



UKS
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des Saarlandes

Reconstruction of the Aortic Valve and Root: A practical Approach

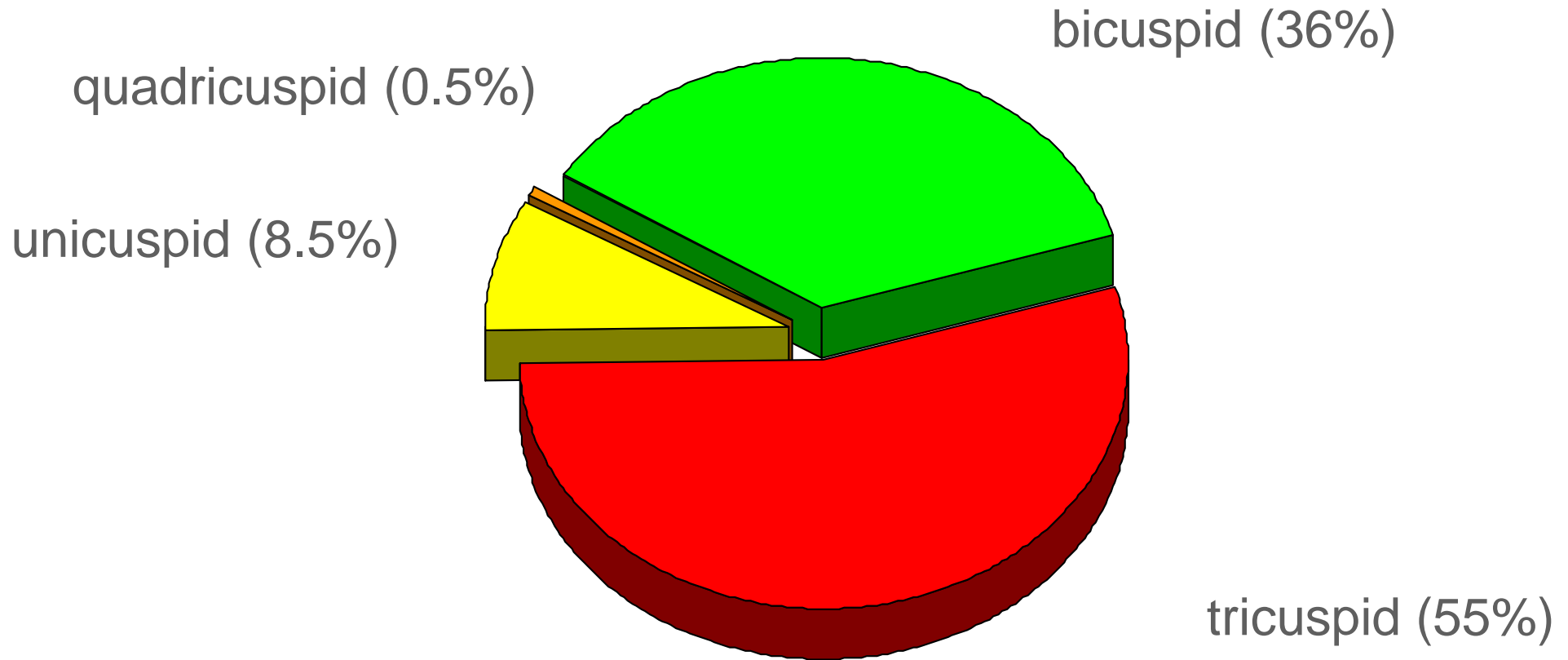
Results of Root Repair

Diana Aicher

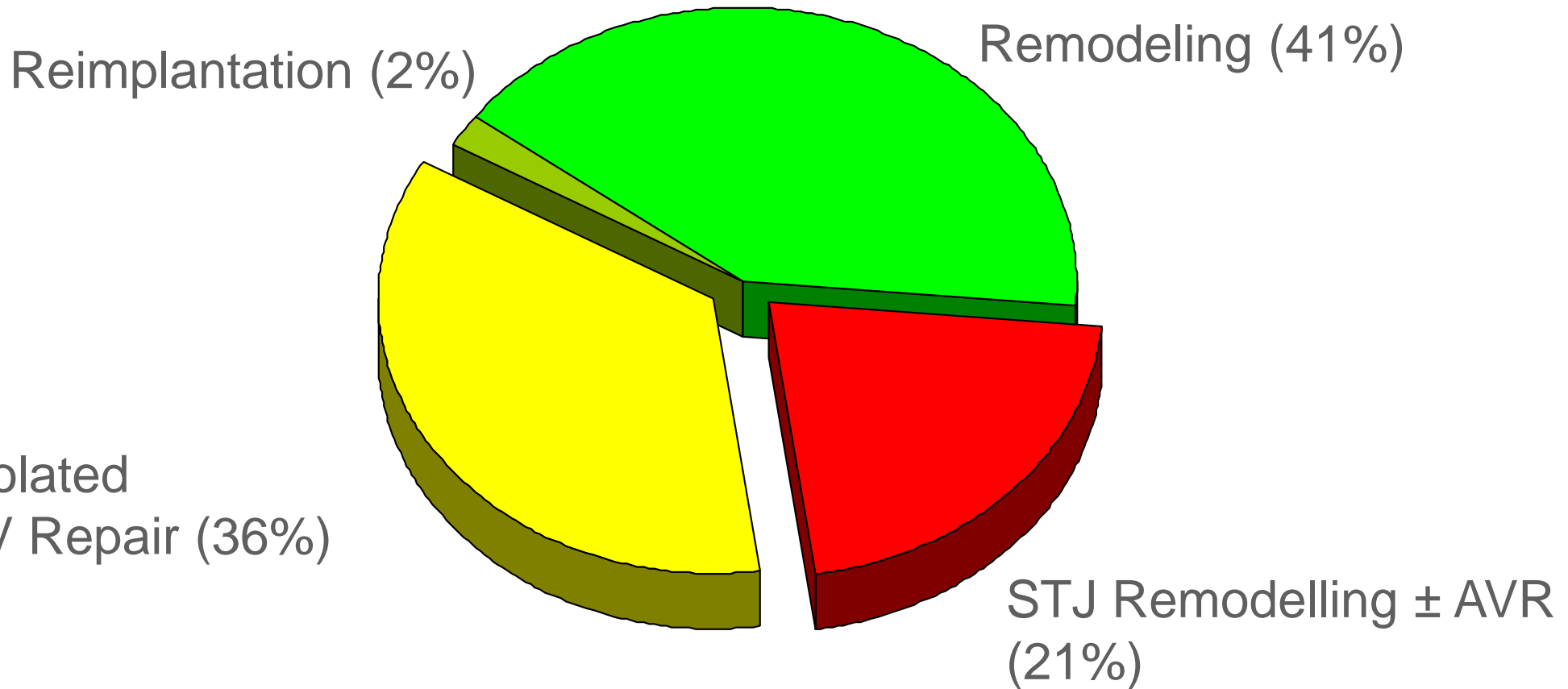
September 16th-18th 2015



Aortic Valve Morphology n=2073



Aortic Valve Repair n=2073



Valve preserving surgery (10/1995- 3/2009)

