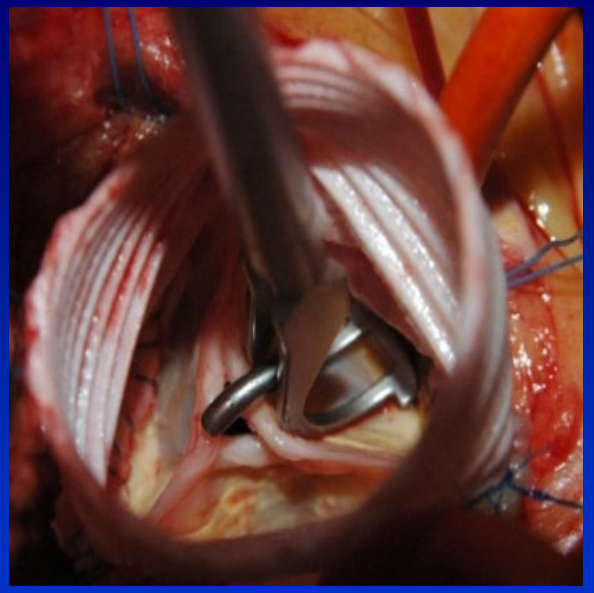
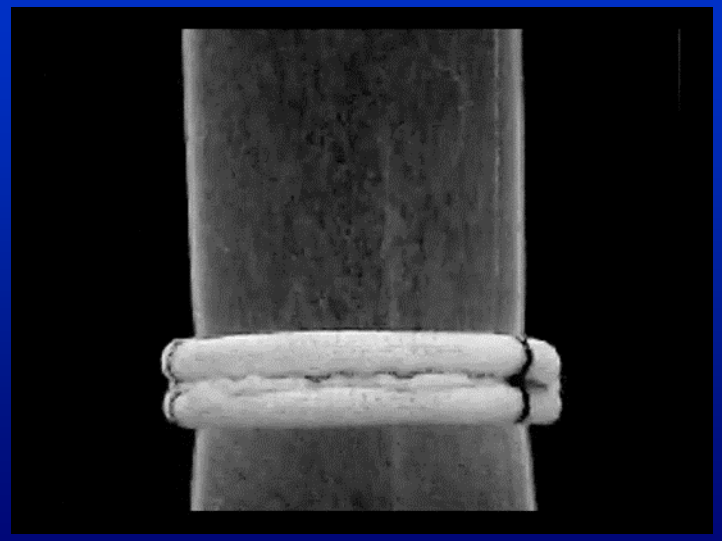


Annuloplasty ring for aortic valve repair

Emmanuel Lansac MD PhD

Cardiac Surgery
Institut Mutualiste Montsouris,
Paris, France



Disclosure information

Consultant for Coroneo, Inc

2017 ESC/EACTS VHD guidelines

Heart Team discussion is recommended in selected patients* in whom aortic valve repair may be a feasible alternative to valve replacement.	I	C

** Patients with pliable non-calcified tricuspid or bicuspid valves who have a type I (enlargement of the aortic root with normal cusp motion) or type II (cusp prolapse) mechanism of AR.*

AVR in the young = excess mortality

AVR at 45-54 yrs = **30.6%** (BP) vs **26.4%** (M) at 15 years (p 0.03)

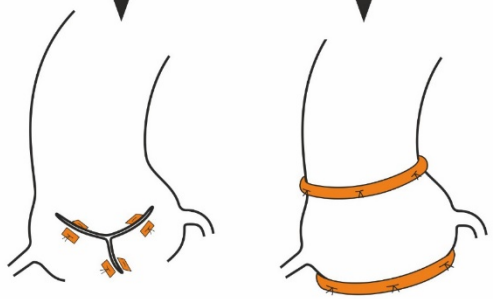
AVR (BP) at 40 years old = - 20 years lost of life expectancy

Bouhout JTCVS 2014 *Forcillo ATS 2014* *Bourguignon ATS 2015* *Goldstone nov NEJM 2017* Baumgartner et al EHJ 2017

Aorta management in aortic valve repair for AI

Normal Root and Ascending Aorta
(all Ø ≤ 40-45 mm)

