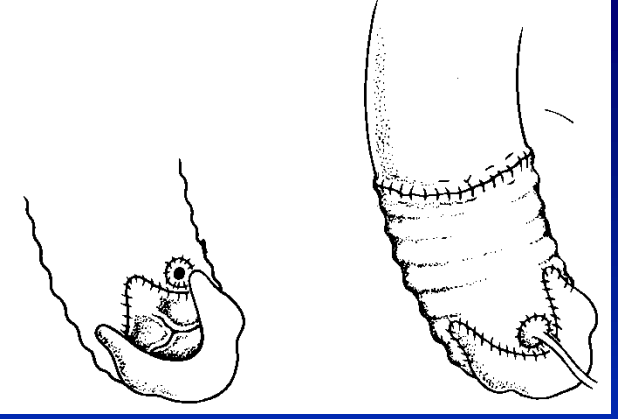
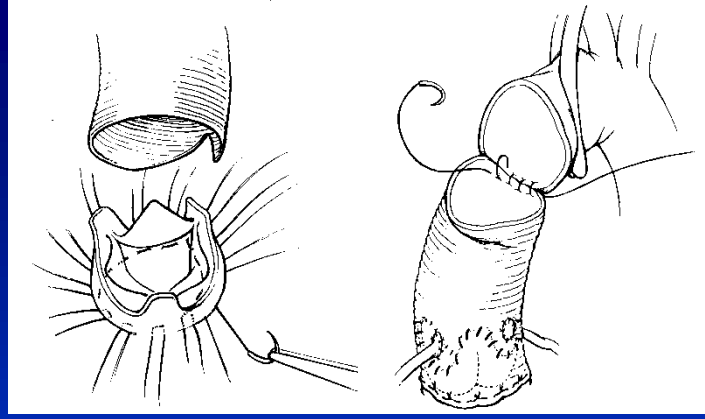
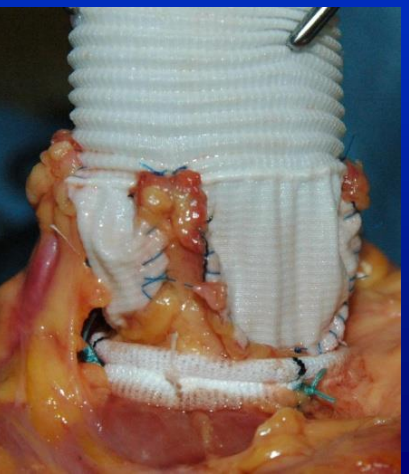




Always do a remodelling?



Emmanuel Lansac,

Isabelle Di Centa

Cardiac Surgery
Institut Mutualiste Montsouris,
Paris, France

Aortic Valve Sparing/repair

- 31 publications; surgery from 1968-2012
- N = 4,777 (21,716 pt yrs), mean pooled age 51 years, 71% male
- Bicuspid valve: 14% (range 0-33%)
- Acute dissection: 10% (range 0-37%)
- Severe (grade II-IV) AR: 46% (range: 6-100%)
- Remodeling (4 papers), reimplantation 15 papers, mixed 12 papers
- Operative mortality: 2.2%

	Linearized occurrence rate	95% CI
Late mortality	1.5%/yr	1.2-2.0%/yr
Reoperation	1.3%/yr	1.0-1.7%/yr
TE	0.4%/yr	0.2-0.8%/yr
Bleeding	0.2%/yr	0.1-0.4%/yr
MAVRE	1.7%/yr	1.2-2.2%/yr

Arabkhani et al. ATS 2015, in press

Remodeling or Reimplantation?

No clinical advantages in terms of survival and reoperation of Remodeling over Reimplantation

Annulus dilation = risk factor for repair failure

→ favor valve sparing root replacement providing an aortic annuloplasty :
-through proximal suture using the reimplantation technique
- or annuloplasty ring device in combination with the remodelling technique.

Arabkhani et al. ATS 2015, in press

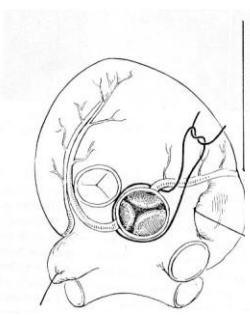
Goals for aortic valve repair

treat dilated aortic annulus and STJ Ø

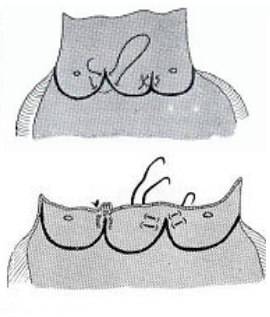
preserve root dynamics (neosinuses of Valsalva)

preserve expansibility (interleaflet triangles)