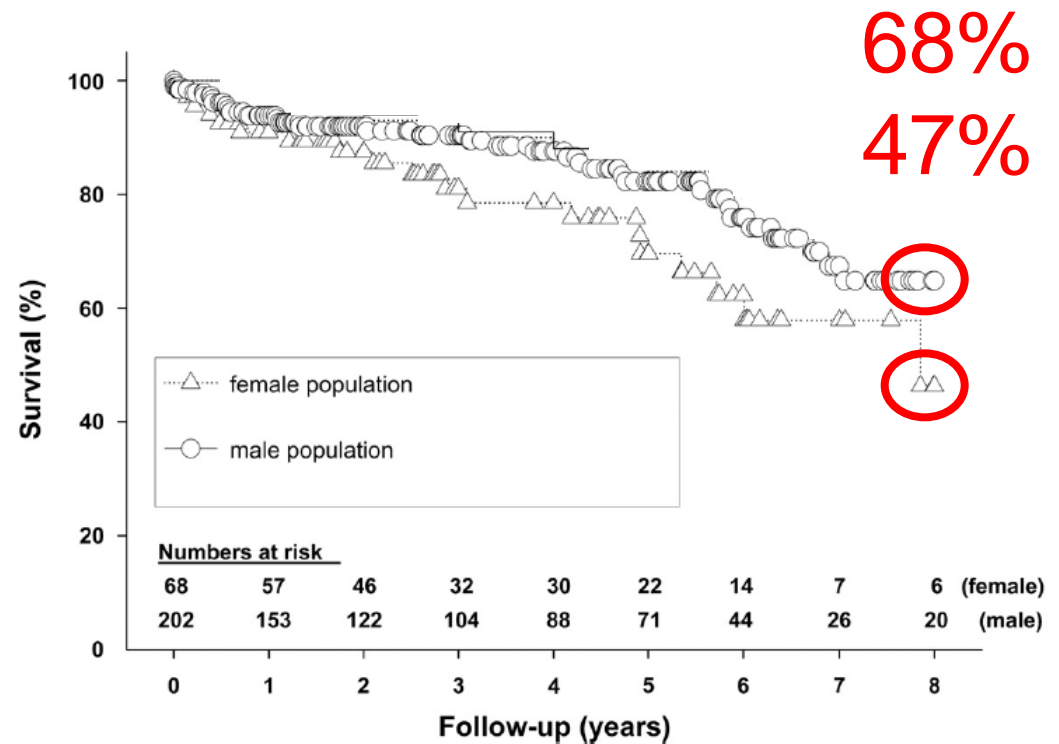
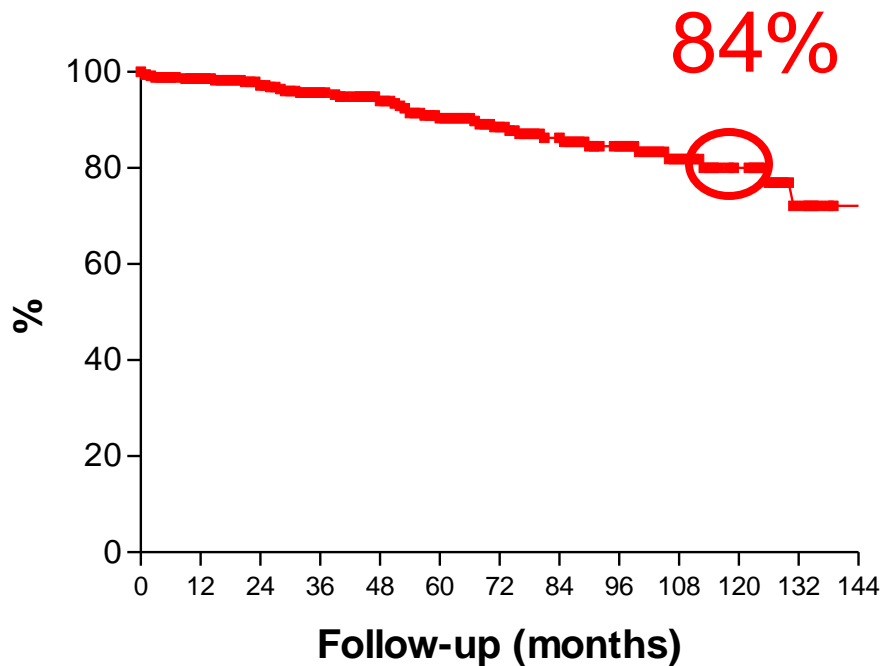
	Remodeling (N=401)	Reimplantation (N=29)	p
Age (years)	58 ± 15	42 ± 16	
Sex (m/f)	300/101	19/8	
Tricuspid AV	271	27	
BAV/UAV	124/6	2/-	
Diagnosis: Aneurysm	336	22	
AADA	59	7	
CADA	6	-	
Marfan	13	12	
Myocardial Ischemia (min)	82 ± 20	112 ± 24	0.01
Hospital mortality			
total	13/401 (3.2 %)	0/29	0.32
elective	9/342 (2.6%)	0/22	0.33
emergency	4/59 (6.8%)	0/7	0.08

Results of Root Repair

Aortic Root Repair (Homburg)

Aortic Root Replacement
 (Composite)

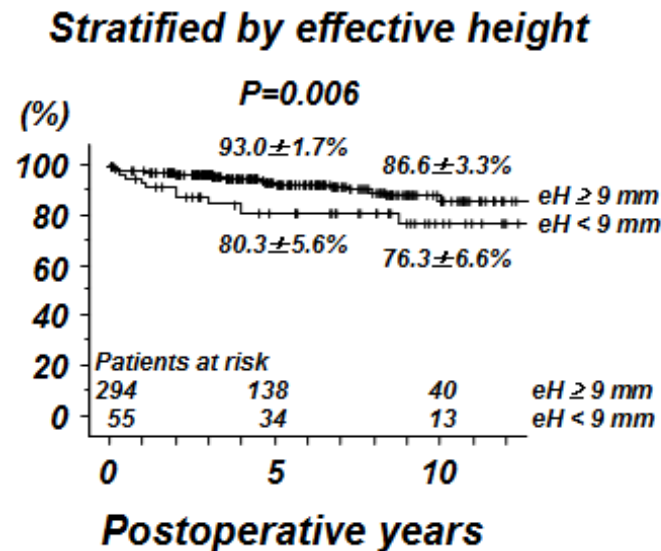
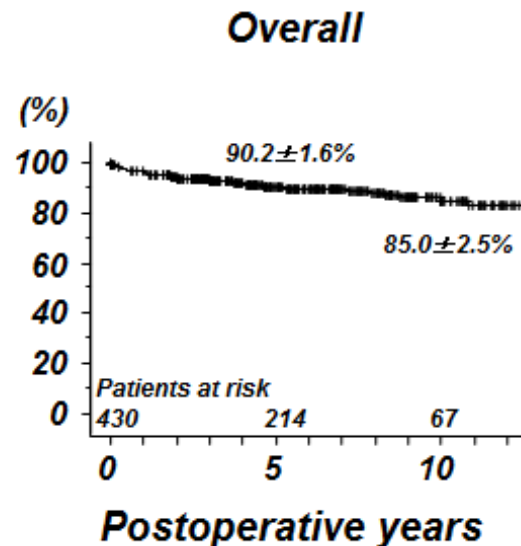
Survival



