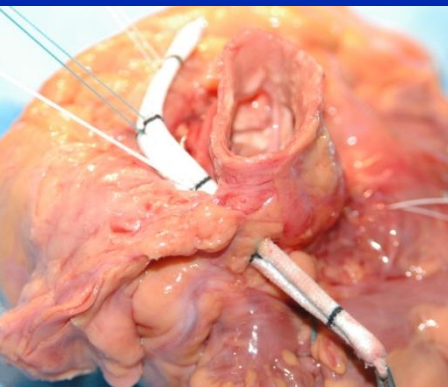


The aorto-ventricular junction in aortic repair

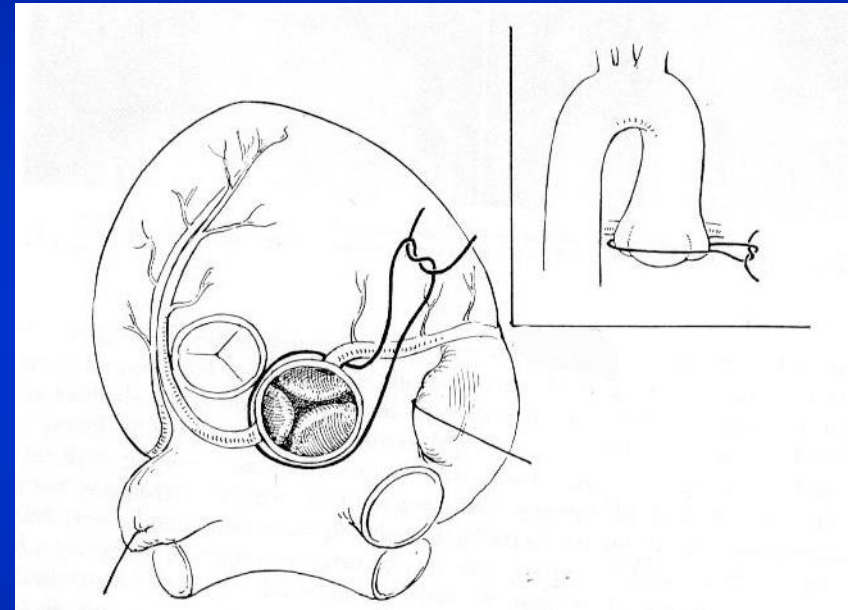
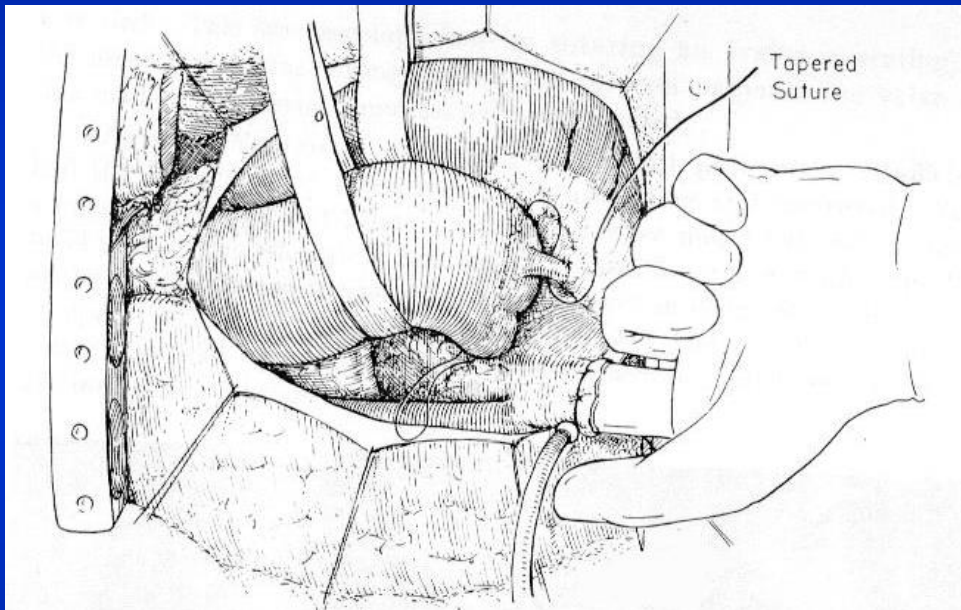
Emmanuel Lansac,
Isabelle Di Centa

Cardiac Surgery
Institut Mutualiste Montsouris,
Paris, France



The surgical correction of aortic insufficiency by circumclulsion

Taylor WJ, et al. JTCVS 1958;35:192-231



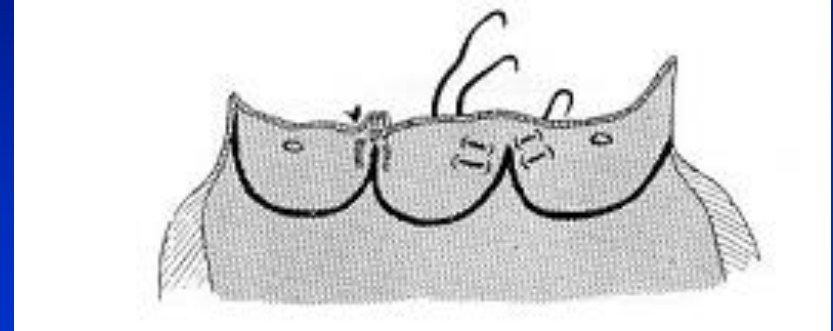
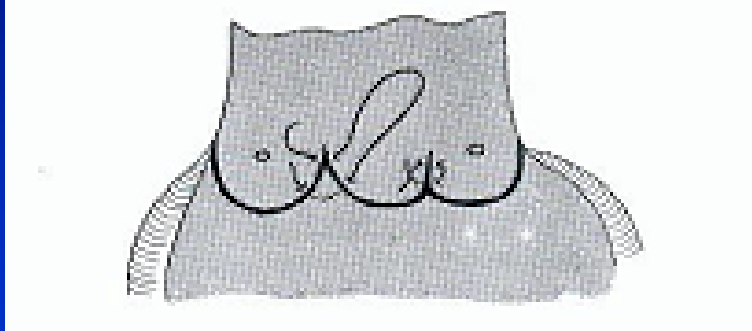
First subvalvular aortic annuloplasty

Beating Heart Right thoracotomy

11 patients, rheumatic disease (8/11)

Subcommissural plication stitches

(Cabrol stitches 1966)



Plicating U stitches at the base
of the interleaflet triangles

Plicating U stitches at the
commissures

= partial subvalvular annuloplasty

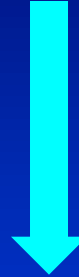
= partial supra-annular annuloplasty

Plication of the interleaflet triangles impairing valve dynamics
especially for bicuspid valves \Rightarrow significant gradient
minimal reduction in aortic annular base diameter

Useful to protect a commissural repair or as a bailout
technique

Dilated aortic annulus > 25 - 28 mm

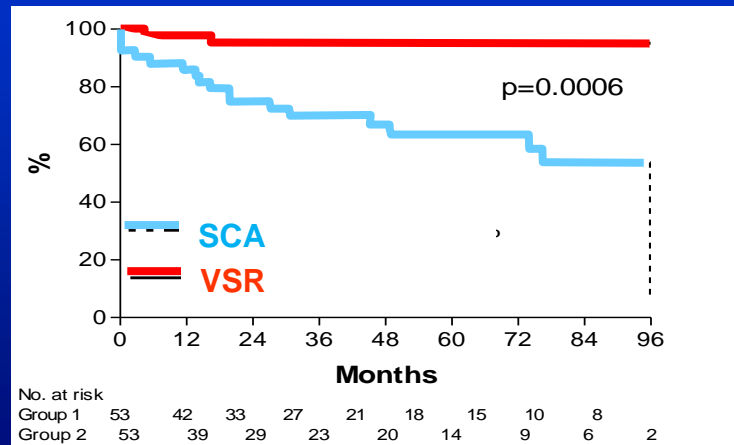
Risk factor for failure



Luciani ATS 1999, Lansac EJTCVS 2006,
Hanke JTCVS 2008, de Kerchove JTCVS 2010,
Schäfers JTCVS 2013, Navarra EJTCVS 2013,
Aicher JTCVS 2013, Vallabhajosyula ATS 2014
Fattouch ICVTS 2014, De Kerchove EJTCVS 2016

Circumferential aortic annuloplasty improves the results

(External ring, proximal suture reimplantation, Annular stitch)



Root for all ?

De Kerchove JTCVS 2011

2014 ESC Guidelines on the diagnosis and treatment of aortic diseases

Aortic valve repair, using the re-implantation technique or remodelling with aortic annuloplasty, is recommended in young patients with aortic root dilation and tricuspid aortic valves.