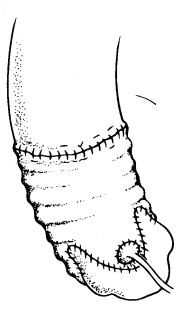
restore coaptation and effective height



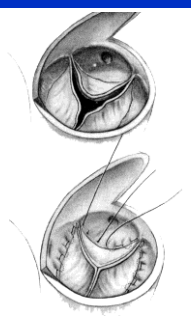
Taylor
1958



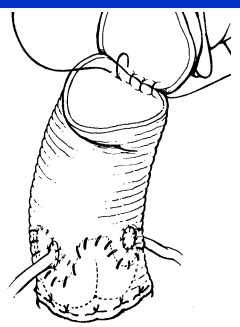
Cabrol
1966



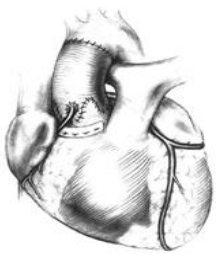
Yacoub
1983



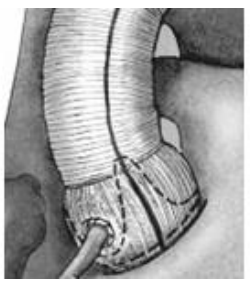
Carpentier
1983



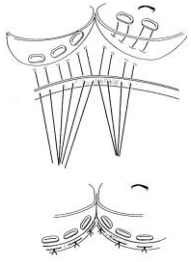
David
1992

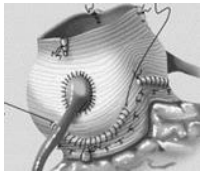


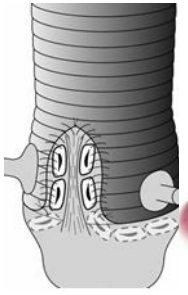
David III
1996

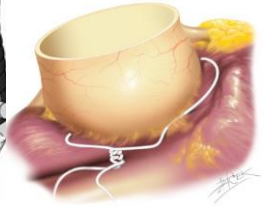


De Paulis
2001-2002









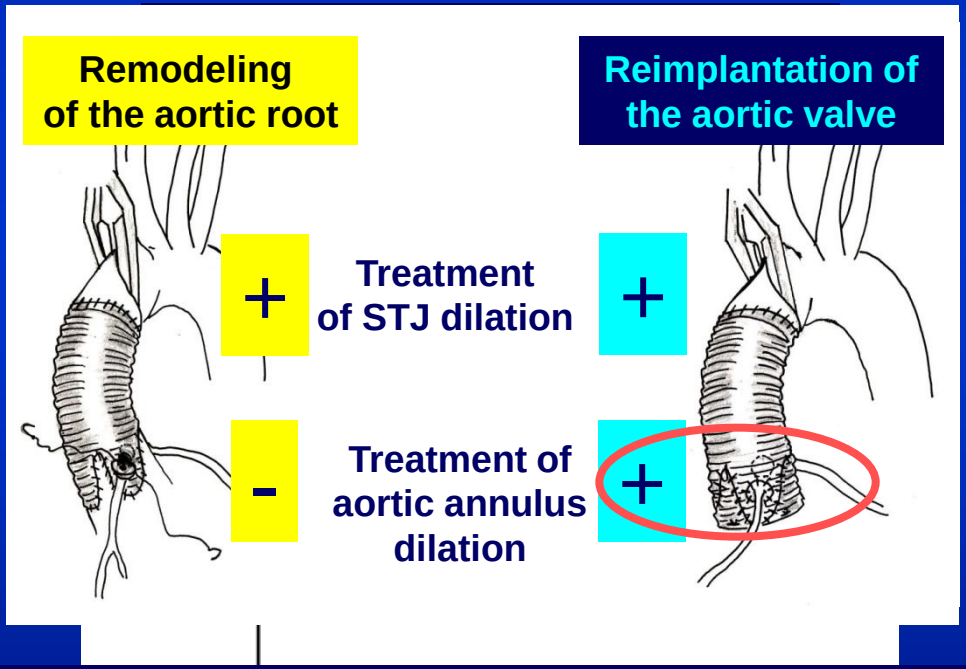
Izumoto
2002

Need for standardization

Rankin
2011

Aortic annuloplasty and valve sparing root replacement ?

Risk factor for failure of the Remodeling :
Annulus dilation >25-28 mm



Reimplantation performs a subvalvular annuloplasty

Remodeling alone is a contraindication if annulus>25 mm

Burkhart JHVD 2003 Lansac EJTCVS 2006 Hanke JTCVS 2009 David JTCVS 2010 Kunihara JTCVS 2011

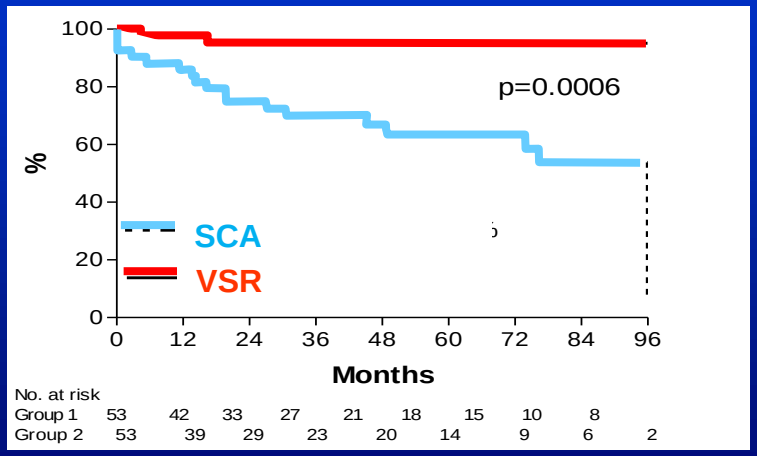
Dilated aortic annulus > 25 - 28 mm

Risk factor for failure

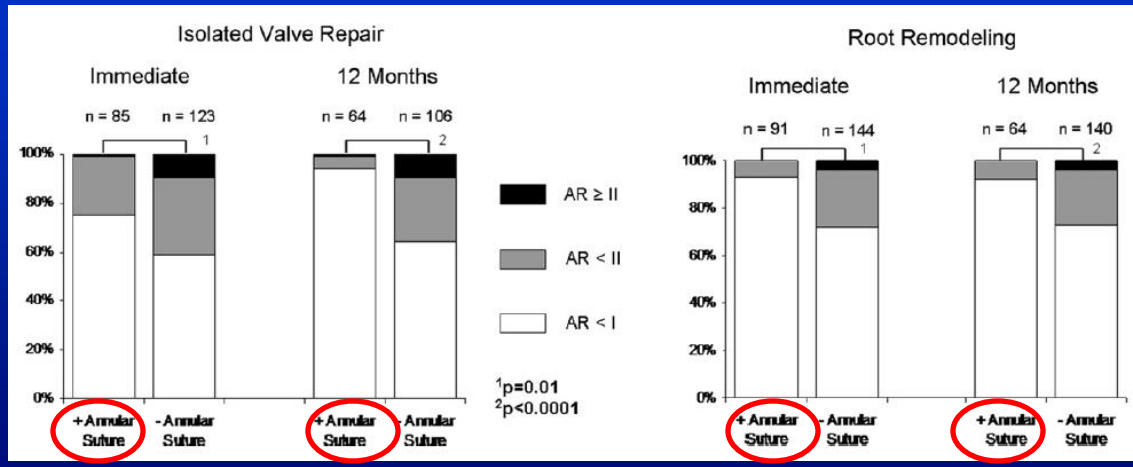
Luciani ATS 1999, Lansac EJTCS 2006, Hanke JTCVS 2008, de Kerchove JTCVS 2010, Schäfers JTCVS 2013, Navarra EJTCVS 2013, Aicher JTCVS 2013, Vallabhajosyula ATS 2014

Circumferential aortic annuloplasty improves the results

(External ring, proximal suture reimplantation, Annular stitch)