Preoperative aortic root geometry and postoperative cusp configuration primarily determine long-term outcome after valve-preserving aortic root repair

Takashi Kunihara, MD, PhD,^a Diana Aicher, MD,^a Svetlana Rodionychева, MD,[~] Heinrich-Volker Groesdonk, MD,^a Frank Langer, MD,^a Fumihiko Sata, MD, PhD,^b and Hans-Joachim Schäfers, MD, PhD^a

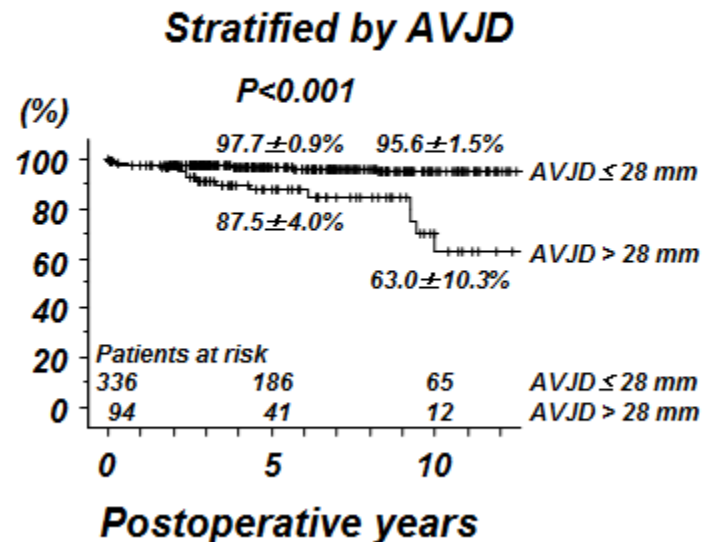
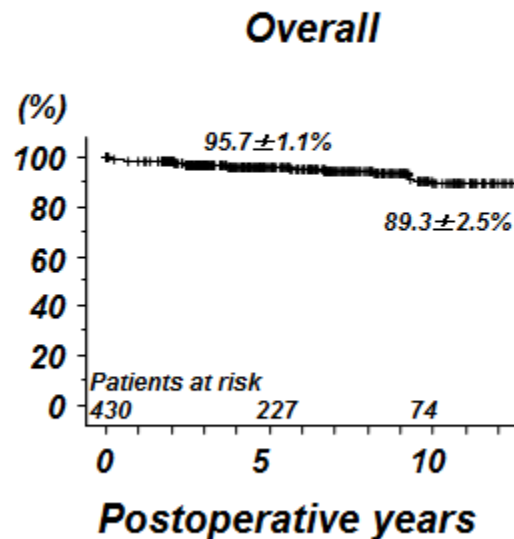
Freedom from AR \geq II



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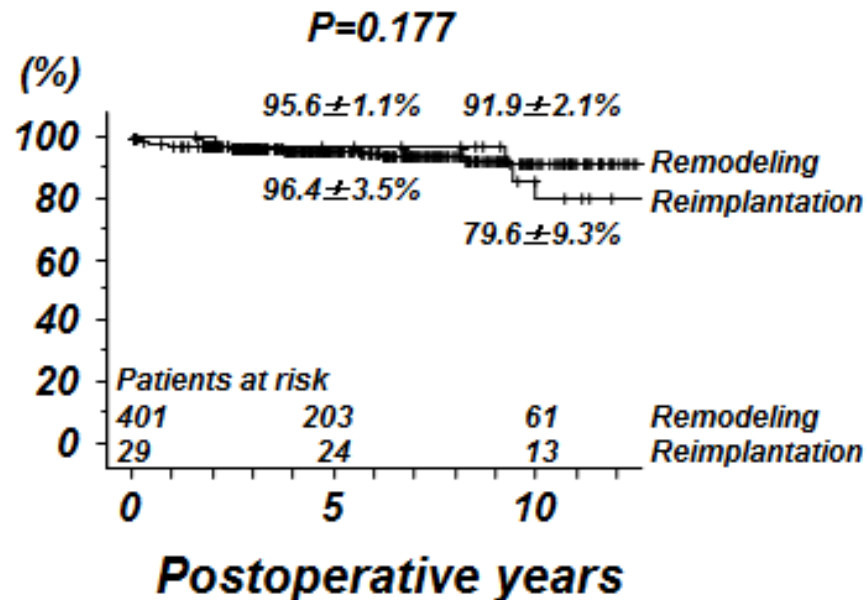
Freedom from Reoperation



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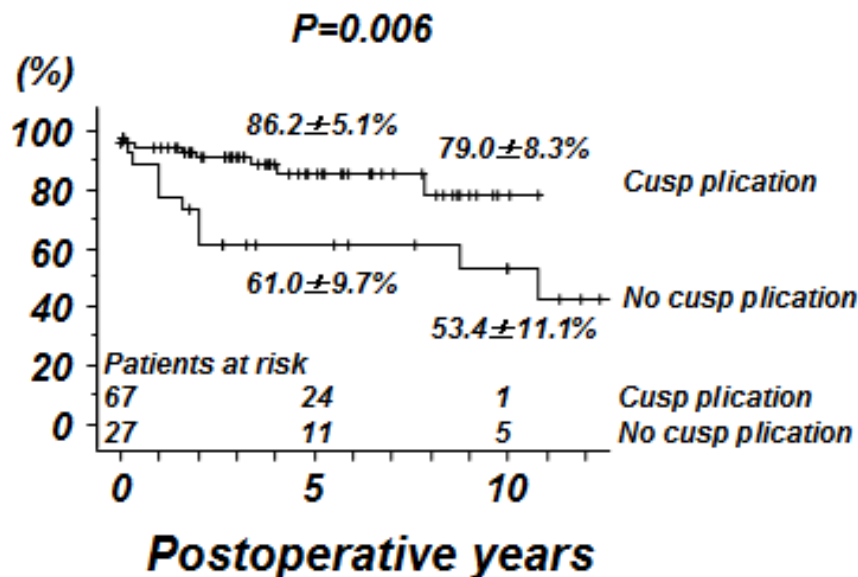
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**Freedom from AR \geq II in
cases with AVJD $>$ 28mm**