I

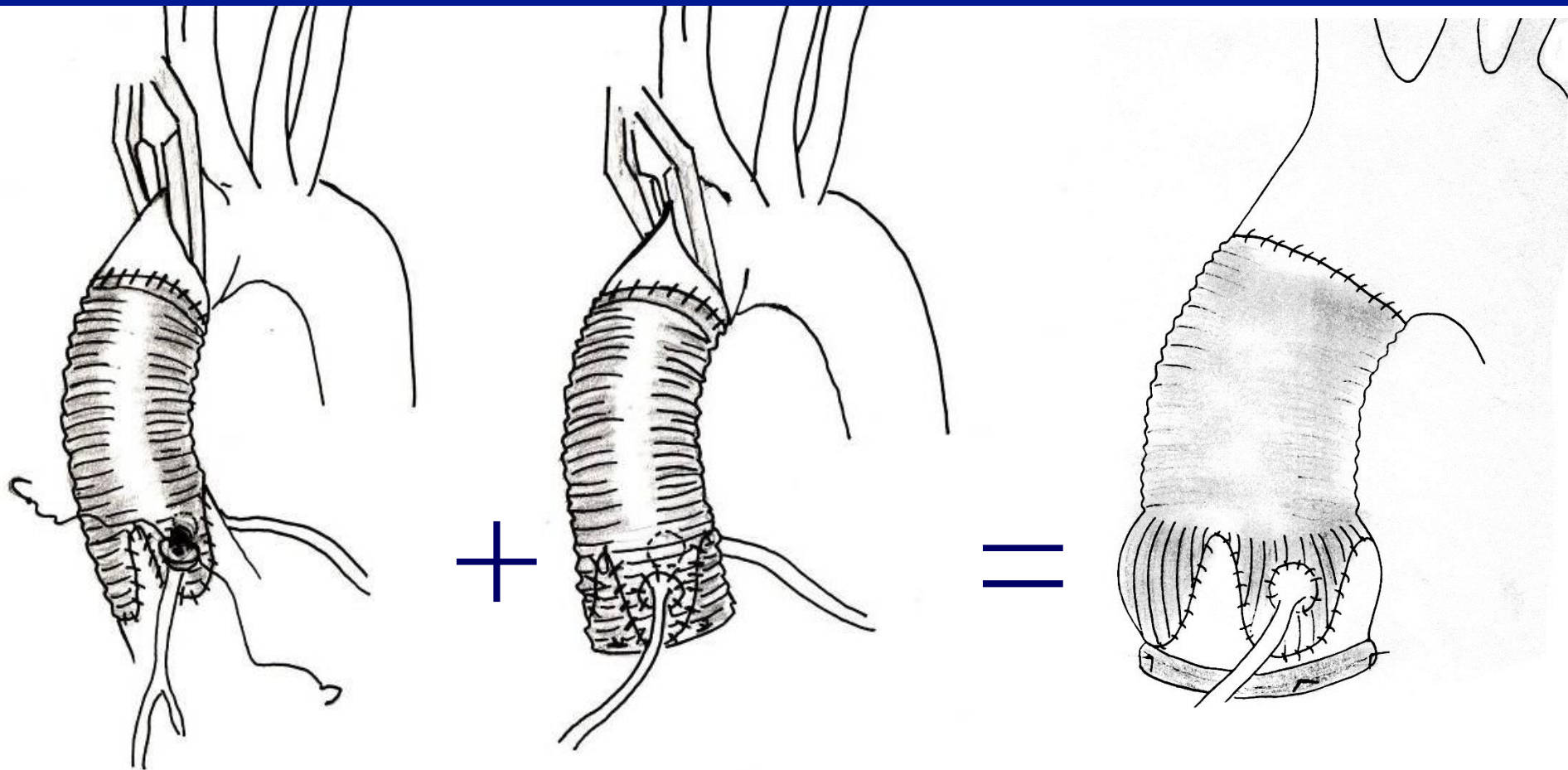
C

Rate of VSRR remains low over times (15% STS database)

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

80 % of Bentall procedure are for dystrophic AI

Physiological and standardized approach to Valve Sparing Root Replacement



**Remodeling
1983 Yacoub**

**Reimplantation
1992 David**

**Remodeling +
Aortic annuloplasty
2003**

Reasons for valve sparing failures

Cusp prolapse

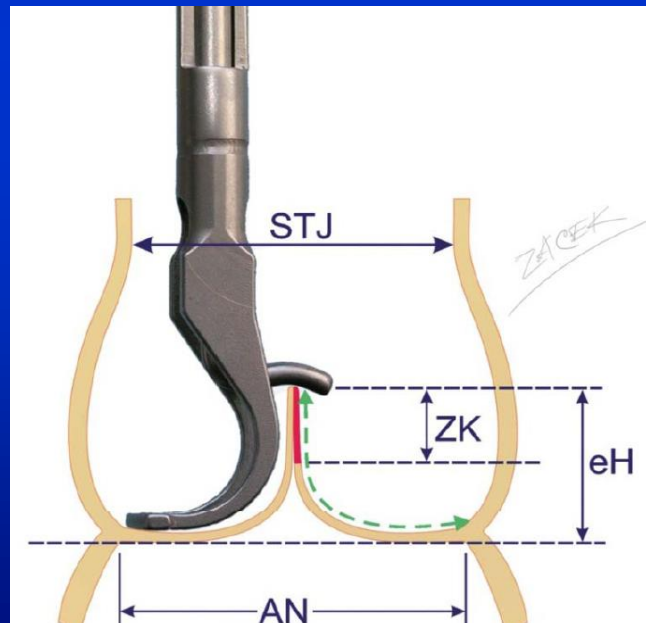
Remodeling /
Reimplantation

Reduction
of the STJ

Symmetrical
prolapse

↓ eH : - 3 to - 4 mm

Schäfers et al., JTCVS 2006



No eH resuspension
(Eye balling repair)

Risk factor for
AI recurrence
Reoperation

Lansac JTCVS 2010

Soncini. MEP 2009

Bierbach E JTCVS 2010

Jeanmart ATS 2007

De Paulis 2010

Oka ATS 2011

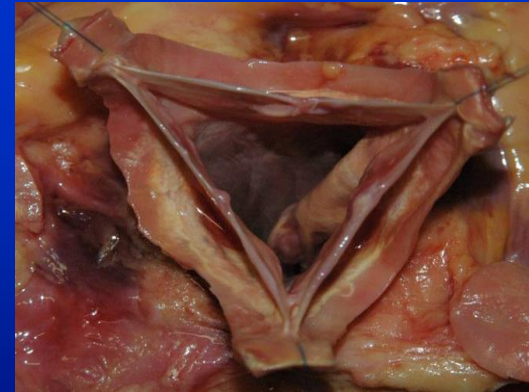
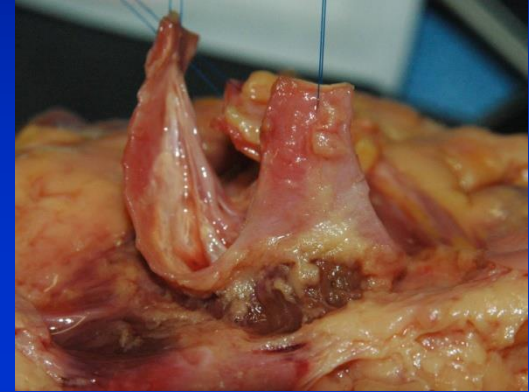
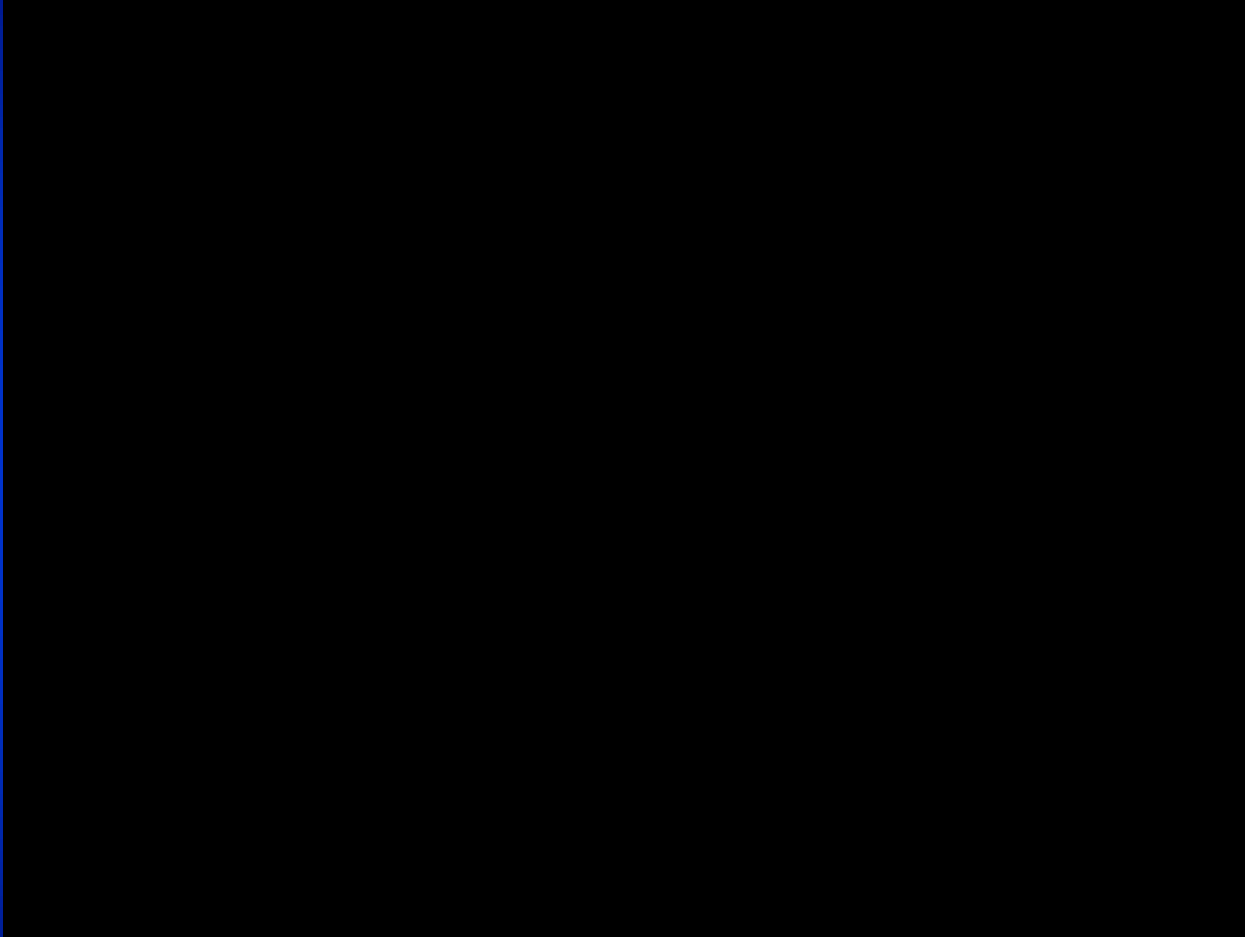
Kunihara JTCVS 2011