AORTIC ANNULUS



<25 mm

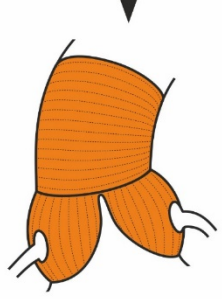
No annuloplasty /or SCA

≥25 mm †

Double sub + supra-STJ annuloplasty

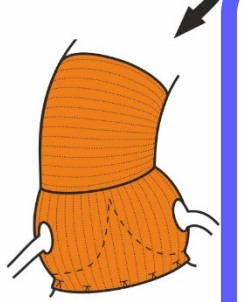
Dilated Root
(Sinus of Valsalva ≥ 45 mm)

AORTIC ANNULUS



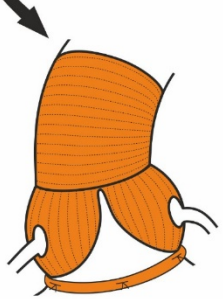
<25 mm

Remodeling alone



≥25 mm †

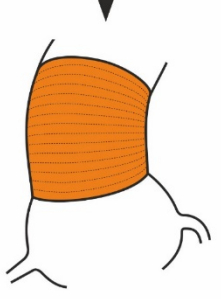
Reimplantation



Remodeling + Annuloplasty

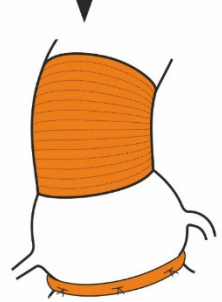
Dilated Ascending Aorta
(Asc ≥ 40-45 mm with normal Root)

AORTIC ANNULUS



<25 mm

Asc. ao. replac. (no anpl. or SCA)



≥25 mm †

Asc. ao. replac. + Annuloplasty

✻ = Large Ao annulus (>28-30 mm); Root wall disease particularly with coronary ostia inserted higher than STJ; Modify BAV geometry (commissural orientation)

† = The cutoff value of 25mm (measured with Hegar dilator) above which circumferential annuloplasty is recommended, remains a question of debate; certain centers recommend >27mm.

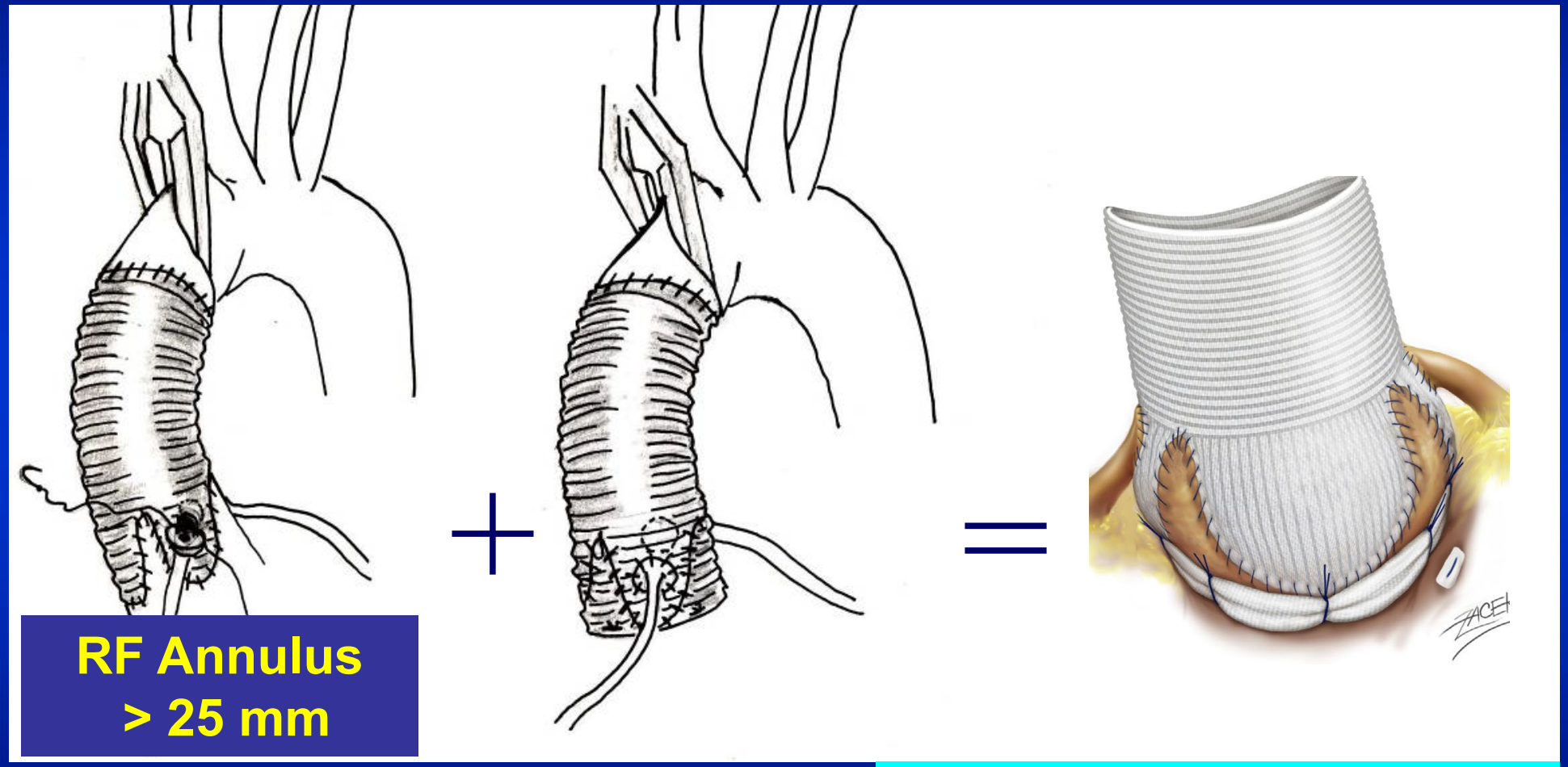
Aortic valve repair : state of the art EJCTS 2017 E Lansac L De Kerchove