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Hans-Joachim Schäfers, MD, PhD^a

TABLE 1. Predictors of late aortic valve stability

	Univariate <i>P</i> value	Multivariate <i>P</i> value	HR	95% CI
AR grade ≥ II				
AVJ diameter > 28 mm	<.001	<.001	3.326	1.833–6.036
eH < 9 mm	<.001	<.001	3.354	1.857–6.060
STJ diameter	.025	.565		
Use of pericardial patch	.068	.071		
Concomitant CABG	.142	.177		
Reoperation				
AVJ diameter > 28 mm	<.001	<.001	5.076	2.281–11.300
Use of pericardial patch	.005	.007	3.815	1.208–12.048
eH < 9 mm	.042	.049	2.272	1.002–5.152
Body height	.115	.505		
Operative procedure	.177	.986		
Use of cusp plication	.188	.303		

Predictors of recurrent AR grade II or greater or reoperation on the aortic valve. *HR*, Hazard ratio; *CI*, confidential interval; *eH*, effective height; *CABG*, coronary artery bypass grafting.

Valve-preserving Surgery

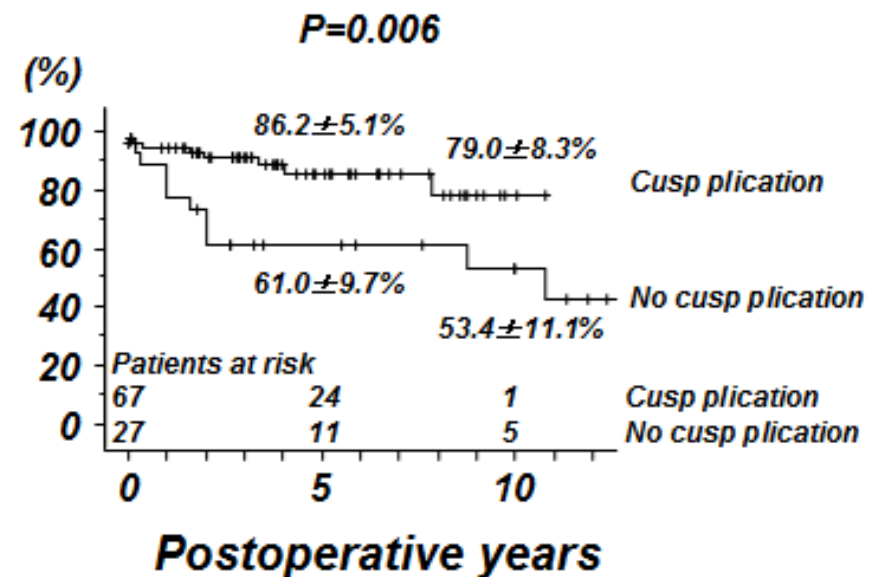
Suboptimal valve stability for AVJ > 28mm:

AVJ > 28mm risk factor or

AVJ indicator for large root (+large cusps) which will prolapse after more reduction of root dimensions



Freedom from AR \geq II in cases with AVJD > 28mm



Valve-preserving Surgery: Reasons for Reoperation

	Remodeling n=401	Reimplantation n=29
Cusp prolapse	10	-
Cusp suture dehiscence	6	-
Cusp retraction	3	-
Endocarditis	2	1
Commissural detachment	-	2
Aortic valve stenosis	1	-
	22 (5.5%)	3 (10.3%)

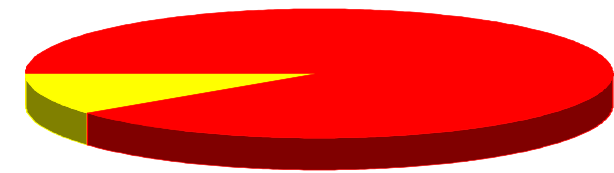
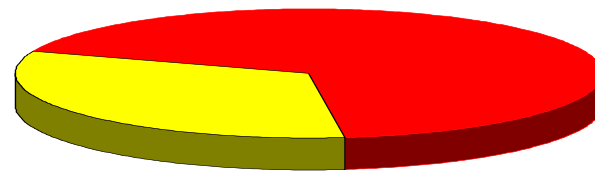
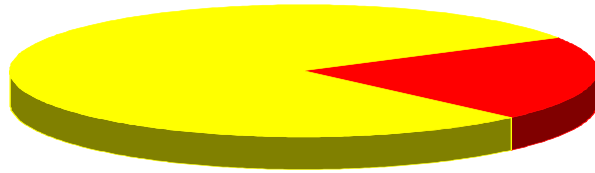
Results of Root Repair

Cusp prolapse correction (%)

