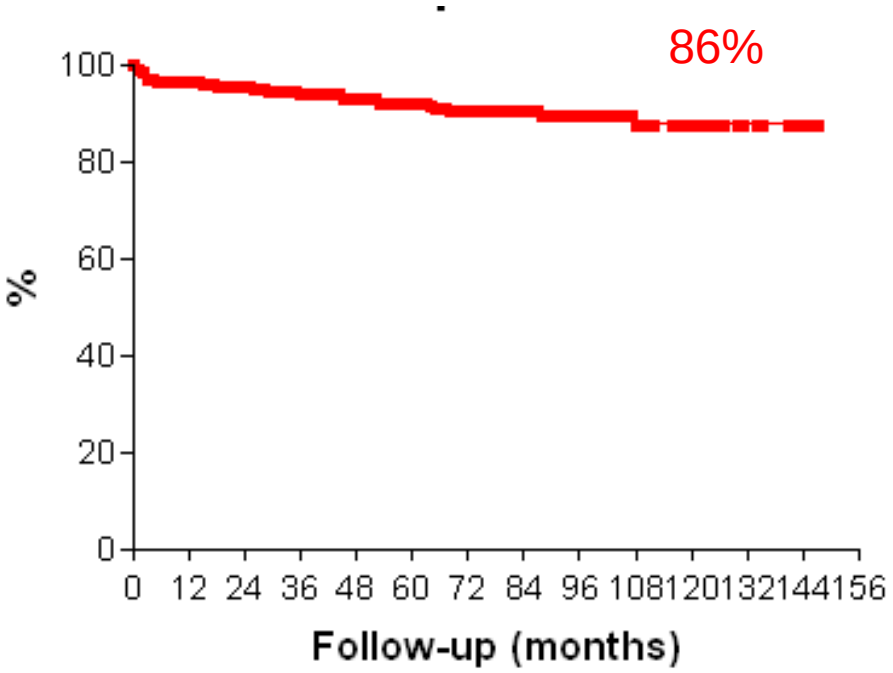


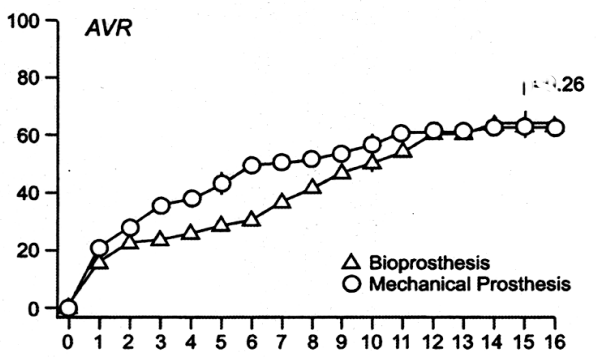
Plication of
Cusp Margin



Aortic Valve Repair

Freedom from Valve-related Complications





Hammermeister et al, JACC 2000

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association.

Valve Configuration Determines Long-Term Results After Repair of the Bicuspid Aortic Valve

Diana Aicher, Takashi Kunihara, Omar Abou Issa, Brigitte Brittner, Stefan Gräber and Hans-Joachim Schäfers

Circulation. 2011;123:178-185; originally published online January 3, 2011;
doi: 10.1161/CIRCULATIONAHA.109.934679