Cusp eH resuspension

Marom JTCVS 2012

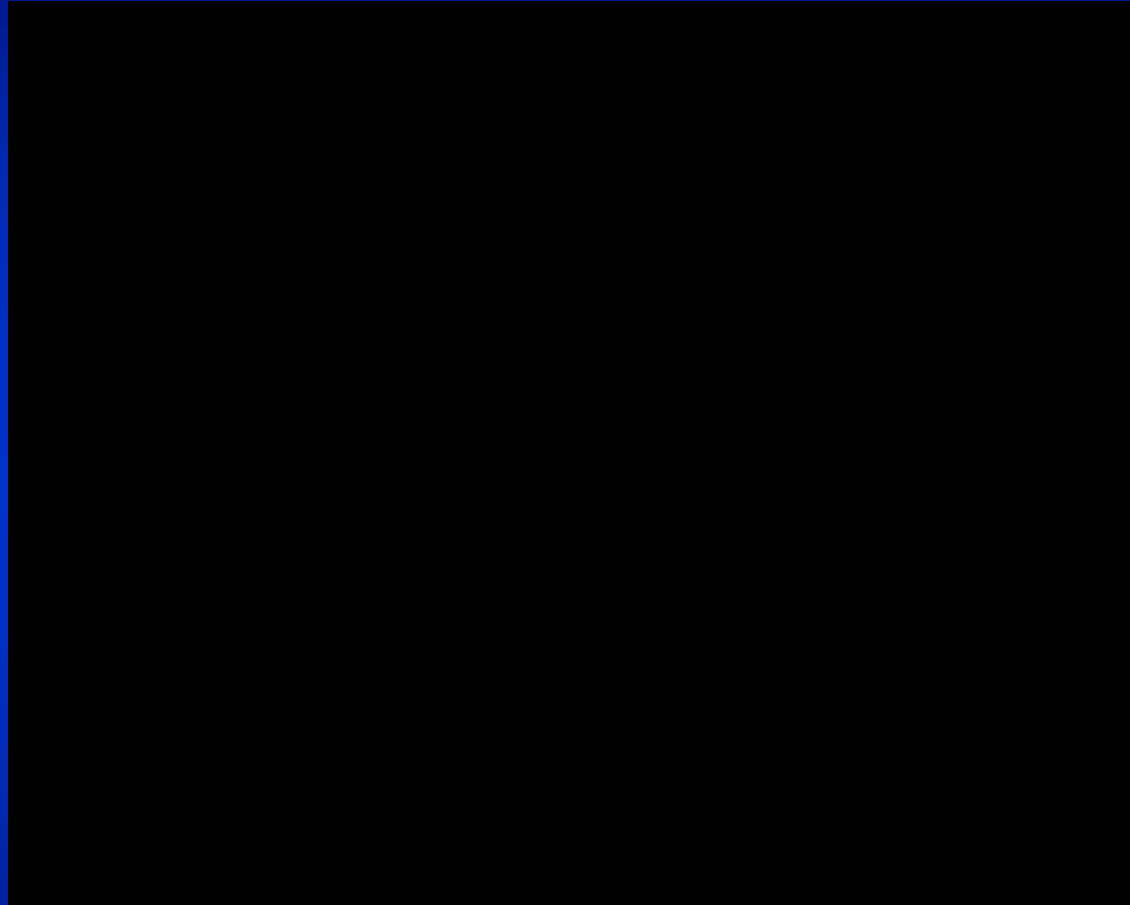
Zacek with permission

1. Dissection of the subvalvular plane



Inspection of cusp lesions

Geometric height

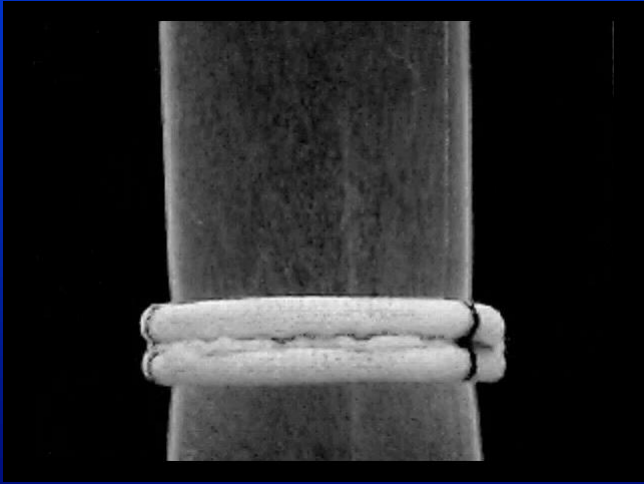


**Retracted if <16 mm in tricuspid
and <19 mm in bicupid**

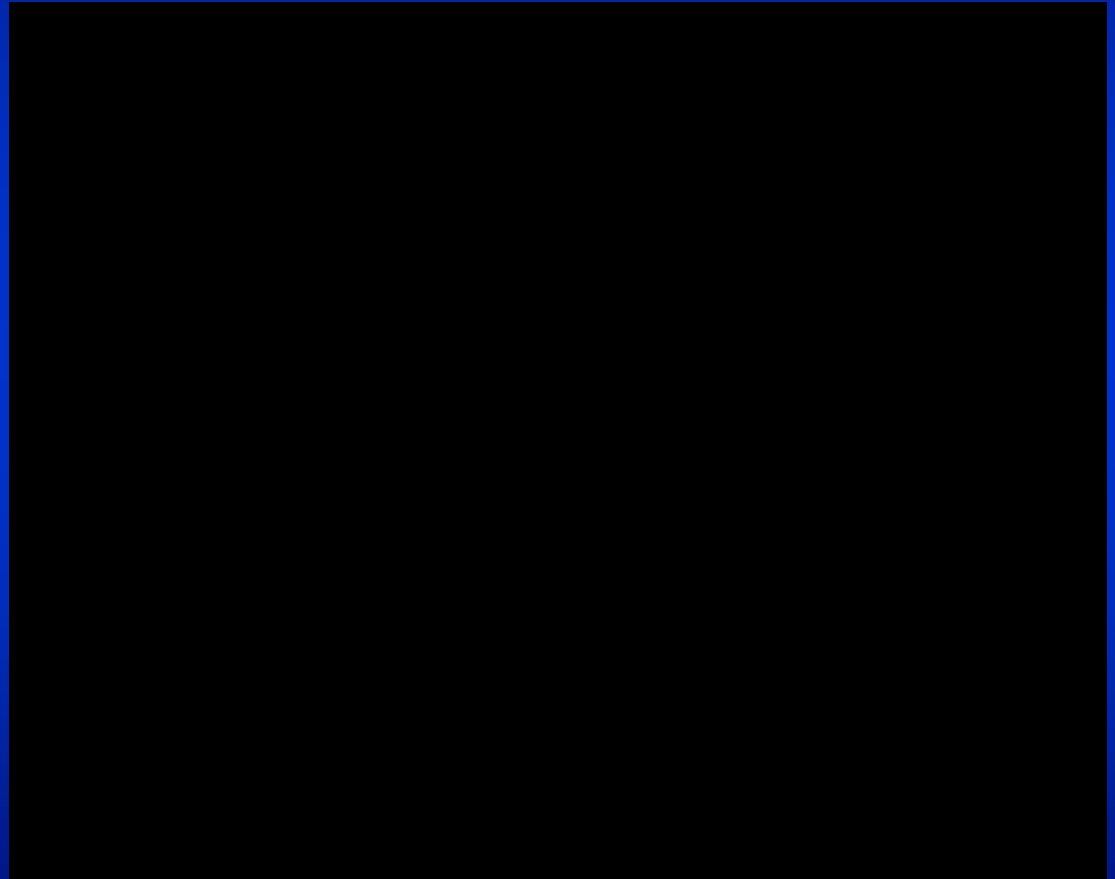
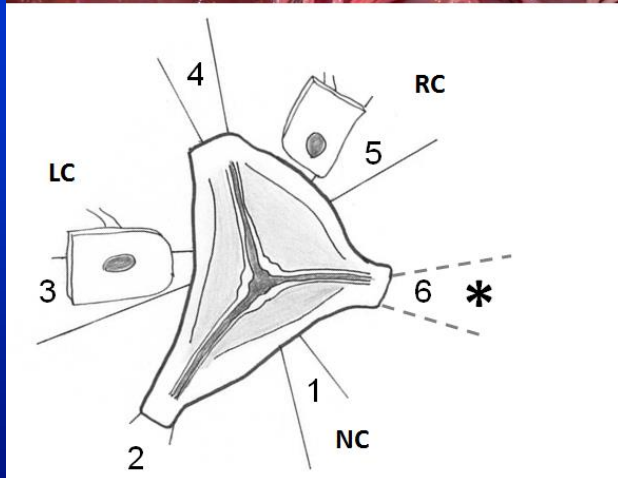
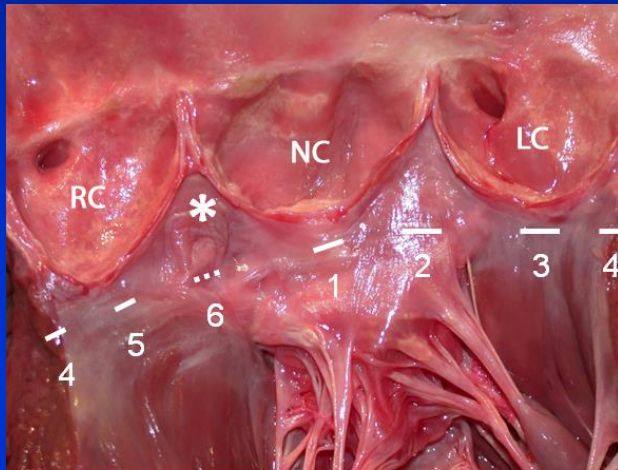
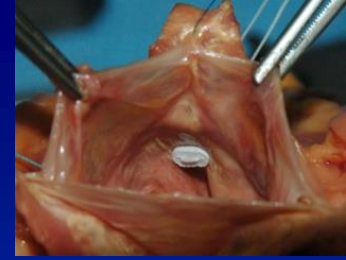
Standardization based on aortic annulus Ø