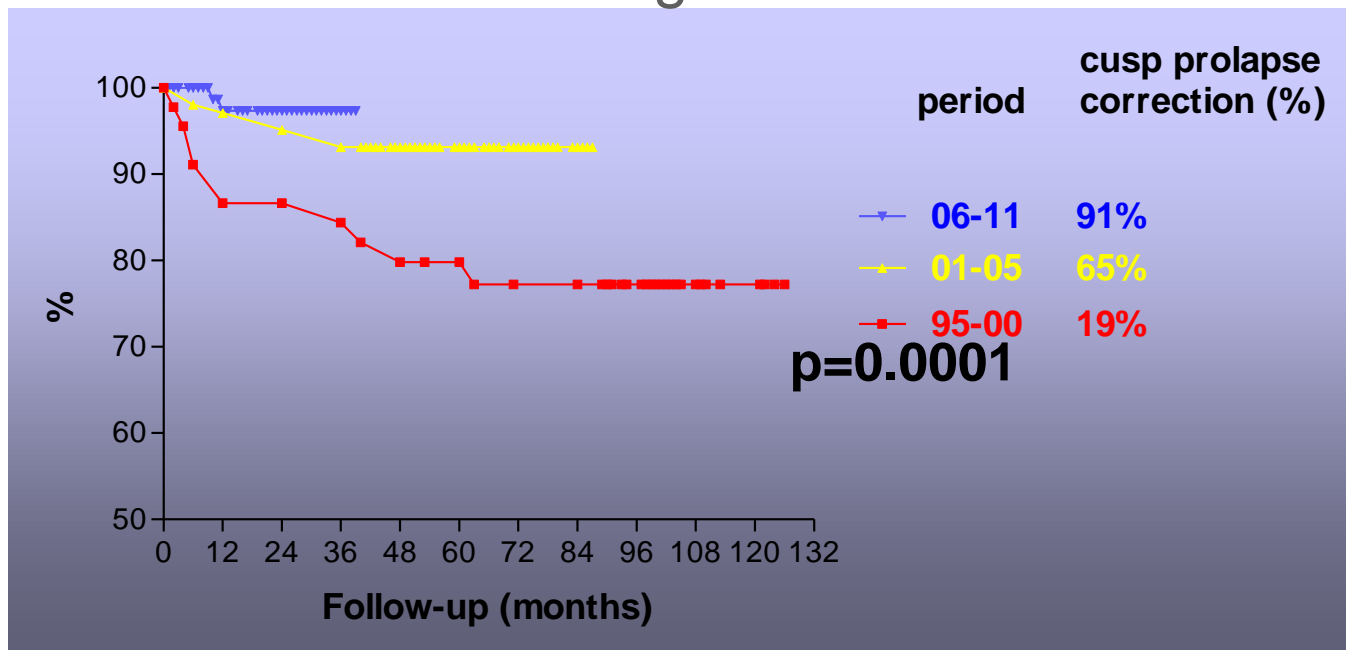
1995-2000: 19%

2001-2005: 65%

2006-2011: 91%



Learning Curve



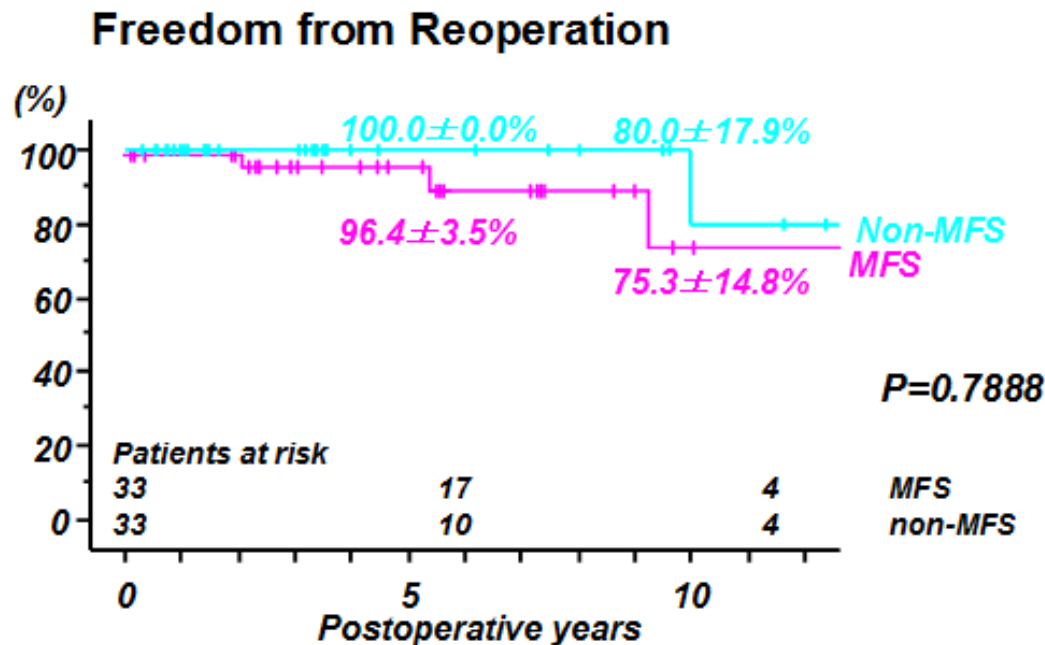
Results of Root Repair

J Heart Valve Dis. 2012 Sep;21(5):615-22.

Outcomes after valve-preserving root surgery for patients with Marfan syndrome.

Kunihara T¹, Aicher D, Rodionychewa S, Asano M, Tochii M, Sata F, Schäfers HJ.

Long-term valve stability between patients with Marfan and propensity score-matched cohort without Marfan.





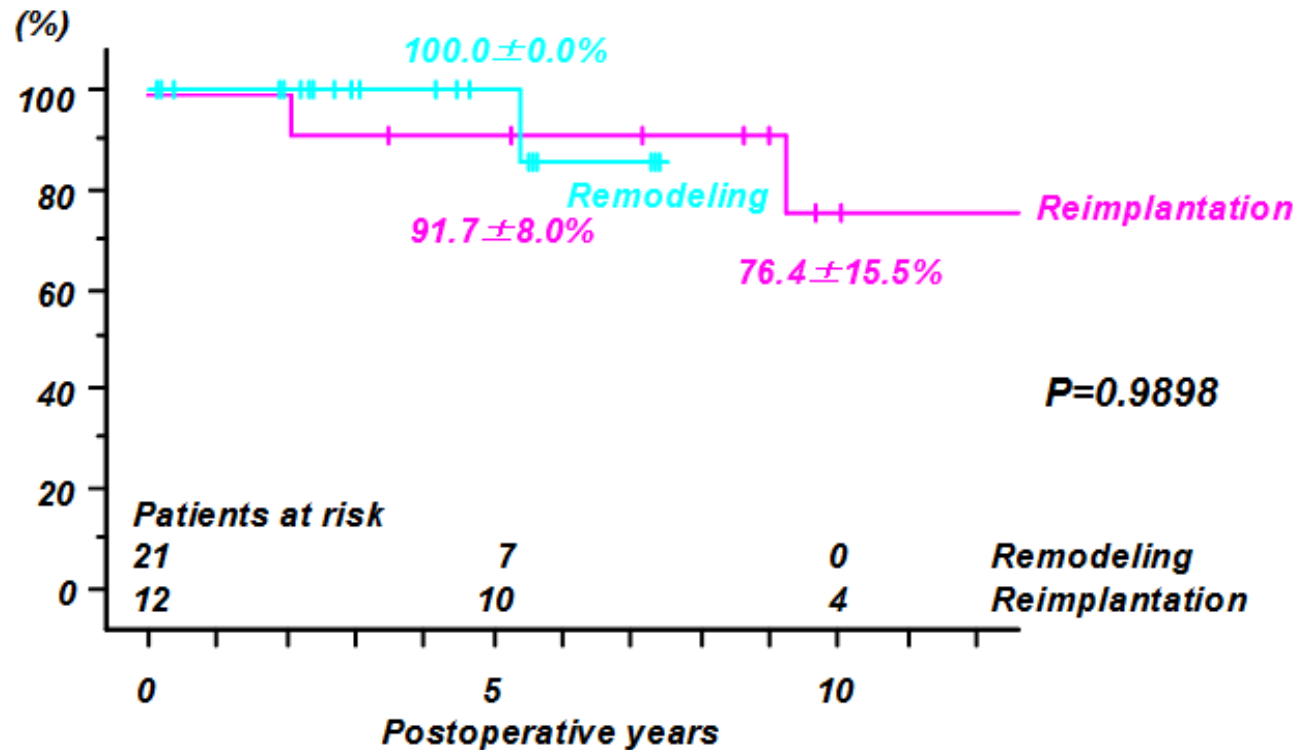
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Freedom from Reoperation of MFS