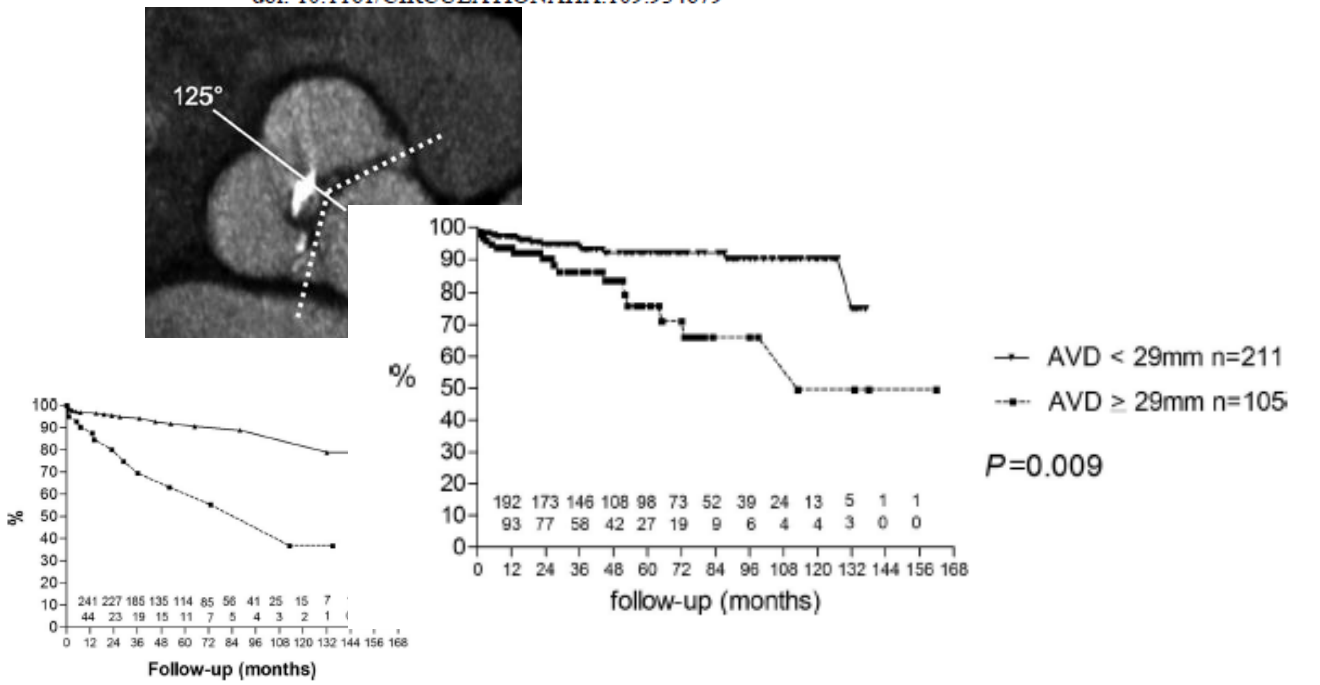


Figure 3. Actuarial freedom from reoperation after aortic valve repair in patients with a BAV depending on preoperative AVD.

European Journal of Cardio-Thoracic Surgery 49 (2016) 428–438
doi:10.1093/ejcts/ezv050 Advance Access publication 26 February 2015