 	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

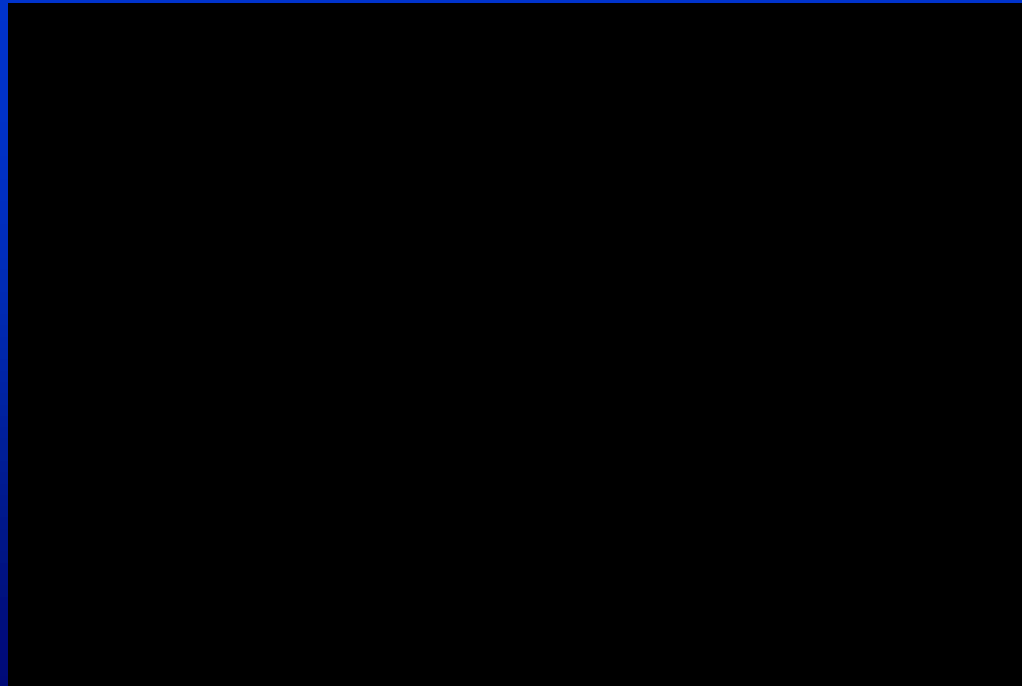
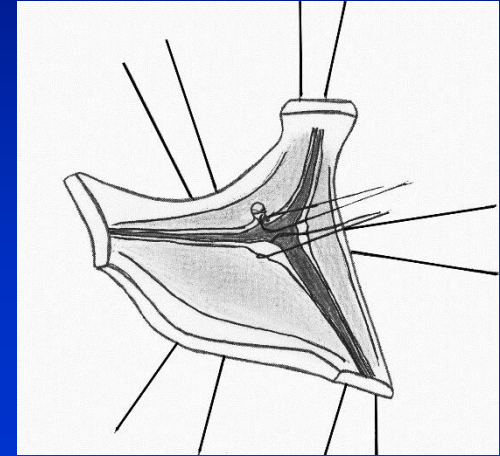
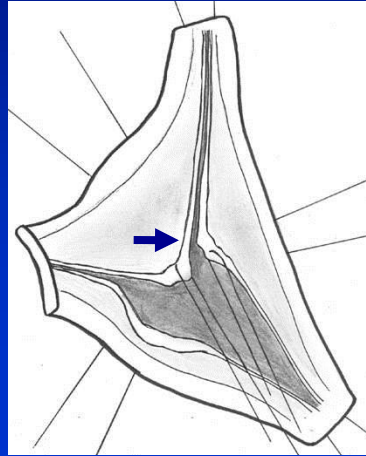
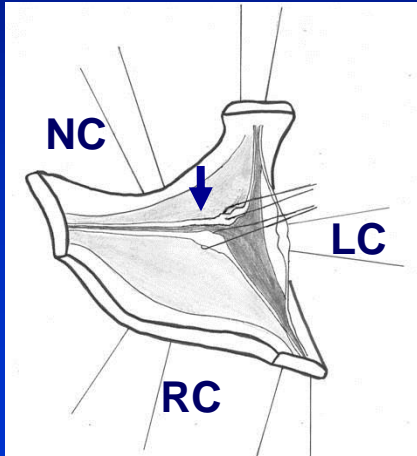
Annuloplasty ring = down size from one size



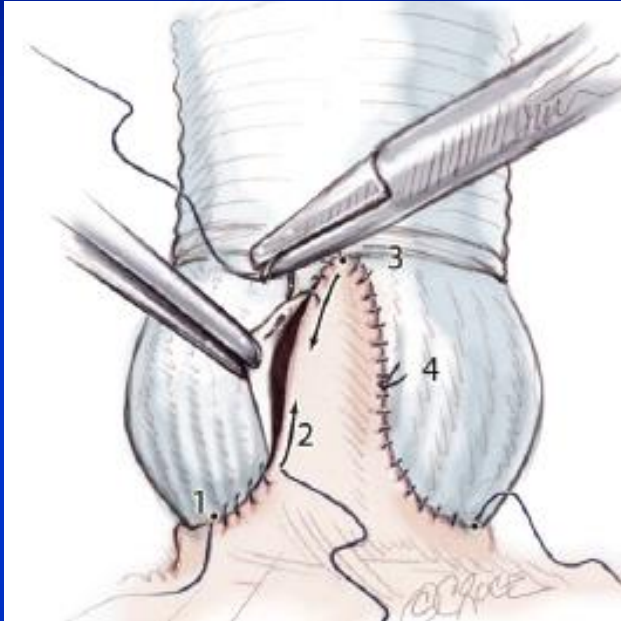
6 subvalvular « U » stitches



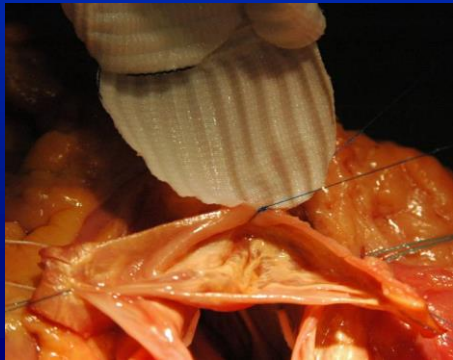
Alignment of cusp free edges prior Remodeling



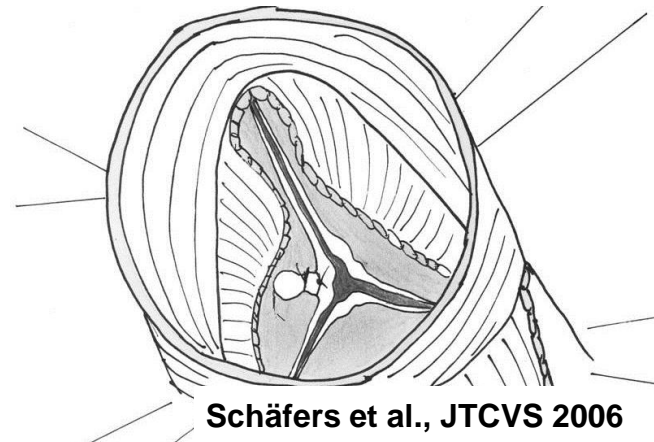
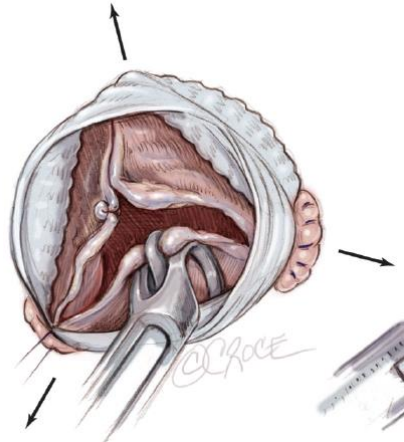
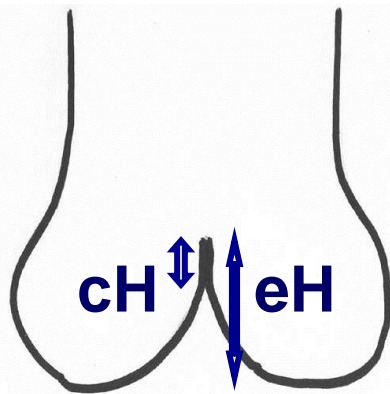
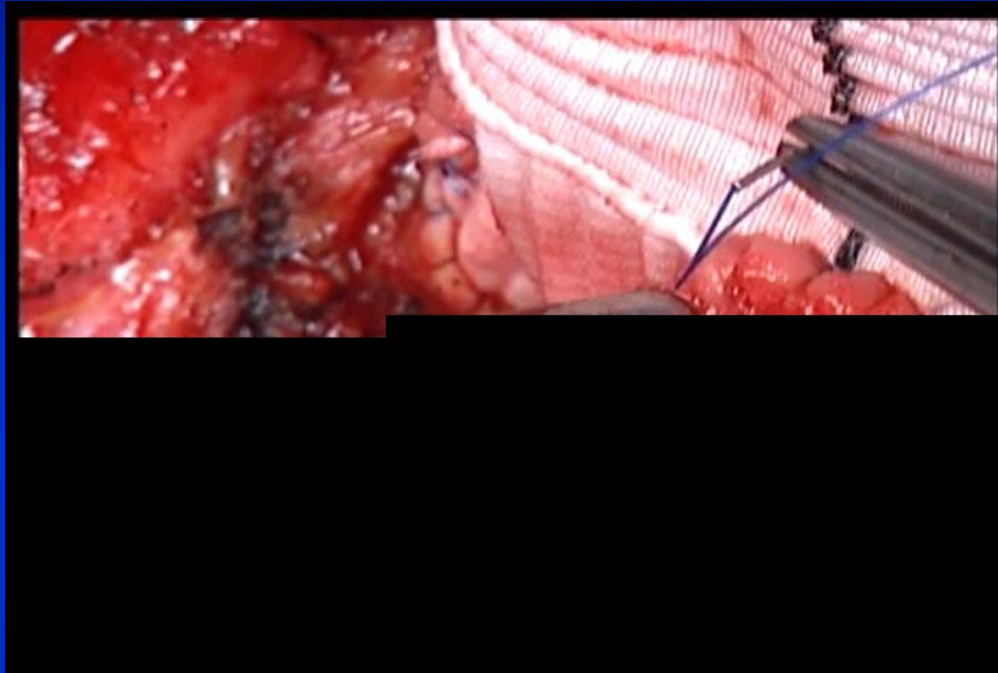
Remodeling Root repair