Root Remodeling and Aortic Valve Repair for Unicuspid Aortic Valve

Marco Franciulli, MD, Diana Aicher, MD, Tanja Rädle-Hurst, MD, Hiroaki Takahashi, MD, PhD, Svetlana Rodionycheva, MD, and Hans-Joachim Schäfers, MD, PhD

preoperative patients characteristics (12/2007 and 11/2013)

	range	mean	median
<i>Gender(M/F)</i>		23/2	
<i>Age (y)</i>	21-65	38±12	34
<i>AR (degree)</i>	2.5-3.5	2.9±0.3	3
<i>Preoperative gradient</i>			
<i>max (mmHg)</i>	6-74	21.4±17	20
<i>mean (mmHg)</i>	3-48	11.5±10	10
<i>diameter ascending aorta (mm)</i>	50-64	51±4	50
<i>Sinus diameter (mm)</i>	45-55	48±5	47



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Early Results:

- No death
- 92% AR 0; 8% AR I at discharge,
- systolic mean gradient of 6 ± 3 mmHg at discharge

Mid-term Results:

- No death
- No bleeding or thromboembolic events
- One endocarditis (healed with conservative treatment)

Valve stability:

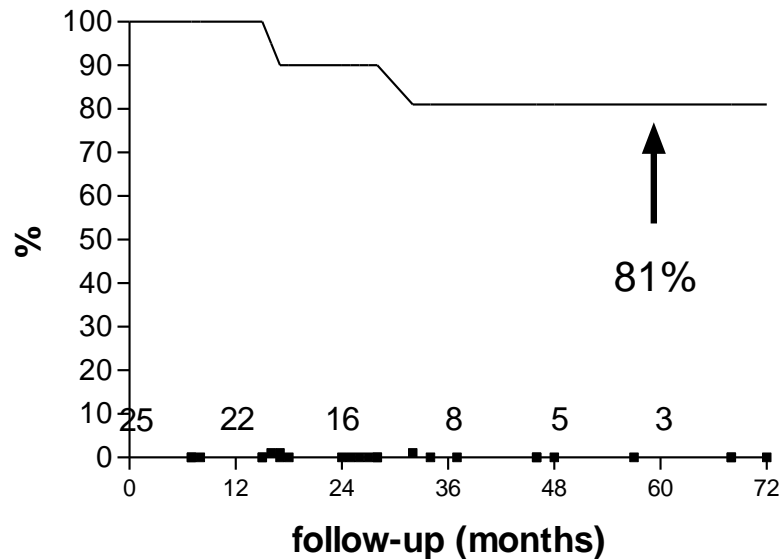
- 3 reoperations (2 suture dehiscence patch/cusp: no annular stabilization; 1 after endocarditis) biologic AV replacement (n=1); re-repair (n=2)
- Of 5 patients without annular support, 2 underwent reoperation (40%) versus 1 of 20 (5%) who were treated by suture annuloplasty.

Root Remodeling and Aortic Valve Repair for Unicuspid Aortic Valve

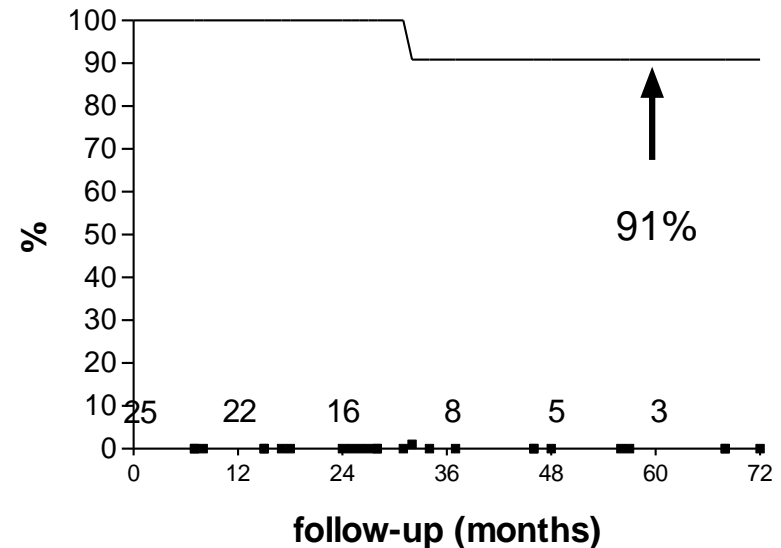
Marco Franciulli, MD, Diana Aicher, MD, Tanja Rädle-Hurst, MD, Hiroaki Takahashi, MD, PhD, Svetlana Rodionycheva, MD, and Hans-Joachim Schäfers, MD, PhD

Results:

freedom from reoperation



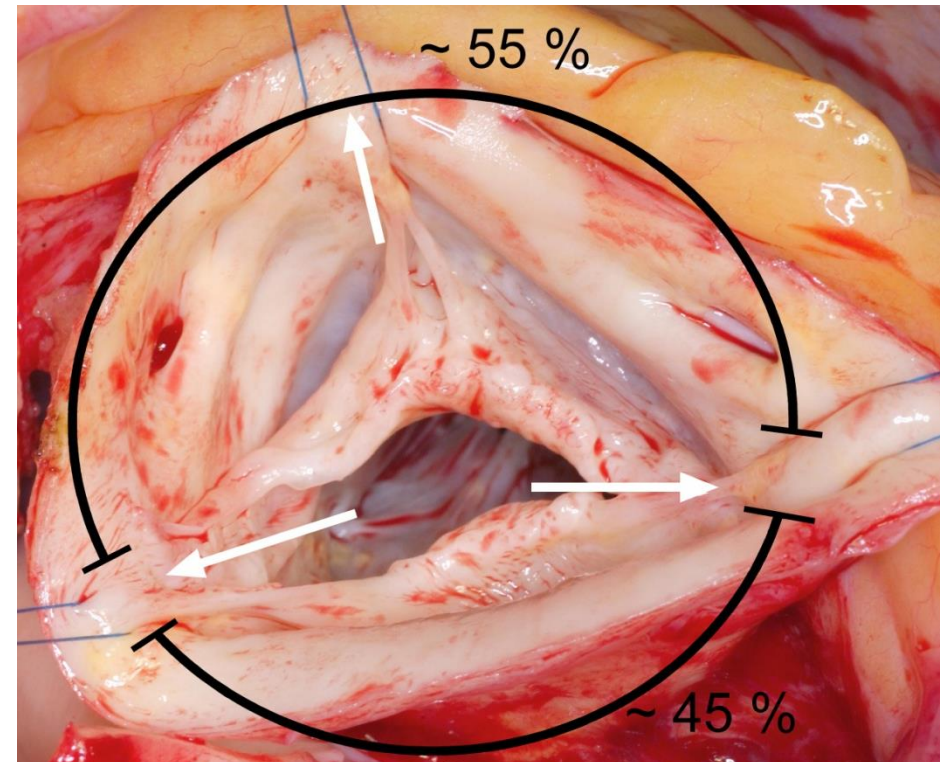
freedom from valve replacement



Cumulative follow-up 677 months (mean 27 ± 18 months)

Advantages of Remodeling

- Identical valve stability compared to reimplantation
- Shorter ischemic time
- Individual anatomy in different morphologies (asymmetry regarding position of the coronary ostias and depth of the sinuses) can be easily adapted by remodeling
- Preserved aortic distensibility



Aortic valve insufficiency due to aortic dilatation: correction by sinus rim adjustment

ROBERT W. M. FRATER, MB.Ch.B., M.S., F.R.C.S., F.A.C.S., F.A.C.C.