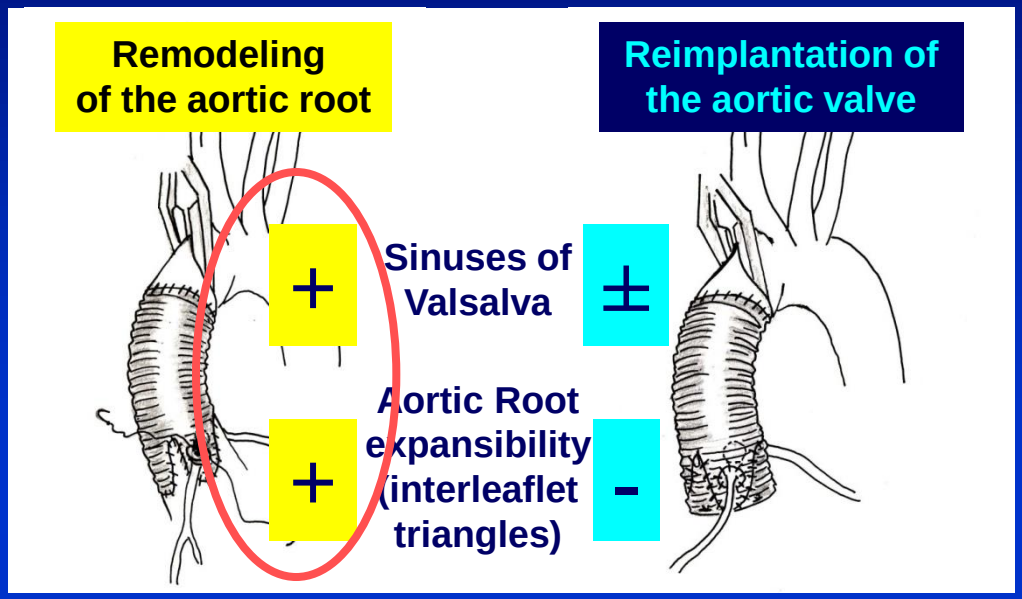


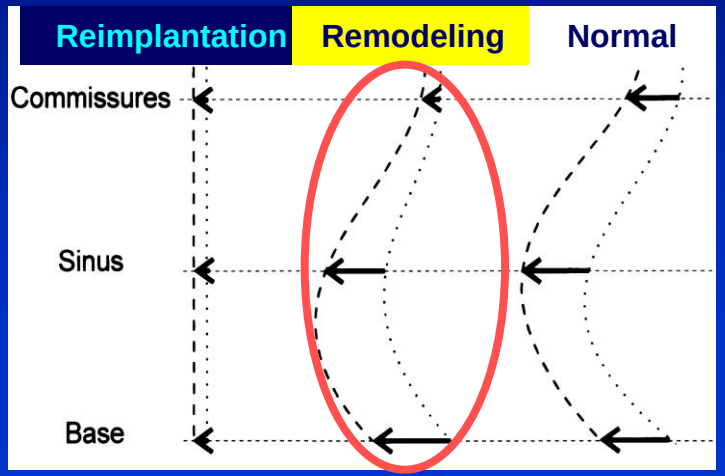
De Kerchove JTCVS 2011



Aicher JTCVS 2013

Aortic root dynamics after valve sparing





Leyh RG. Circulation 1999

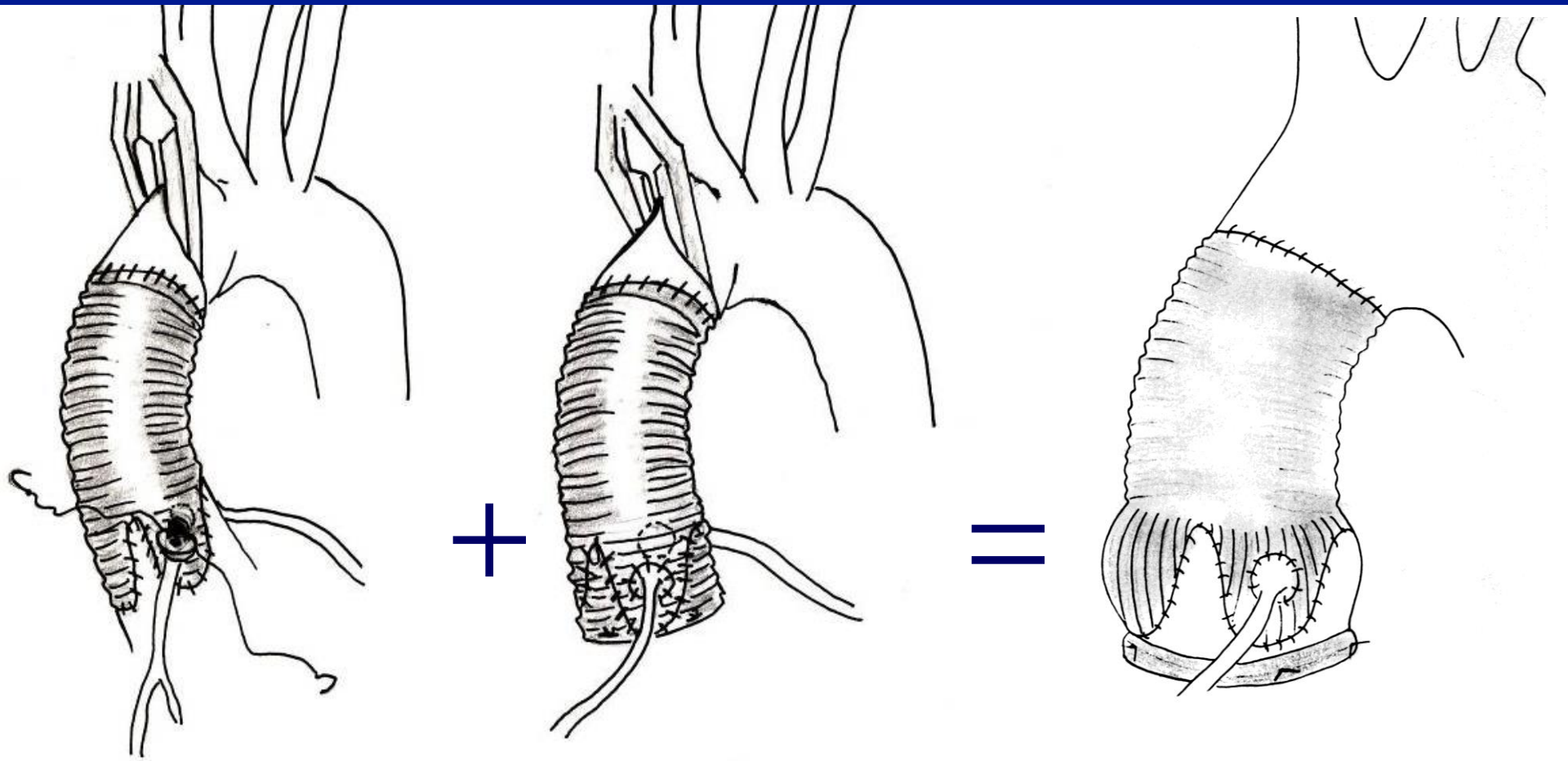
Cusp motion and expansibility of the aortic root are best preserved