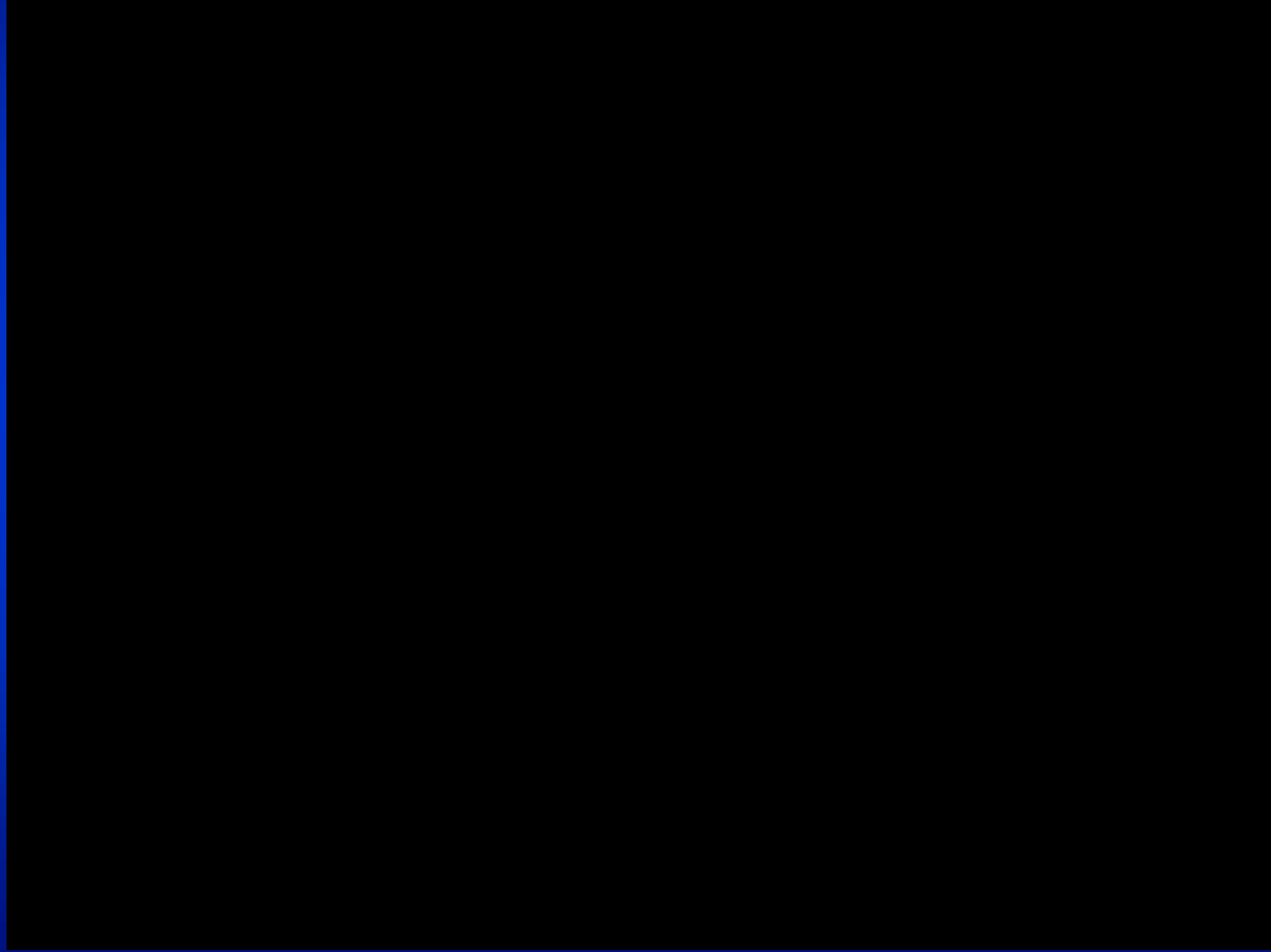
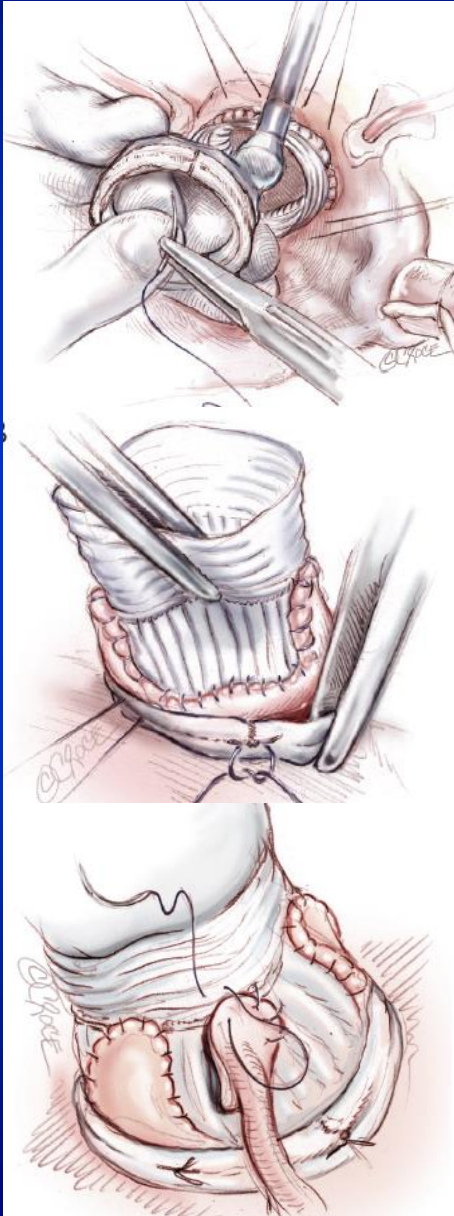
3 commissures at same level
Symmetrically at 120°



Cusp resuspension after the Remodeling (effective height 9 mm)



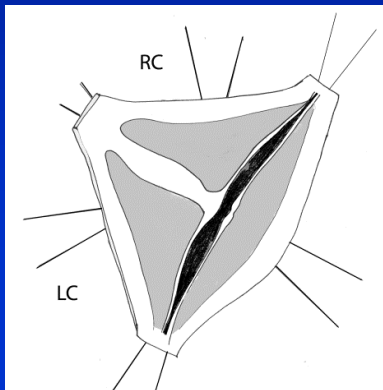
Subvalvular ring implantation



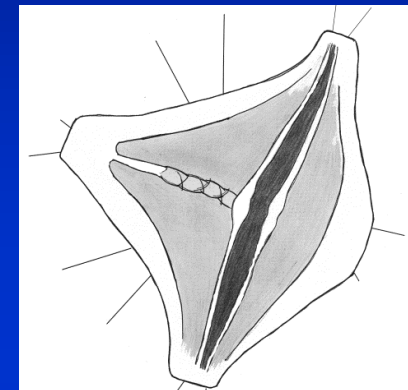
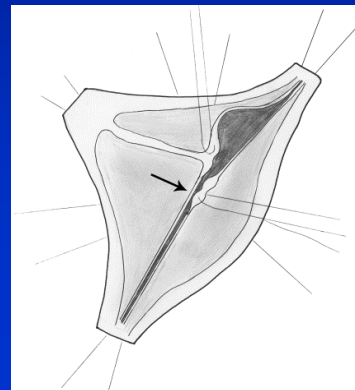
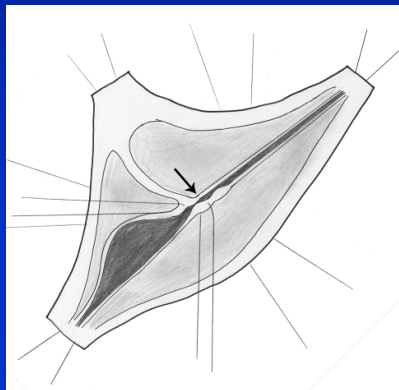
Root aneurysms: Bicuspid valves

(Sinus Valsalva $\text{\O} \geq 45 \text{ mm}$)

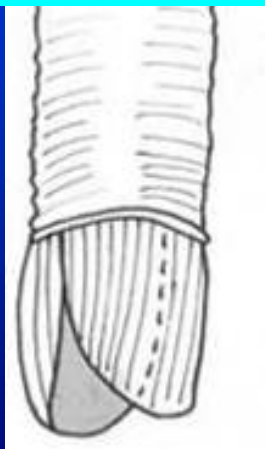
6 subvalvular
« U » stitches



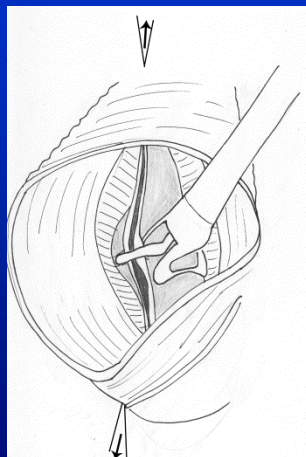
Alignment of cusp free edges



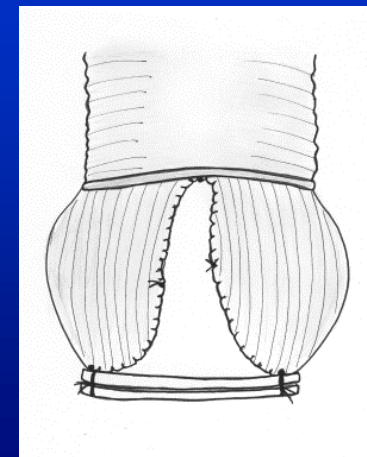
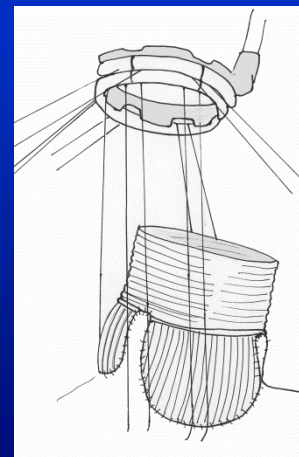
Commissures
at 180°