ABSTRACT Idiopathic dilatation of the aortic root may commonly cause chronic insufficiency of the aortic valve. In these patients the cusp and sinuses are normal or virtually normal in area and pliability and the coronaries are not displaced. The insufficiency in these patients may be totally corrected by an adjustment of the intercommissural distance at the sinus rim level. The dilated ascending aorta is dealt

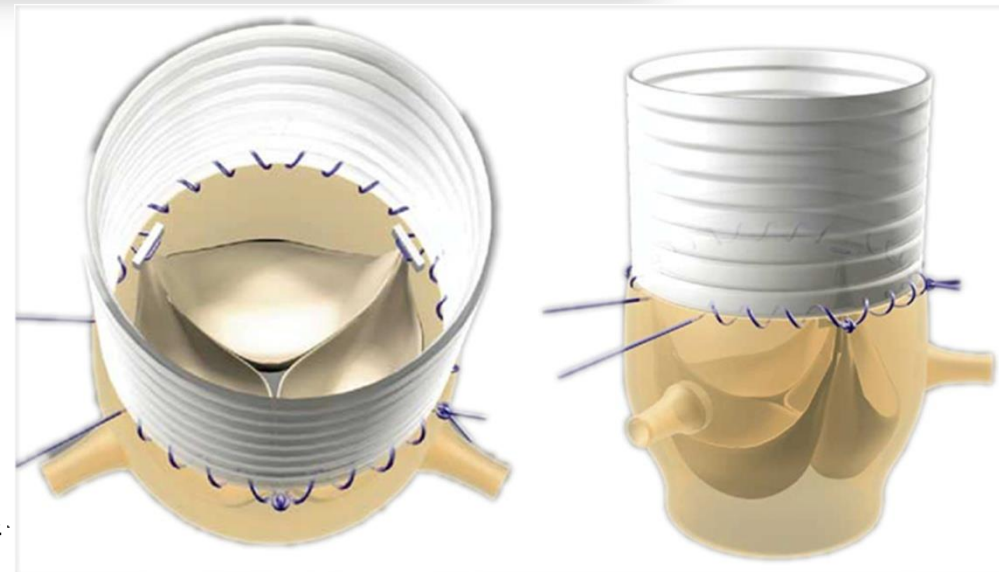
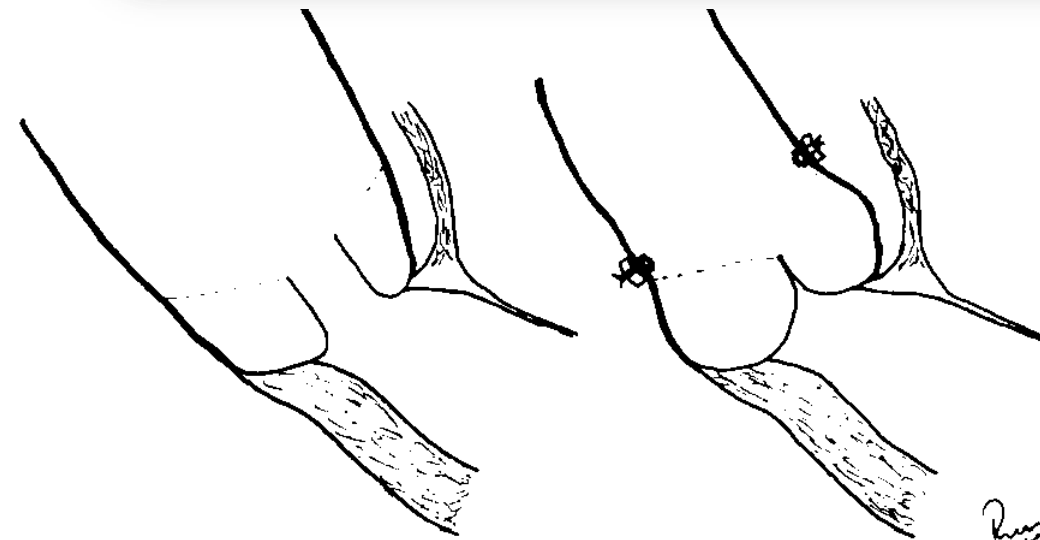


FIGURE 4. *Left*. The sinus rim is fixed in a systolic position. *Right*. The sinus rim reestablished in a diastolic position



Mid-term results after sinutubular junction remodelling with aortic cusp repair[†]

Mitsuru Asano, Takashi Kuniyama, Diana Aicher, Hazem El Beyrouti, Svetlana Rodionychewa,
and Hans-Joachim Schäfers*

Patients characteristics

n	144
Age (years)	56.0 ± 17
Male, n (%)	103 (71.5)
BSA (m ²)	1.95 ± 0.13
Left ventricular ejection fraction (%)	60.8 ± 13.0
Aortic regurgitation (grade)	3.2 ± 0.4
TAV (tricuspid)	58
Non –TAV (bicuspid /unicuspid)	86(59/27)

Diameter of aortic root (mm)

AVJ	27.3 ± 2.4
Sinus valsalva	36.8 ± 2.9
Sinutubular junction	30.7 ± 3.4
Ascending aorta	51.8 ± 6.1