1) after Remodeling than after Reimplantation

2) with graft with neo- sinuses of Valsalva than without

Remodeling provides the most physiological root reconstruction

Physiological and standardized approach to Valve Sparing Root Replacement



Remodeling more physiologic
RF failure annulus > 25 mm

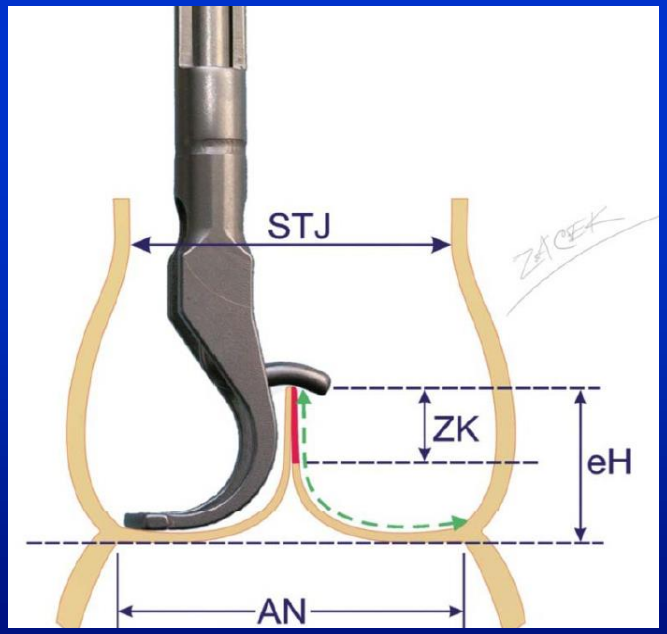
Remodeling +
subvalvular annuloplasty

Reasons for valve sparing failures

Cusp prolapse

Remodeling / Reimplantation → **Reduction of the STJ** → **Symmetrical prolaspse**

↓ eH : - 3 to - 4 mm



No eH resupension (Eye balling repair)

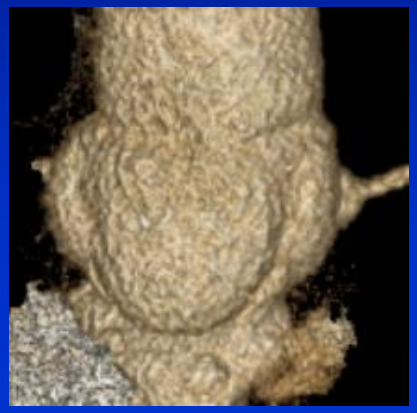
Risk factor for AI recurrence Reoperation

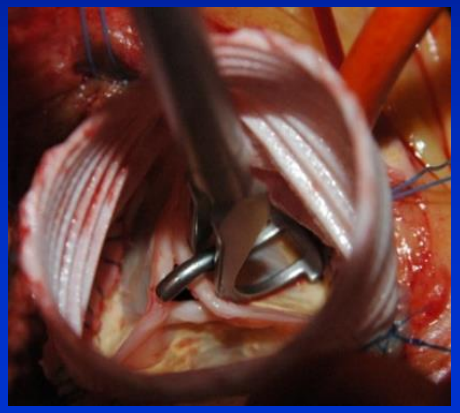
Lansac JTCVS 2010

Cusp eH resuspension

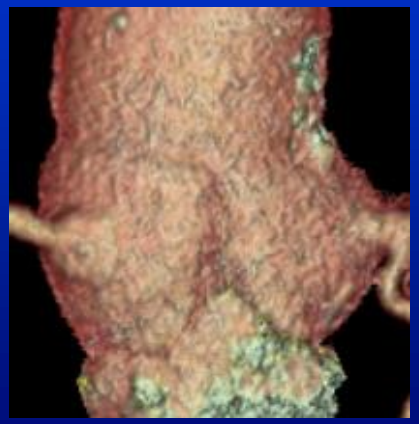
Soncini. MEP 2009
Bierbach EJTCVS 2010
Jeanmart ATS 2007
De Paulis 2010
Oka ATS 2011
Kunihara JTCVS 2011
Marom JTCVS 2012
Zacek with permission

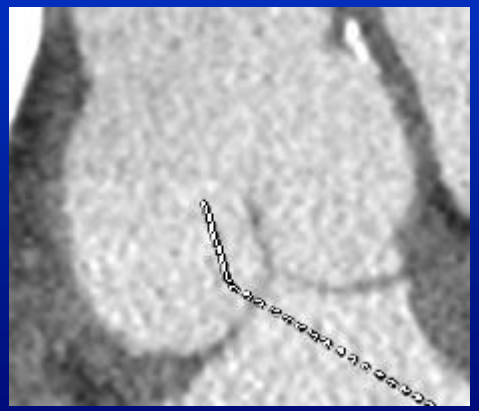
Moving from Valve Sparing to a standardized approach of Aortic valve REPAIR

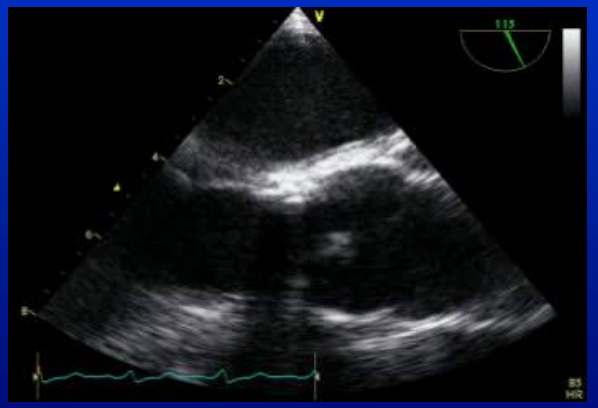




Physiological root Remodeling + **Resuspension of cusp effective height** + **Expansible aortic annuloplasty**

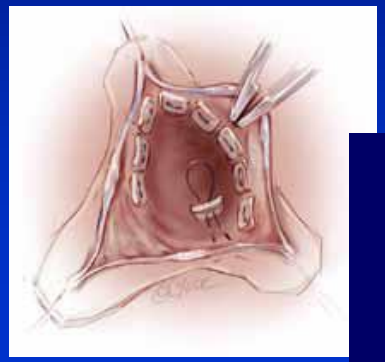


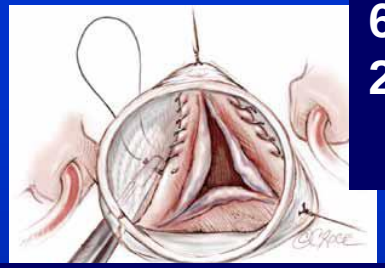




Remodeling + annuloplasty: advantages over Reimplantation?