Effective height
measurement



Subvalvular aortic annuloplasty

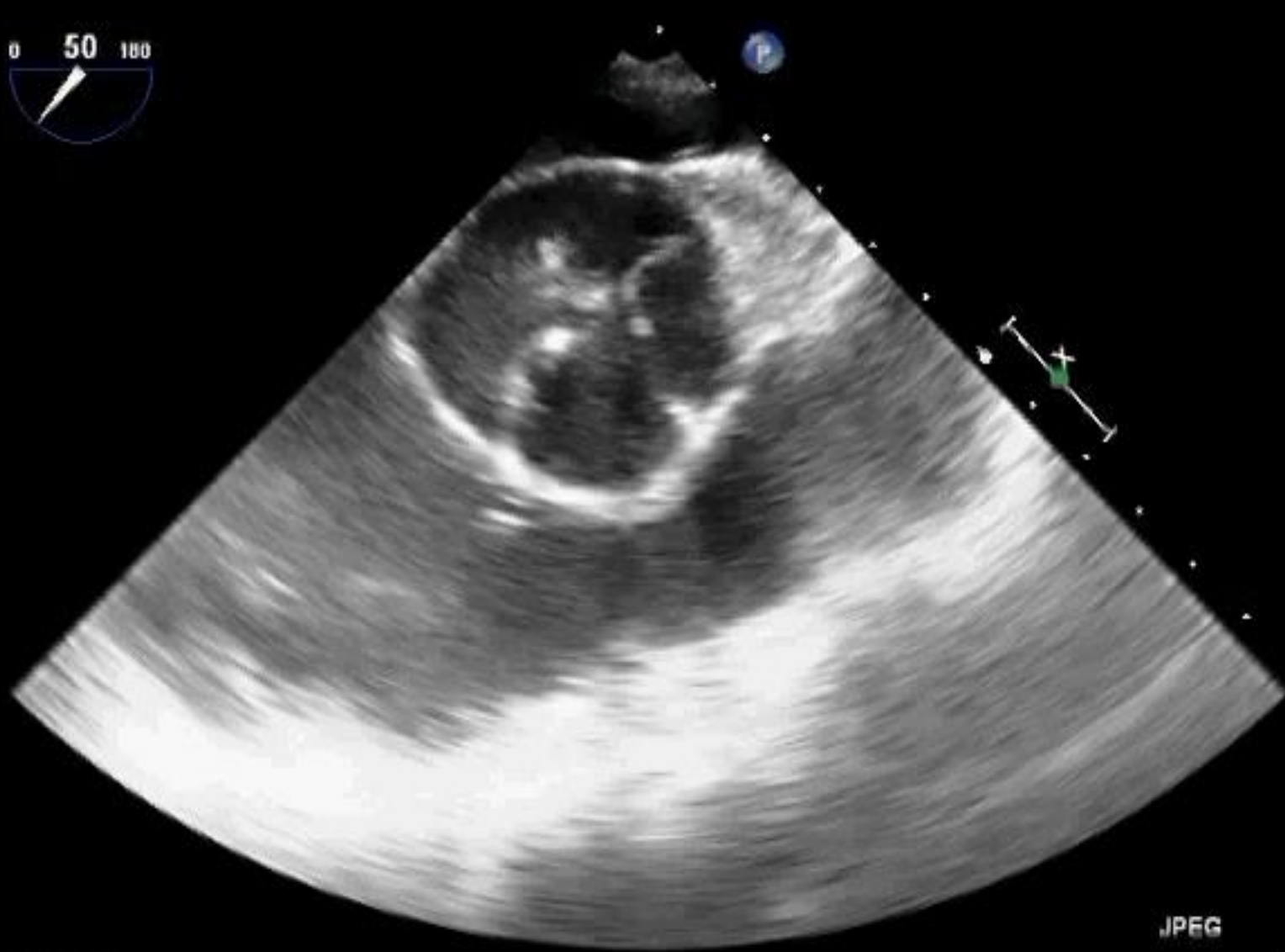


54371620131014

CX7-2t/Adulte

CI 50Hz
12cm

C4



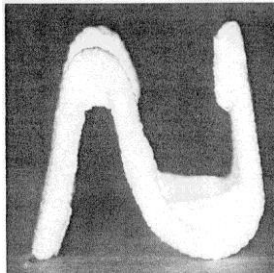
JPEG

T PAT: 37.0C
T ETO: 38.4C

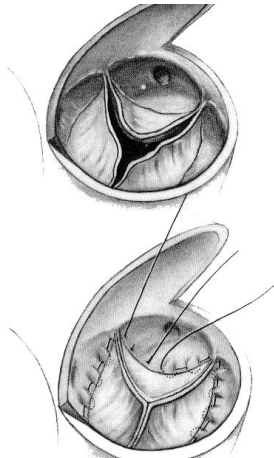
65 bpm

Techniques for aortic annuloplasty

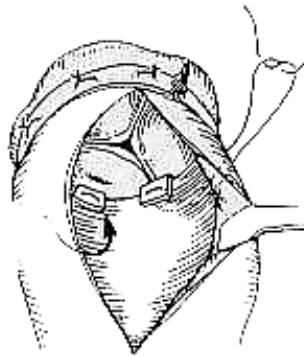
Isolated AI



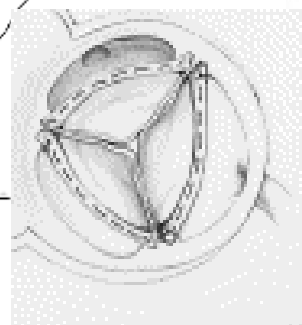
Duran
1983



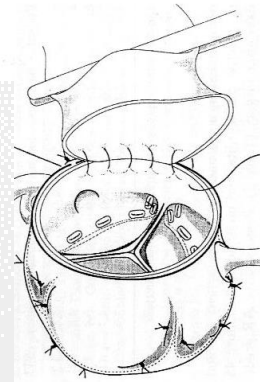
Carpentier
1983



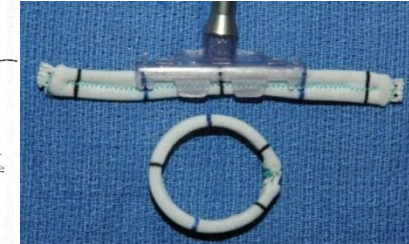
Frater
1986



Haydar
1997



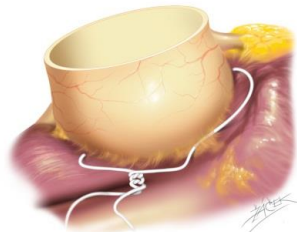
Izumoto
2002



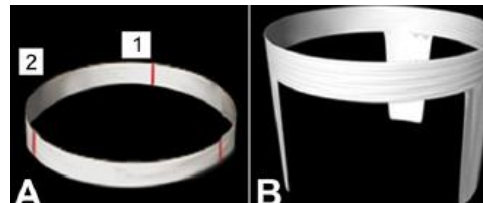
Lansac
2003



Hahm
2006



Schäfers
2009



Fattouch
2011



Scharfschwerdt
2011



Rankin
2011

Need for standardization

Internal annuloplasty ring

Tricuspid valve

65 patients with 62 % root aneurysm.

10.8% reoperation rate (7 patients) at 2 years FU
(No KM freedom for reop)

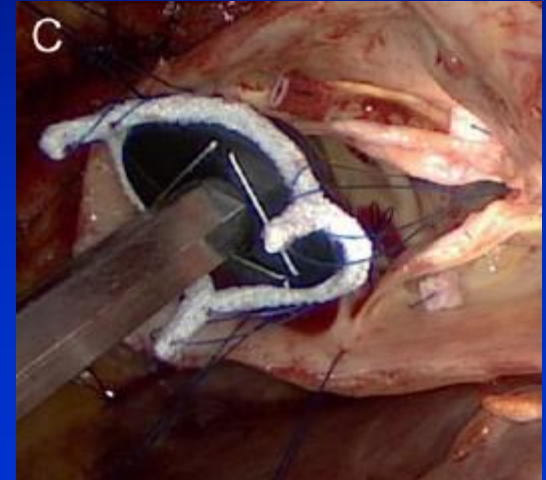
Advantage : place at the nadir

Bicuspid valve

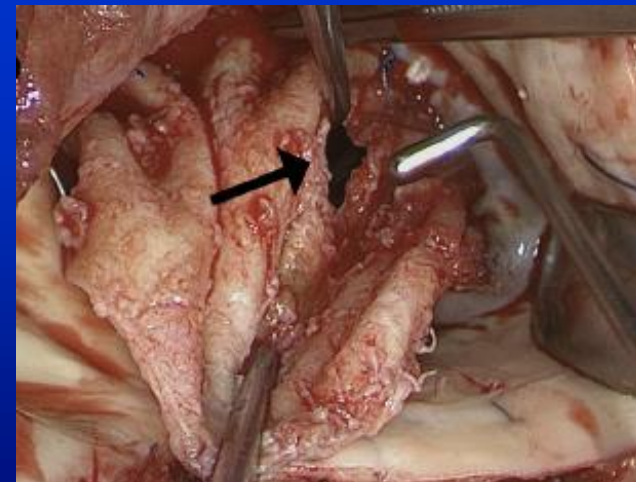
16 patients (43 % with ascending/root aneurysm)

12.5 % reoperation (2 patients) : leaflets tear from annular suture (Mean FU 9 months)

**Drawbacks : interference with leaflets
Tension on the suture (internal device)**



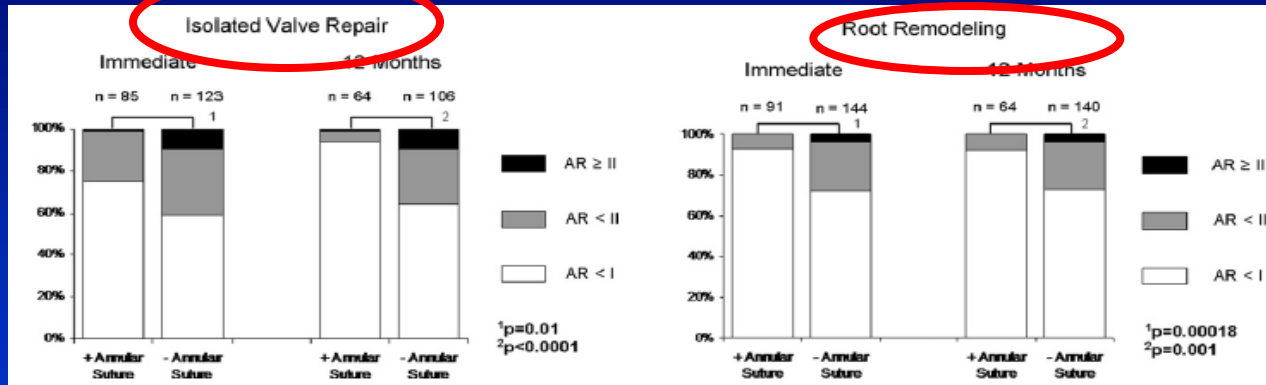
Mazzitelli EJCTS 2016



Mazzitelli ATS 2015

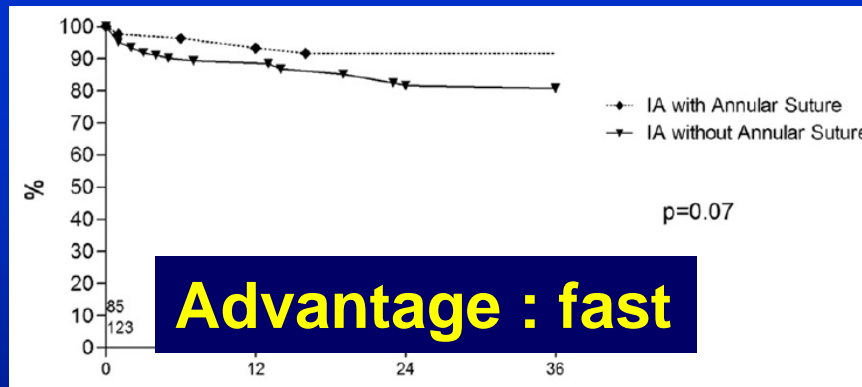
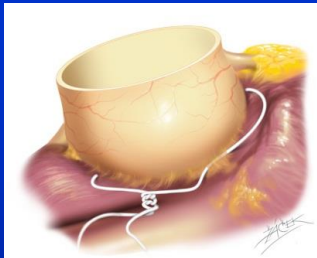
Early results with annular support in reconstruction of the bicuspid aortic valve Improve valve stability