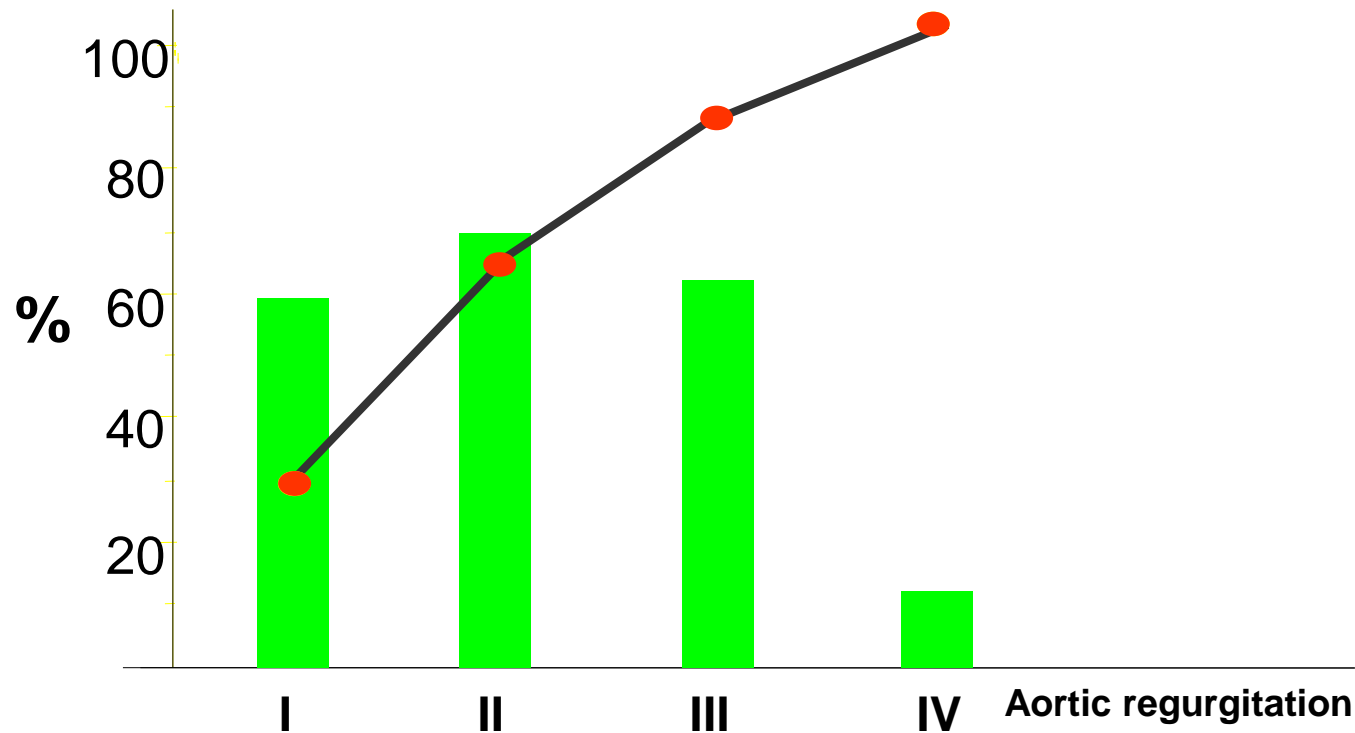


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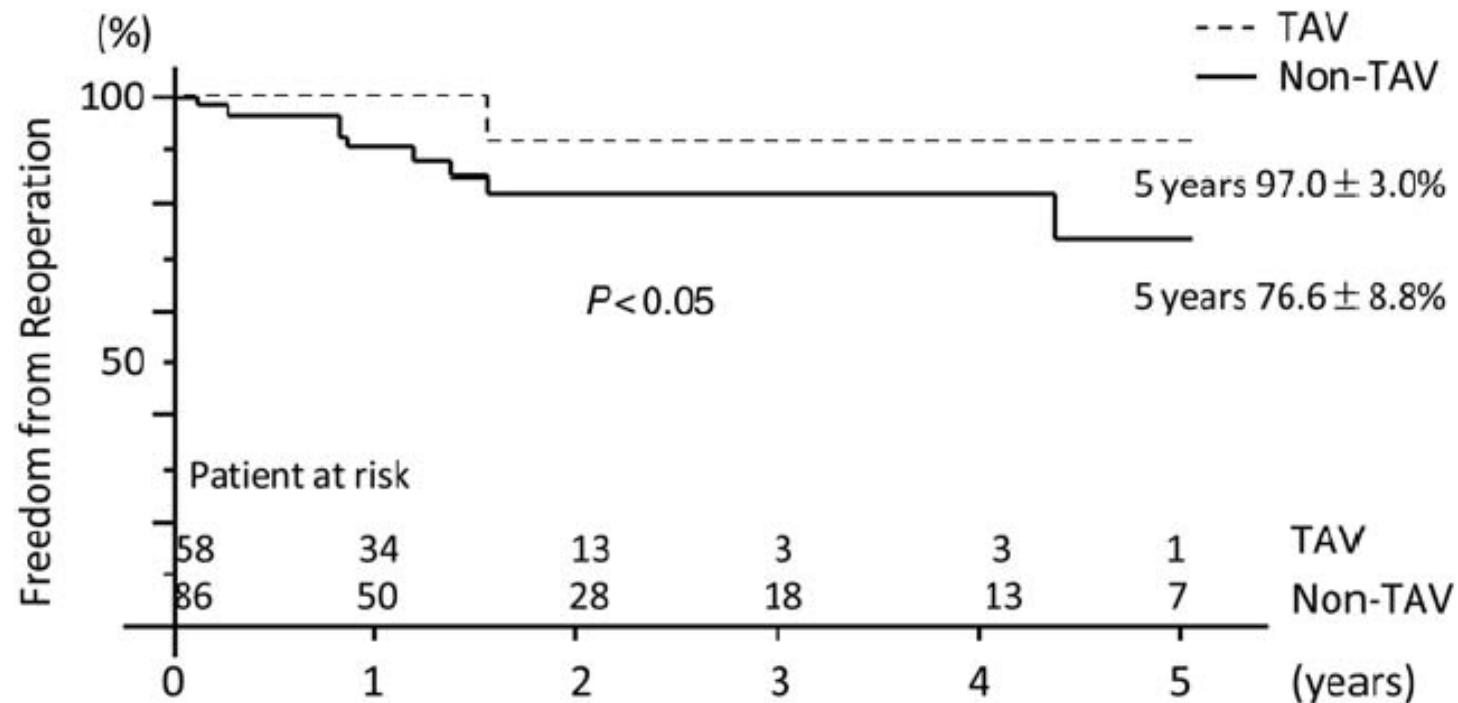
Correlation between cusp prolapse and aortic regurgitation

Cusp prolapse



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and Hans-Joachim Schäfers*

Table 4: Analysis of risk factors for reoperation

	Univariate	Multivariate	HR	95% CI
AVJ > 28 mm	<0.01	<0.01	11.647	2.506-54.134
Pericardial patch	<0.05	0.42		
Non-TAV	0.09	0.21		
Cusp placcation	0.10	0.14		
STJ > 30 mm	0.20	0.28		
Sinus valsalva >40 mm		0.53		

AVJ: aortoventricular junction; STJ: sinutubular junction; HR: hazard ratio; CI: confidence interval.



Conclusions

- Valve stability after root remodeling and reimplantation are identical - even in Marfan patients.
- STJ remodelling is a good option in patients with a preserved sinus.
- Additional cusp repair improves long-term results.