Reimplantation





Selected cases
(AI ≤ Grade II)

6% of high risk patients
20 % of low risk patients

STS Database, EACTS 2013

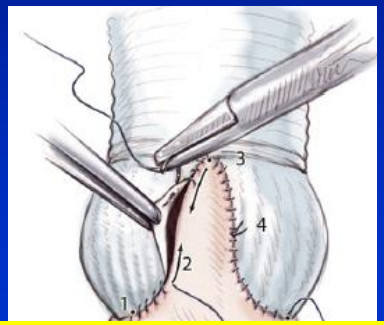
How high do I place the commissures ?
How do I place them circumferentially ?

Eye Balling
valve repair

3) Leaflets

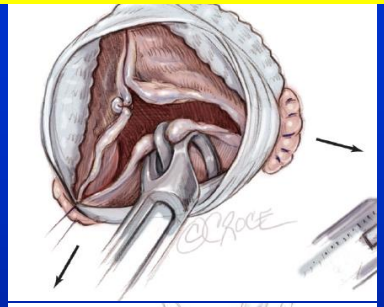
Remodeling + Ring

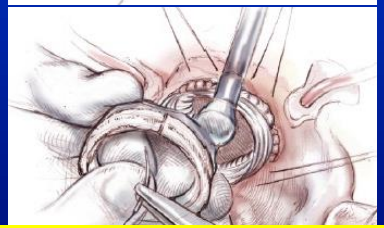
1) Root



3 commissures at the same level
And symmetrical circumferentially

2) Leaflets
(eH caliper)

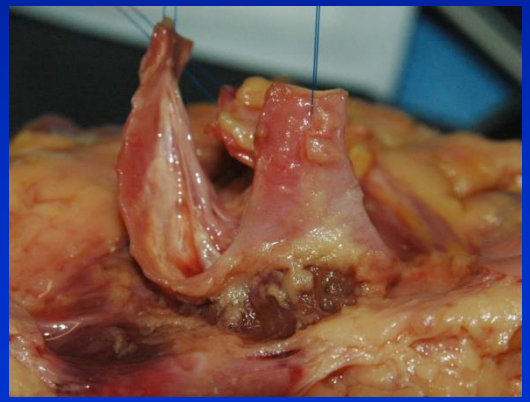


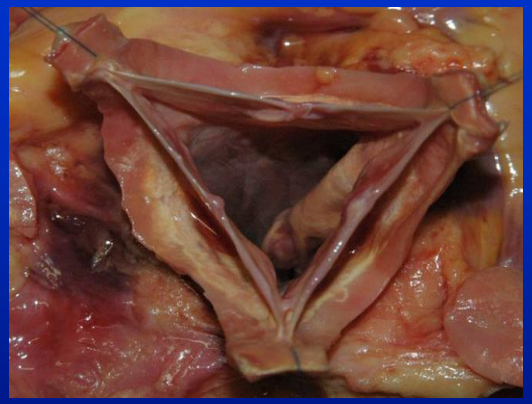


3) Annuloplasty

Standardize Valve repair
With a physiological root reconstruction

1.Dissection of the subvalvular plane



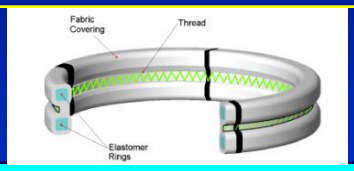


2. Inspection of cusp lesions
Geometric height

Retracted if <16 mm in tricuspid and <19 mm in bicupid

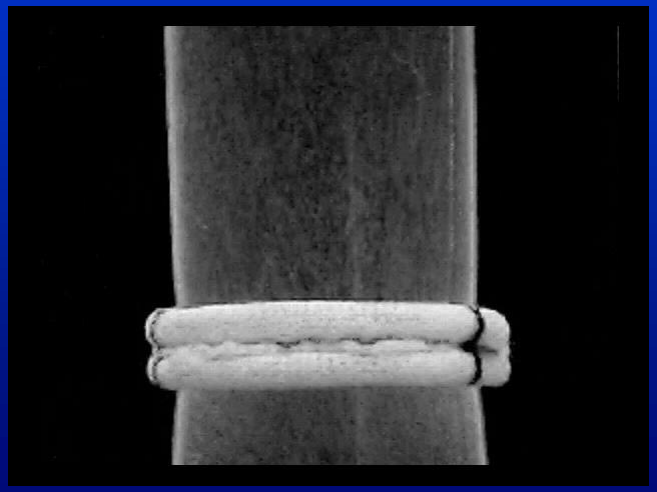
Schäfers et al., JTCVS 2013

Standardization based on aortic annulus Ø

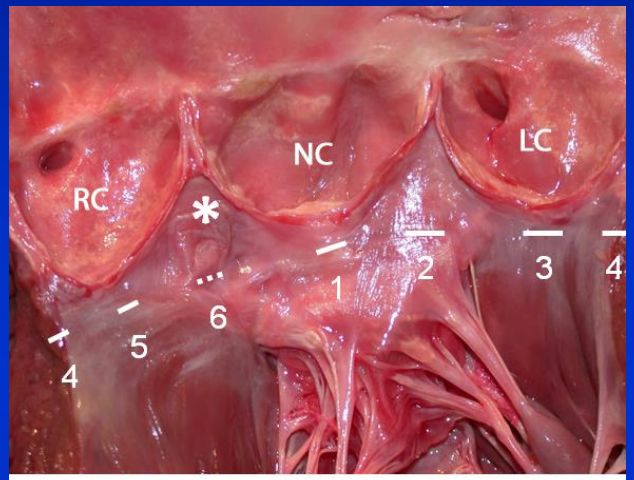


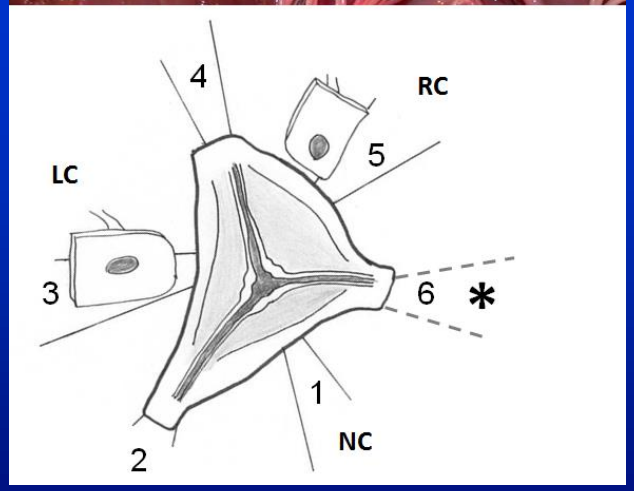
	Aortic annular base Ø (Hegar dilators, mm)				
	25-27	28-30	31-35	36-40	> 40
Valsalva graft® Ø (mm)	26	28	30	32	34
Extra aortic ring® Ø (mm)	25	27	29	31	33