Aicher JTCVS 2013



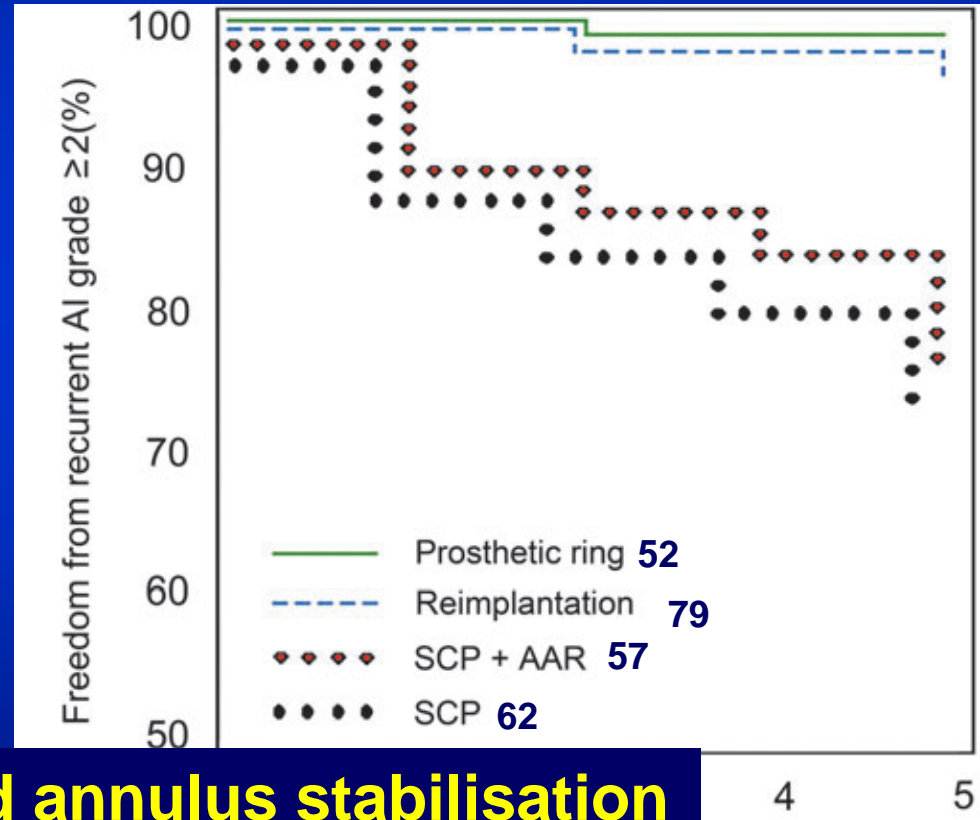
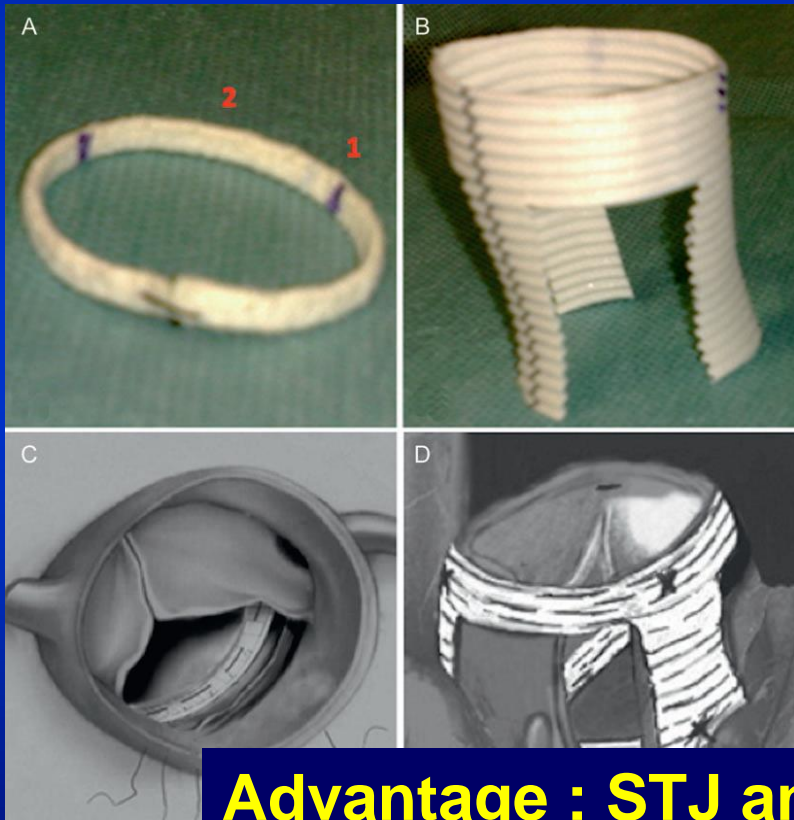
Suture Annuloplasty Significantly Improves the Durability of Isolated Bicuspid Aortic Valve Repair.

Schneider Ann Thorax Surg 2017



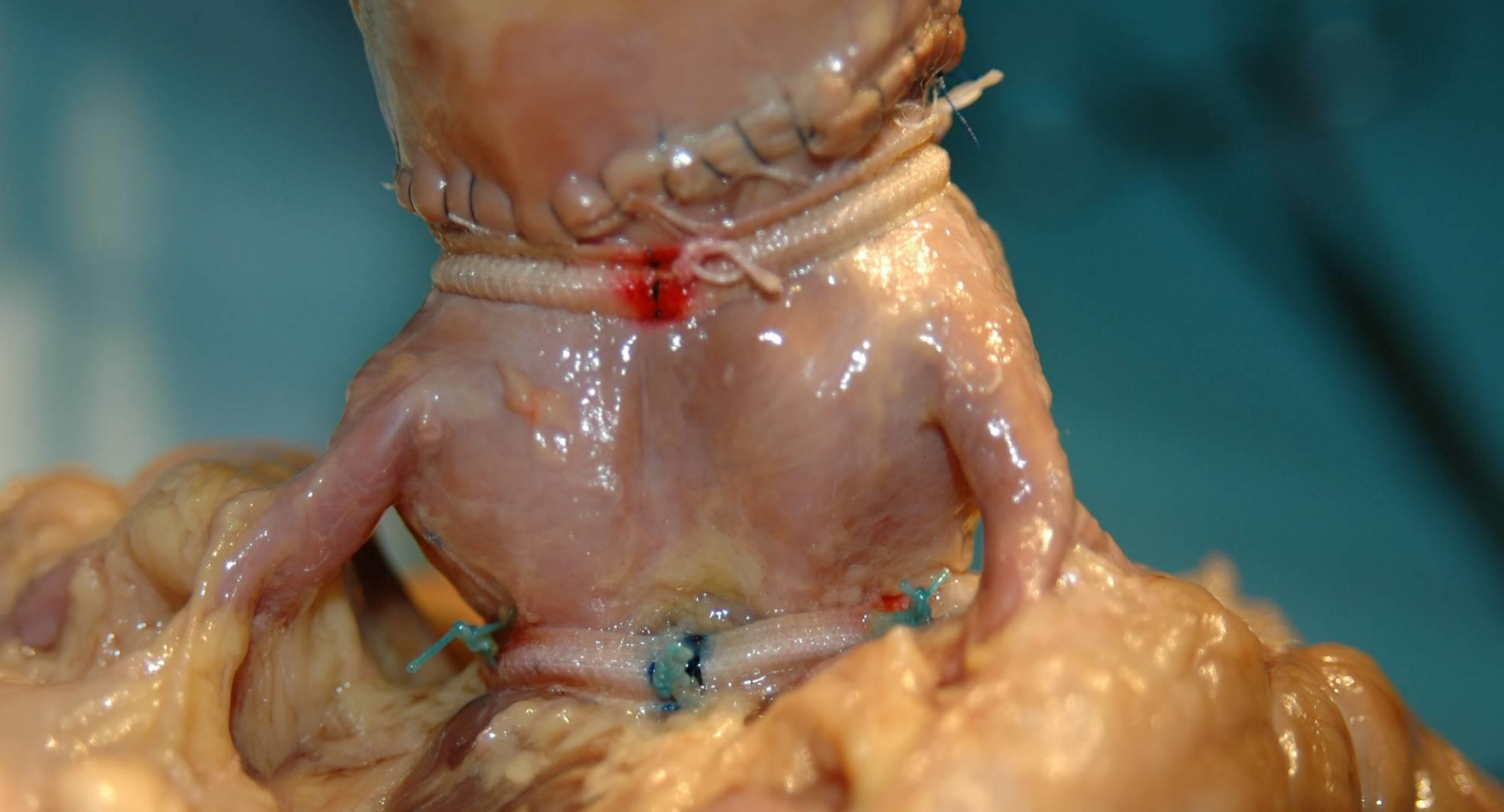
**Drawbacks : anatomical landmarks?
Safety on multicentric use and long term stability?**

Functional annulus remodelling using a prosthetic ring in tricuspid aortic valve repair: mid-term results



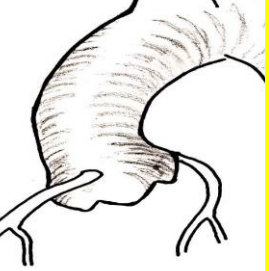
Advantage : STJ and annulus stabilisation

**Drawbacks : interference with leaflets,
Tension on the suture (internal annuloplasty ring)**



Advantage : safe with clear anatomical landmarks

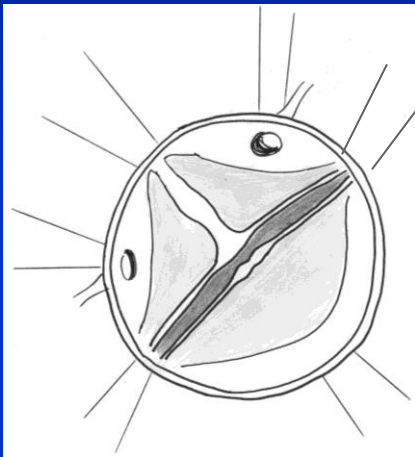
**Drawbacks : Right coronary sinus nadir (reimplantation limit)
Importance of deep dissection of sub valvular plane**



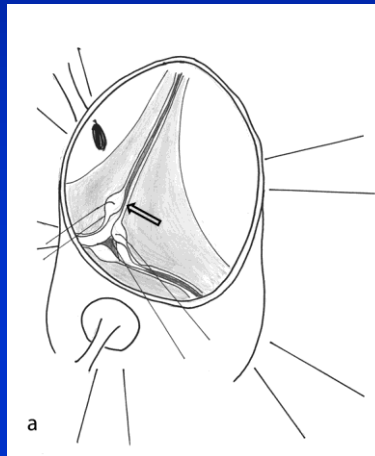
Double annuloplasty For Isolated aortic valve repair (all diameters ≤ 40 mm)