ORIGINAL ARTICLE

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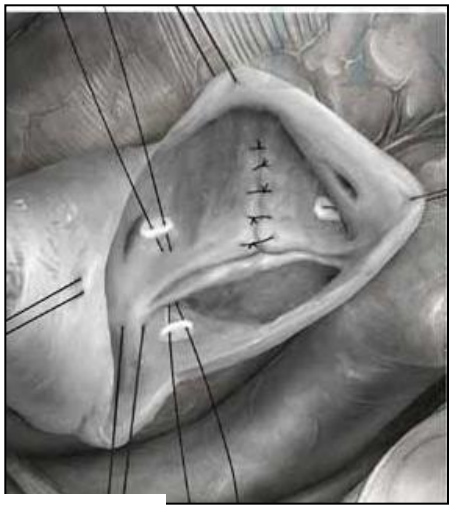
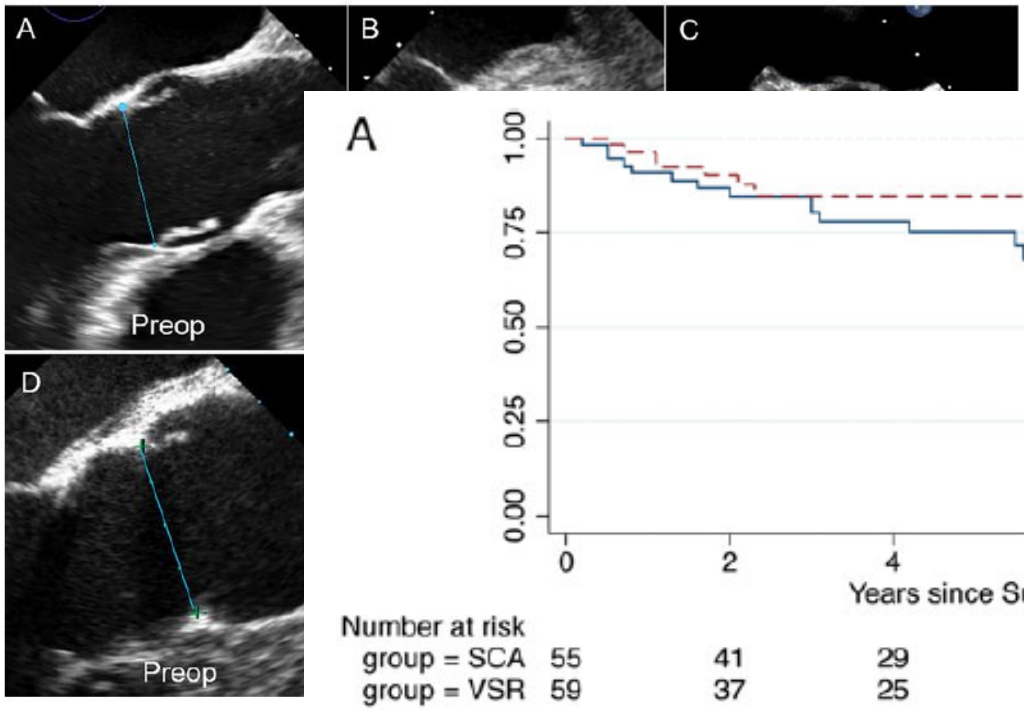
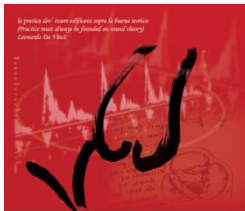
The role of annular dimension and annuloplasty in tricuspid aortic valve repair†

Laurent de Kerchove[a,*], Stefano Mastrobuoni[a], Munir Boodhwani[b], Parla Astarci[a], Jean Rubay[a], Alain Poncelet[a], Jean-Louis Vanoverschelde[a,c], Philippe Noirhomme[a] and Gebrine El Khoury[a]

[a] Pôle de Recherche Cardiovasculaire, Institut de Recherche Expérimentale et Clinique, Université Catholique de Louvain and Division of Cardiothoracic and Vascular Surgery, Brussels, Belgium



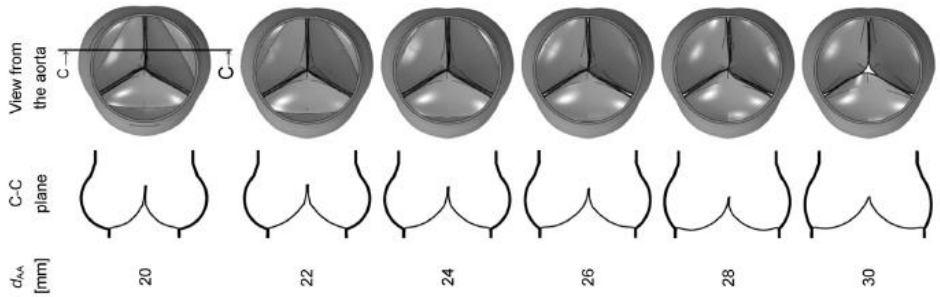




Annular dilatation effects coaptation

Aortic root numeric model: Annulus diameter prediction of effective height and coaptation in post–aortic valve repair