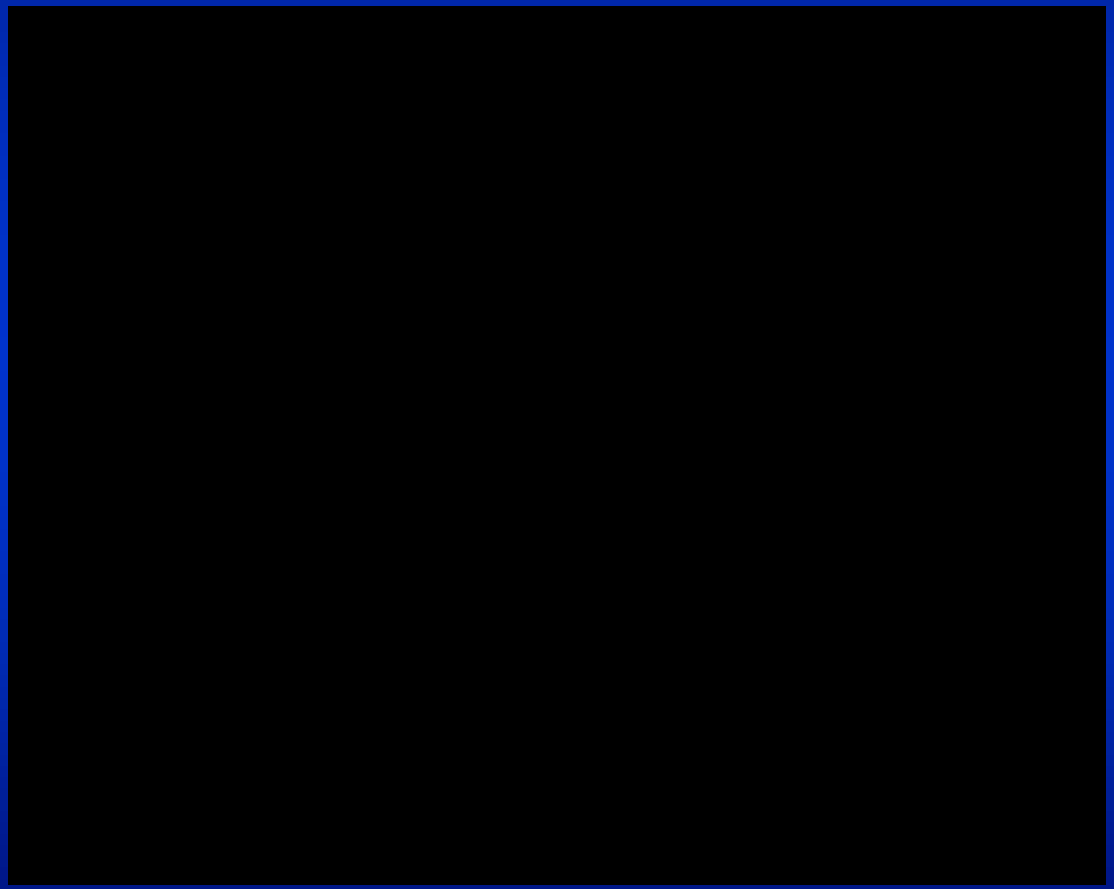
Subvalvular ring = down size from one size