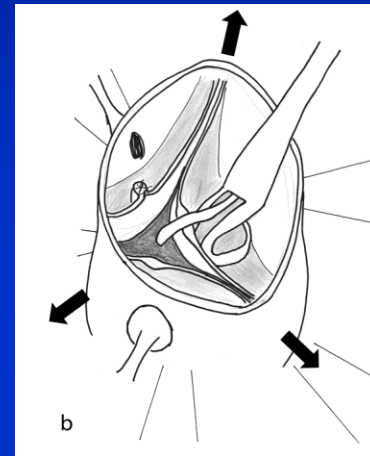
6 subvalvular « U »
stitches



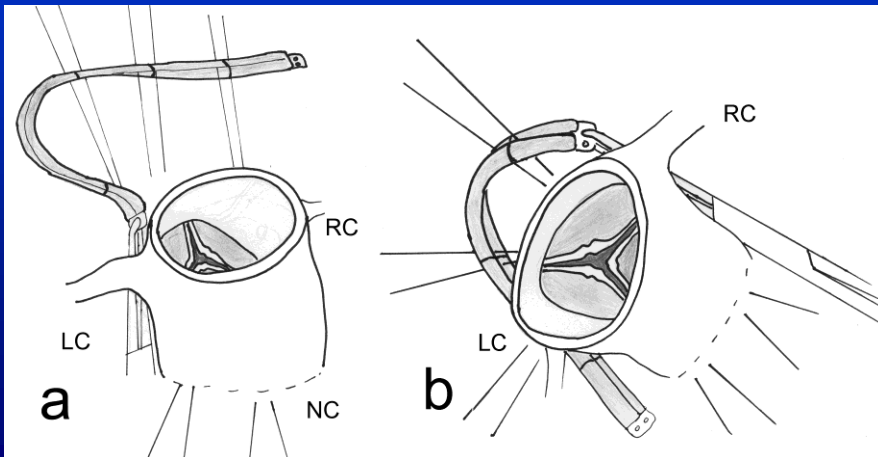
Alignment of cusp free edges



Cusp resuspension
(effective height ≥ 9 mm)



Placement of the open subvalvular ring
below the coronaries



Final aspect



Standardization based on aortic annulus Ø

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

Aortic ring = down size from one size



07/07/2016 09:07:26

TISO.6 MI 0.4

HR : 58

EIO AB
X7-2t
17Hz
13cm

2D
67%
C 50
P Arrêt
HGén
Coul
48%
6838Hz
FP 615Hz
4.4MHz



M4 M4

+59



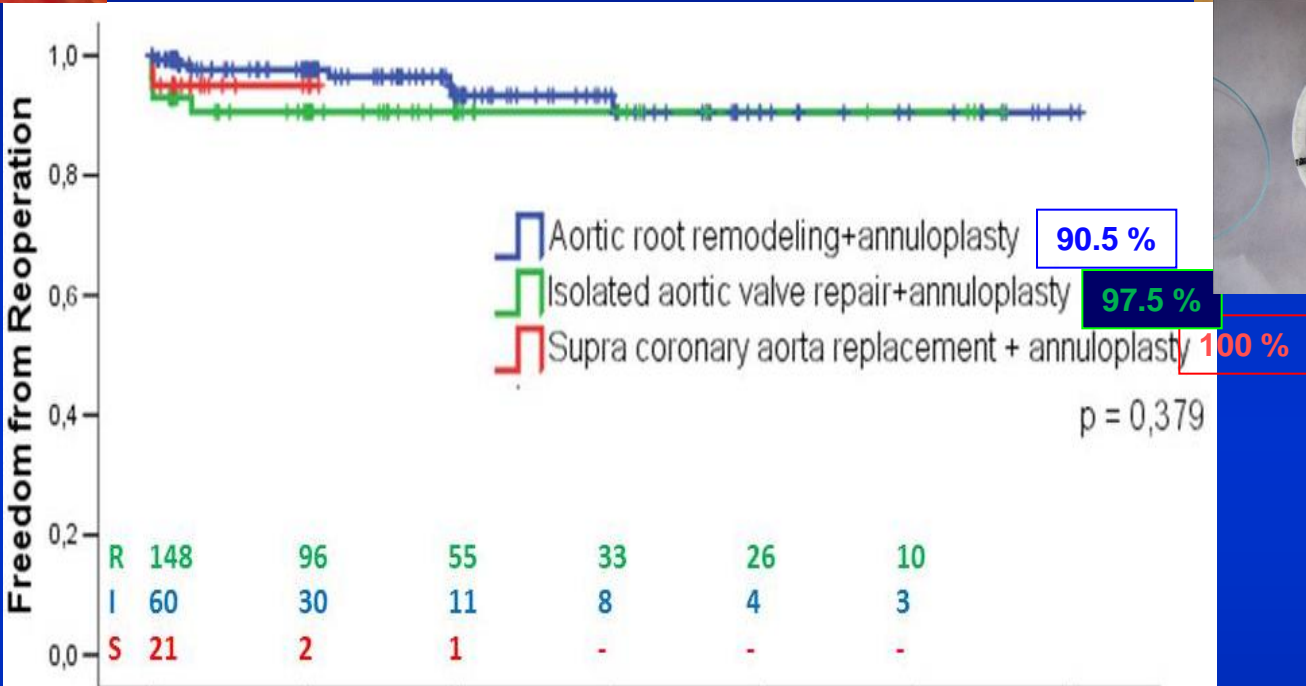
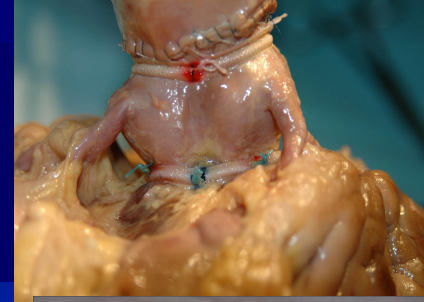
-59

cm/s

PAT T: 37.0C
TEE T: 39.1C

58 bpm

External annuloplasty ring 232 patients (2003 -2015)



92% Freedom from reoperation at 7 years similar among each phenotype with no difference between bicuspid and tricuspid valve

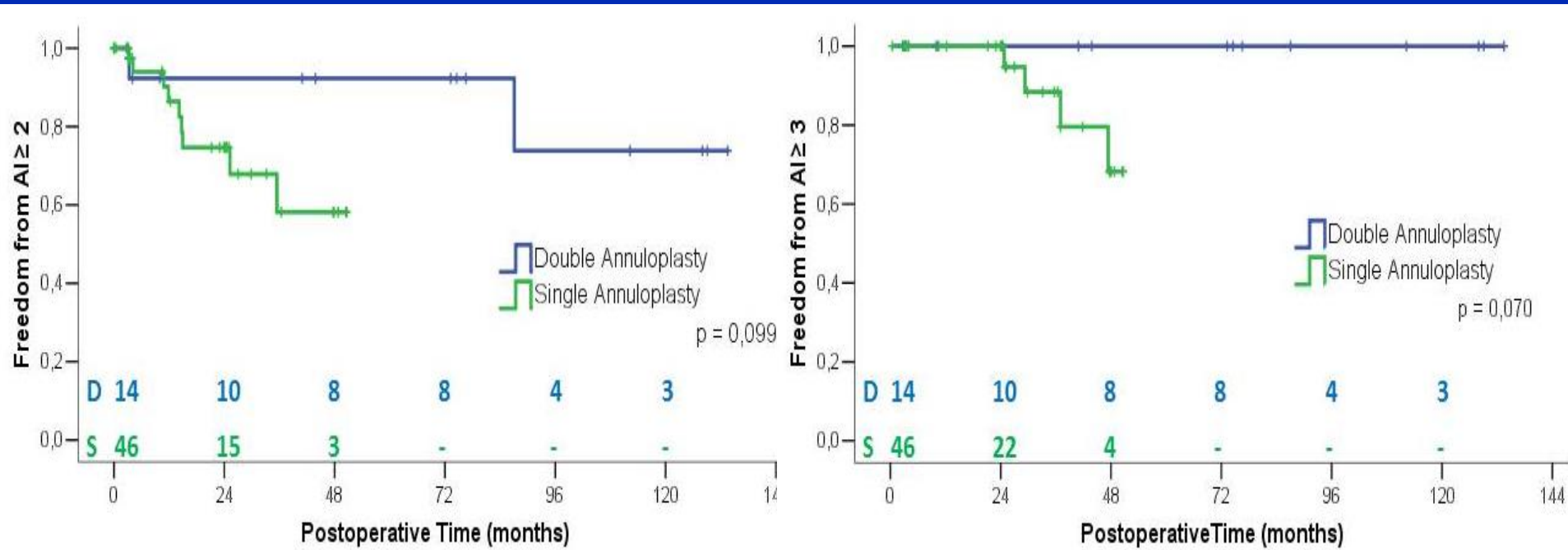
Since 2007, calibrated annuloplasty and systematic cusp effective height assessment improve freedom from reoperation up to 98.9%



Isolated AI repair+open aortic ring Single or double annuloplasty?

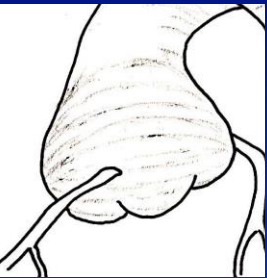


97.4 % Freedom from reoperation at 7 years



Additional ring at STJ level (double sub and supra-valvular annuloplasty) tend to reduce recurrent of AI when compared to single subvalvular annuloplasty

Pliable bicuspid and tricuspid valves



Aortic root aneurysm

Valsalva ≥ 45 mm



Supra-coronary aneurysm

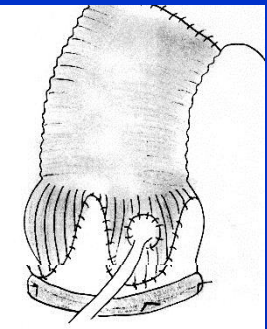
Valsalva < 40 mm



Isolated AI

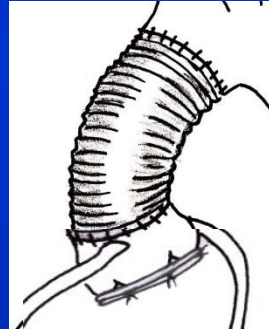
all $\emptyset < 40$ mm

Standardized approach according to phenotypes



Remodeling

+ aortic annuloplasty



Supra-coronary graft

+ aortic annuloplasty
(annulus > 25 mm)



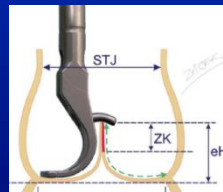
STJ annuloplasty

aortic annuloplasty
(annulus > 25 mm)

Cusp repair



Alignment of the cusp free edges



Resuspension of cusp effective height

+



External aortic annuloplasty

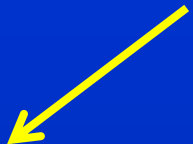


Open Prospective International Multicenter Registry

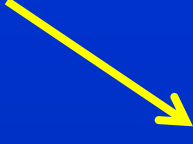
**Isolated AI and/or ascending aorta aneurysm
Candidates for Aortic valve repair / sparing**

Surgical indication

No



Yes



Medical Registry
(In process)

Surgical Registry
Aortic valve Repair / sparing and Replacement

Evaluation of the Guidelines

Evaluation of the results



Open to all center, Join us!
AVIATOR@HeartValveSociety.org