Gil Marom, MSc,[a] Rami Haj-Ali, PhD,[a] Moshe Rosenfeld, DSc,[a] Hans Joachim Schäfers, MD,[b] and Ehud Raanani, MD[c]



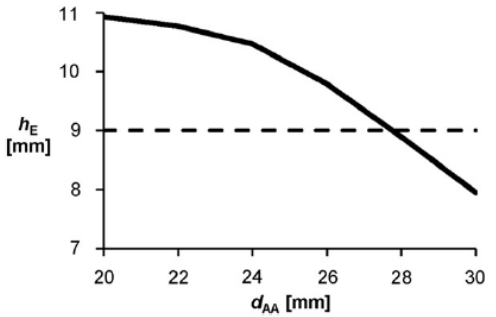
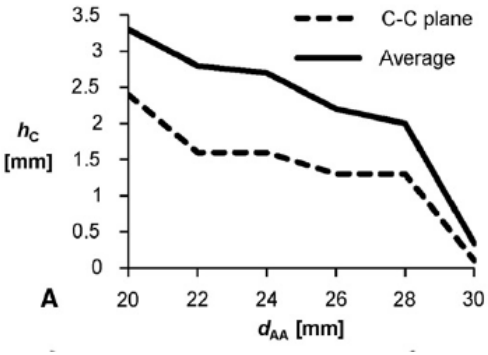
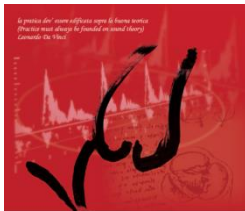


FIGURE 2. The effective height (h_E) as a function of annulus diameter (d_{AA}) under a pressure load of 3 mm Hg.



The Journal of Thoracic and Cardiovascular Surgery • February 2013



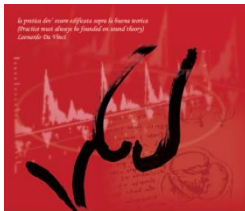
Remodeling root repair with an external aortic ring annuloplasty

Emmanuel Lansac, MD, PhD,[a] Isabelle Di Centa, MD,[b] Ghassan Sleilaty, MD,[a] Stephanie Lejeune, MS,[a] Alain Berrebi, MD,[a] Pavel Zacek, MD, PhD,[c] and Mathieu Debauchez, MD[a]

TABLE 3. Influence of different parameters on late outcomes

Outcome	Freedom from AI ≥2		Freedom from AI ≥3		AV reintervention		MAVRE	
Factor	HR, 95% CI	*P* value	HR, 95% CI	*P* value	HR, 95% CI	*P* value	HR, 95% CI	*P* value
Cusp effective height assessment	0.96 (0.37-2.50)	.939	-†	.043	0.13 (0.02-1.06)	.057	0.20 (0.05-0.76)	.018
Cusp repair	1.23 (0.47-3.25)	.676	0.46 (0.08-2.53)	.374	0.43 (0.10-1.84)	.257	0.52 (0.17-1.57)	.243
Extra-Aortic ring (Extra-Aortic, CORONEO, Inc, Montreal, QC, Canada)	1.5 (0.57-3.96)	.414	-†	.026	0.11 (0.01-0.95)	.044	0.29 (0.09-0.98)	.046
Leaflet anatomy		.281	†	.149		.151		.262
Tricuspid	Reference	-	Reference	-	Reference	-	Reference	-
Bicuspid	0.82 (0.26-2.57)	.737	-†		-†		0.18 (0.02-1.4)	.102
Unicuspid	3.07 (0.68-13.75)	.143	3.37 (0.39-28.9)	.267	-†		0	.983
Preoperative AI*	1.66 (1.1-2.51)	.016	1.63 (0.78-3.44)	.196	0.94 (0.53-1.65)	.824	0.98 (0.64-1.5)	.939
Intraoperative Aortic annulus diameter	1.02 (0.91-1.15)	.693	0.84 (0.51-1.38)	.493	0.88 (0.59-1.3)	.516	0.85 (0.62-1.16)	.303
Valsalva diameter	0.99 (0.94-1.05)	.853	1.00 (0.92-1.09)	.987	1.03 (0.98-1.09)	.268	1.02 (0.97-1.07)	.527
STJ diameter	1.03 (0.99-1.08)	.122	1.01 (0.93-1.1)	.778	1.01 (0.93-1.09)	.883	1.01 (0.95-1.07)	.676
Preoperative LVEF	0.97 (0.93-1.02)	.248	1.04 (0.93-1.16)	.462	1.04 (0.94-1.15)	.461	1.09 (1.00-1.18)	.042