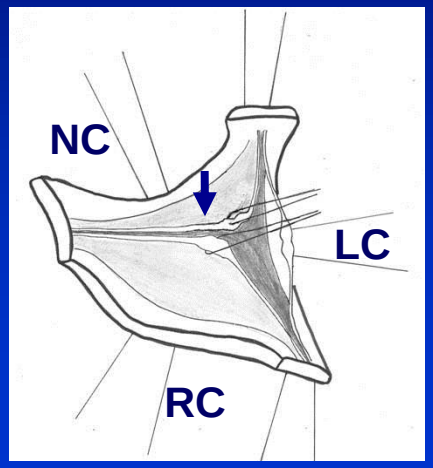
3. 6 subvalvular « U » stitches

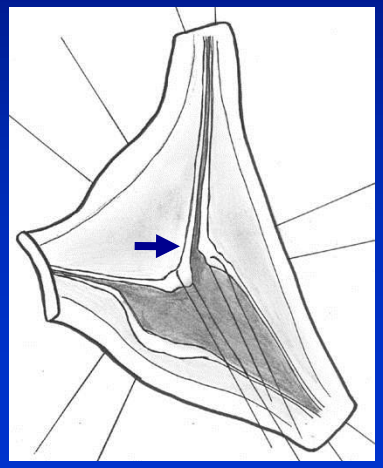


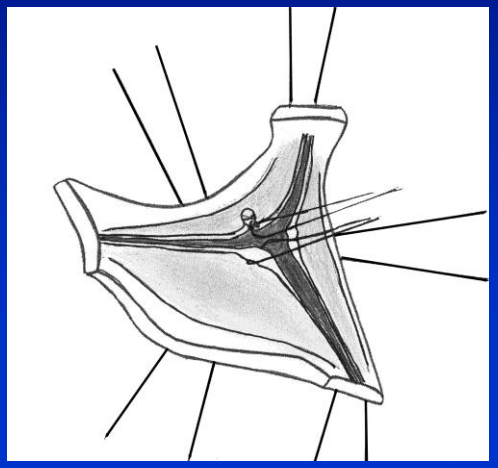


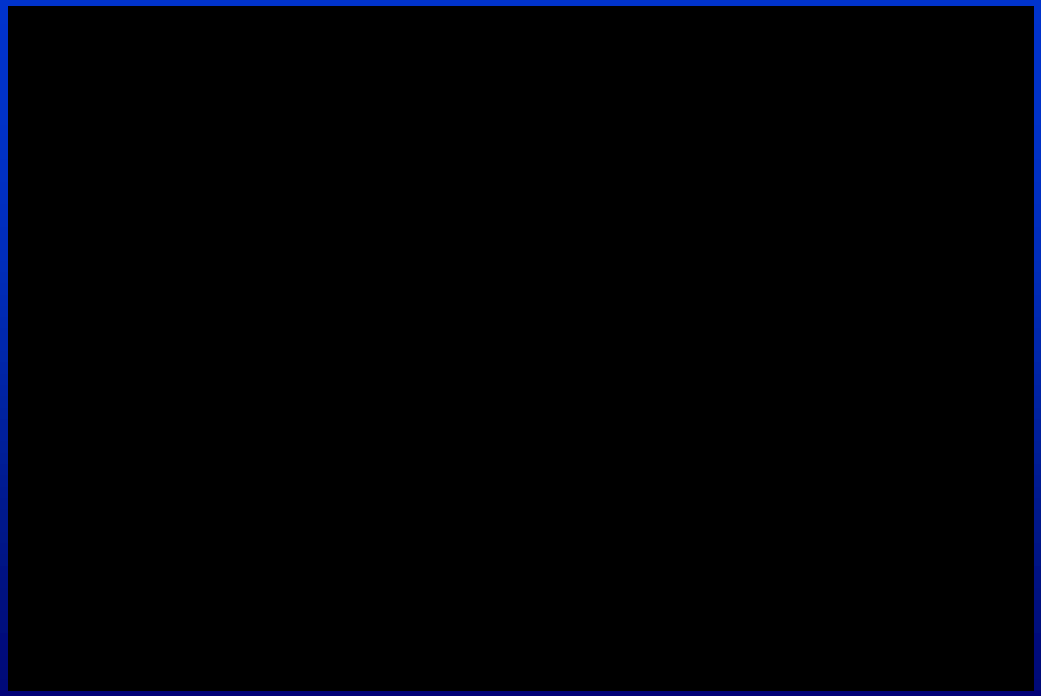


4. Aligment of cusp free edges <u>prior</u> Remodeling



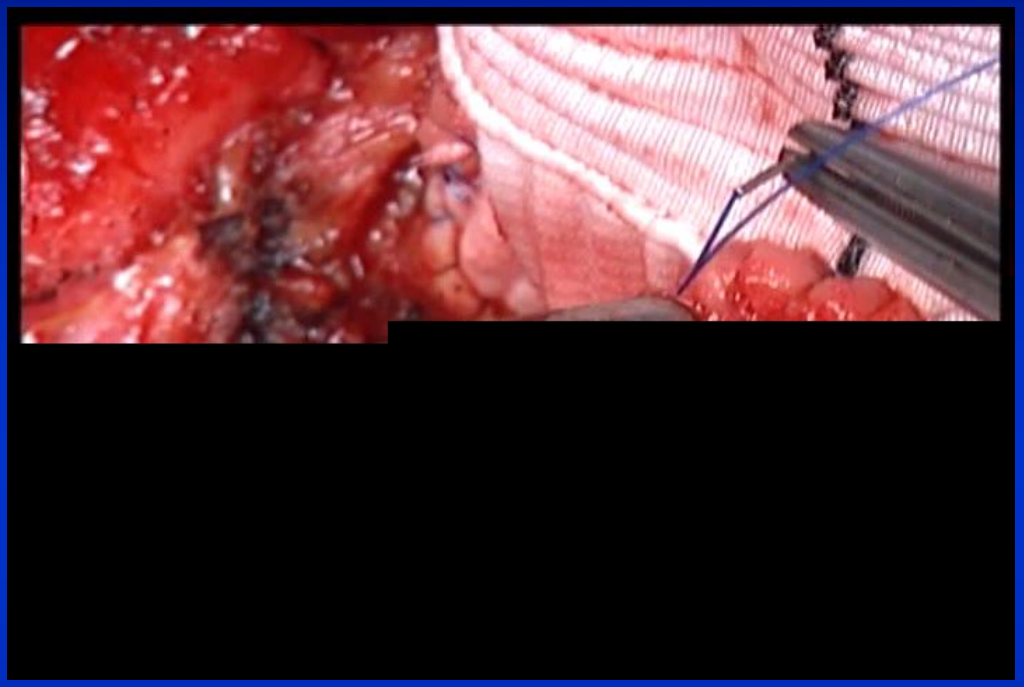


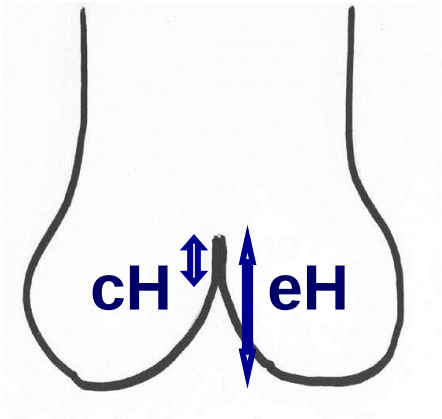


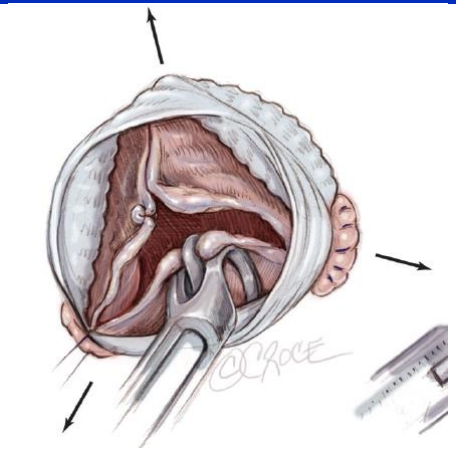


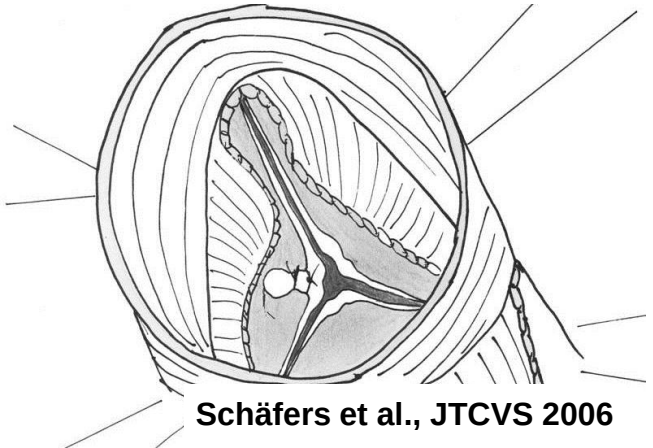
5. Suture of the Remodeling

6. Cusp resuspension <u>after</u> the Remodeling (effective height 9 mm)



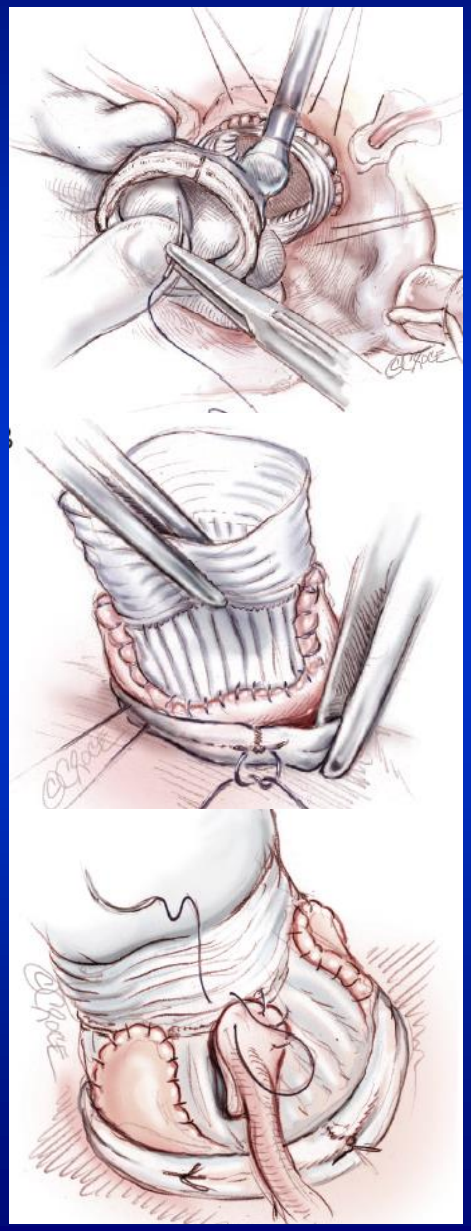






Schäfers et al., JTCVS 2006

7. Subvalvular ring implantation



700 Aortic valve repair using an external aortic ring

IMM series
238 patients
(In process)

Operative mortality 1.2%

Survival 97%, freedom from reoperation 95% at 10y

80 % freedom from AI>1 and 95% from AI>2 à 10y

Bicuspid 40%, no differences with tricuspid or phenotype

CAVIAAR Trial
JTCVS 2015

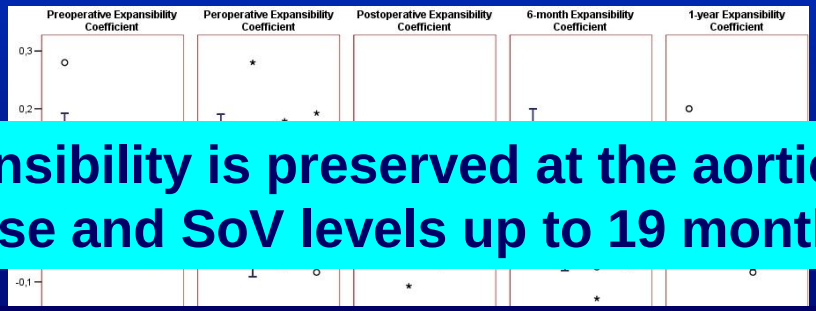
130 valve repair versus 131 CVG

30 days mortality 3.8% in each group

Despite longer crossclamp times and a learning curve in the REPAIR group, there is no increase in post operative morbi-mortality compared to CVG group

At 30 days, REPAIR group showed a trend towards reduce Major Adverse Valve Related Events compared to CVG group (3.8% versus 9.2%, p<0.08)

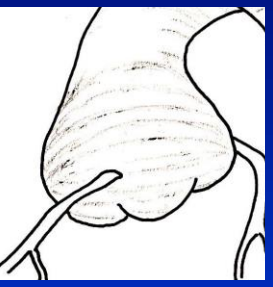
Root dynamics study (60 pts)
EJTCVS 2015



Expansibility is preserved at the aortic annular base and SoV levels up to 19 months (1-64)

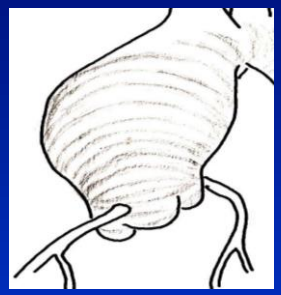
Independently of age and bicuspid valve

Pliable bicuspid and tricuspid valves



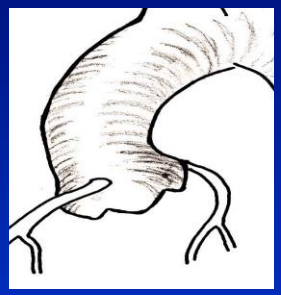
Aortic root aneurysm

Valsalva ≥45 mm



Supra-coronary aneurysm

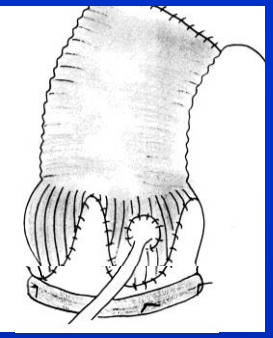
Valsalva<40 mm



Isolated AI

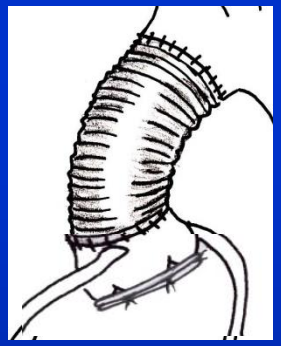
all Ø < 40 mm

Standardized approach according to phenotypes



Remodeling

+ subvalvular annuloplasty



Supra-coronary graft

+ subvalvular annuloplasty

(annulus > 25 mm)

Supra-valvular annuloplasty

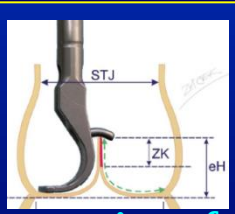
(STJ> 35 mm)

Subvalvular annuloplasty

(annulus> 25 mm)

Cusp repair

Alignment of the cusp free edges



Resuspension of cusp effective height

+

Subvalvular external aortic annuloplasty

AVIATOR

Open Prospective International Multicenter Registry

Isolated AI and/or ascending aorta aneurysm
Candidates for Aortic valve repair / sparing

Surgical indication

No → **Medical Registry**
(In process)

Yes → **Surgical Registry**
Aortic valve Repair / sparing and Replacement

Evaluation of the Guidelines

Evaluation of the results

The Heart Valve Society
An International Heart Team. Leaders in Evaluation, Management & Research.

Open to all center, Join us!

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