(J Thorac Cardiovasc Surg 2017;■:1-10)



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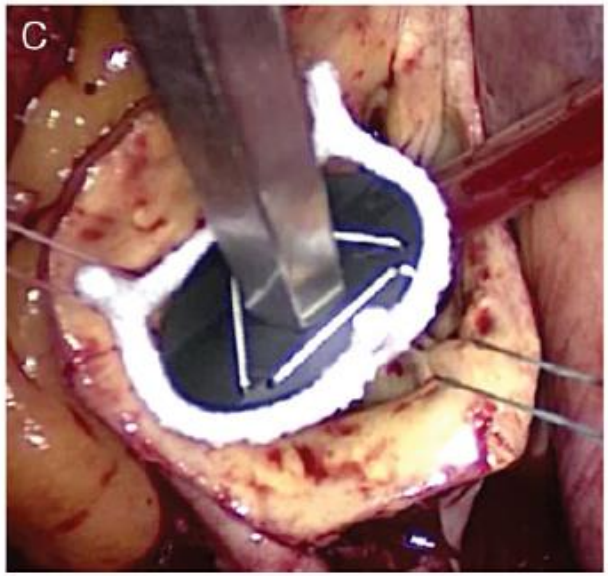
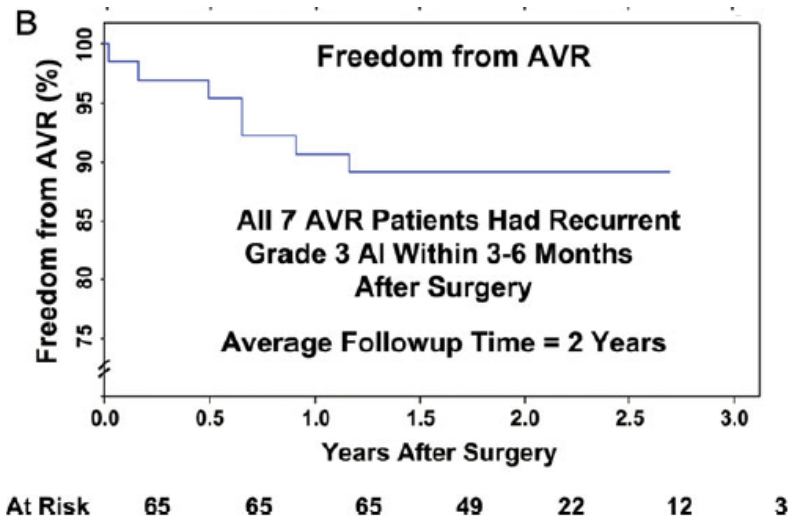
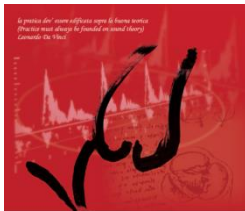
Geometric ring annuloplasty as an adjunct to aortic valve repair: clinical investigation of the HAART 300 device

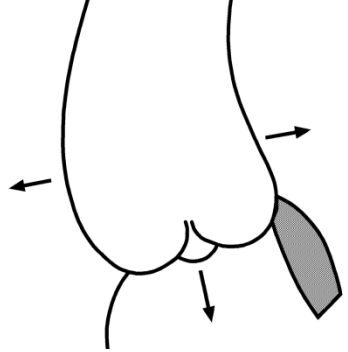
Domenico Mazzitelli[a], Theodor Fischlein[b], J. Scott Rankin[c,*], Yeong-Hoon Choi[d], Christof Stamm[e], Steffen Pfeiffer[b], Jan Pirk[f], Christian Detter[g], Johannes Kroll[h], Friedhelm Beyersdorf[h], Charles D. Griffin[i], Malakh Shrestha[j], Christian Nöbauer[a], Philip S. Crooke[k], Christian Schreiber[a] and Rüdiger Lange[a]



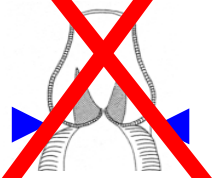




Root Repair – Technical Options

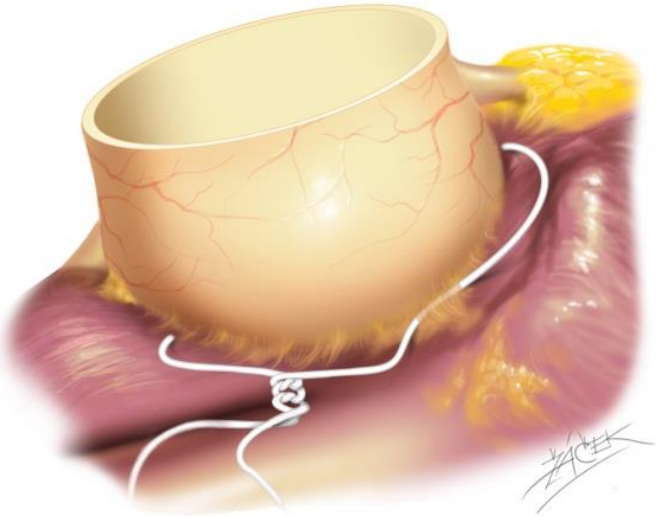


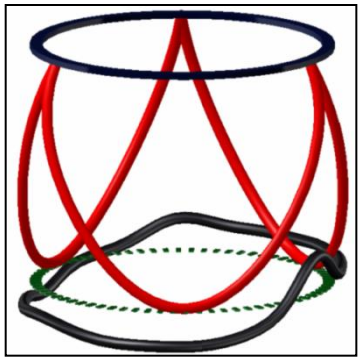
Subcommissural Plication

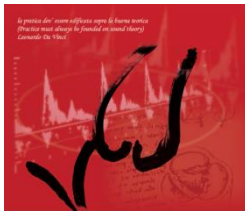


(Cabrol 1966)

Aortic Annuloplasty
(AVJ > 25-27mm)







Suture Annuloplasty Significantly Improves the Durability of Bicuspid Aortic Valve Repair

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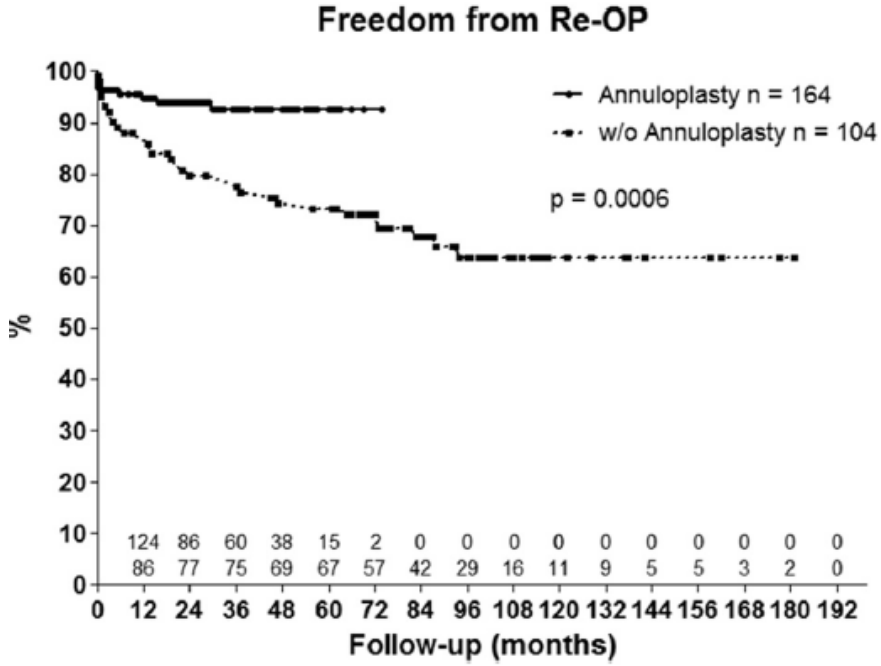
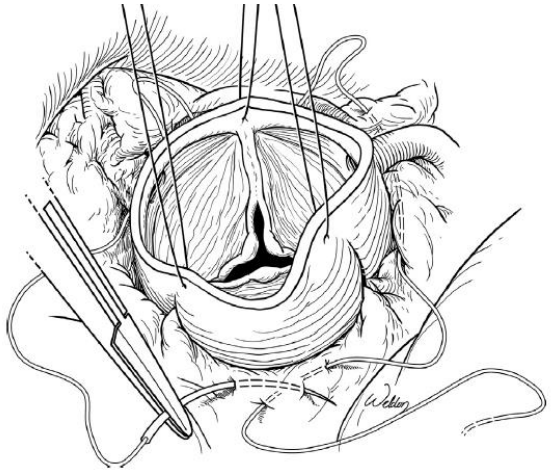
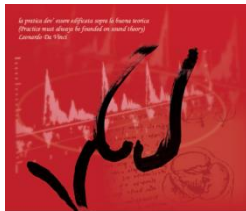




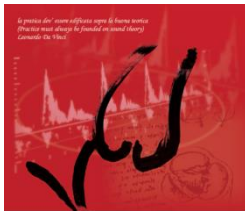
(Ann Thorac Surg 2017;103:504–10)



Freedom from Reoperation – BAV

Predictors of Failure

	p univar.	p multivar.
Patient age < 40 yrs.	0.0051	0.001
Orientation of comm. (<160°)	0.0001	0.002
Non-root replacement	0.0018	
Cabrol suture	0.04	
Pericardial patch	0.0001	0.0001
AV diameter (>28 mm)	0.0005	0.007
ST diameter (≤ 30 mm)	0.0142	
Effective height < 9mm	0.0013	0.002
Preop AR > III	0.0029	



Aortic Valve Reconstruction

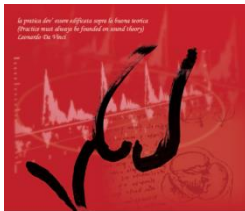
- AV reconstruction is on its way to a rational and reproducible
- approach (A + B + C + ? = functioning AV)

- Scientific basis is becoming clearer

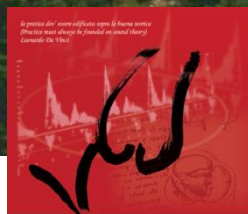
- Valve-related complications are rare if repair is stable

- Durability of repair is better than that of biprostheses in young patients

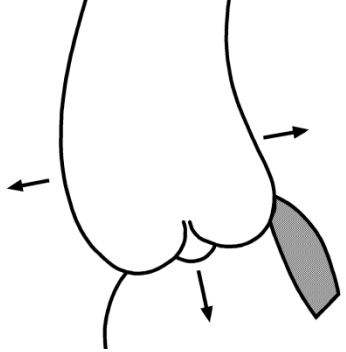
- AV reconstruction should be considered in every patient with AR



Thank you for your attention

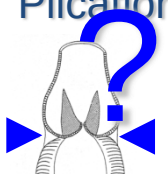


Root Repair – Technical Options



Aortoventricular Plication
(AVJ > 27mm)

Subcommissural Plication



(Cabrol 1966)