2014 aorta and 2017 VHD ESC/EACTS Guidelines

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	

Evangelista et al EHJ 2014 Baumgartner et al EHJ 2017

Physiological and standardized approach to Valve Sparing Root Replacement



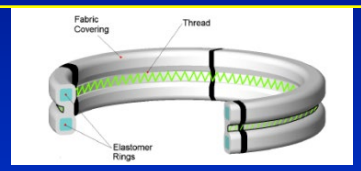
RF Annulus
> 25 mm

Remodeling

Reimplantation

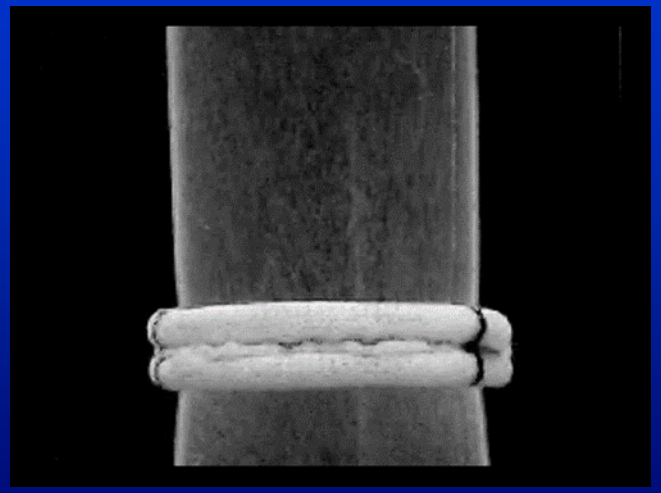
Remodeling +
Aortic annuloplasty

Standardization based on aortic annulus Ø



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

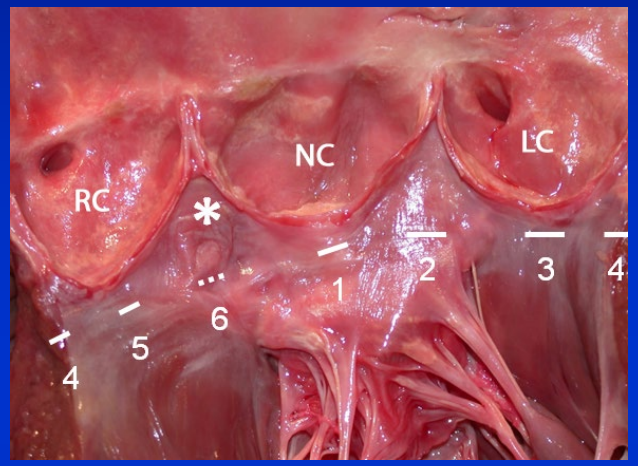
Annuloplasty ring = down size from one size



Lansac et al JTCVS 2009

Remodeling root repair + aortic ring

6 subvalvular « U » stitches



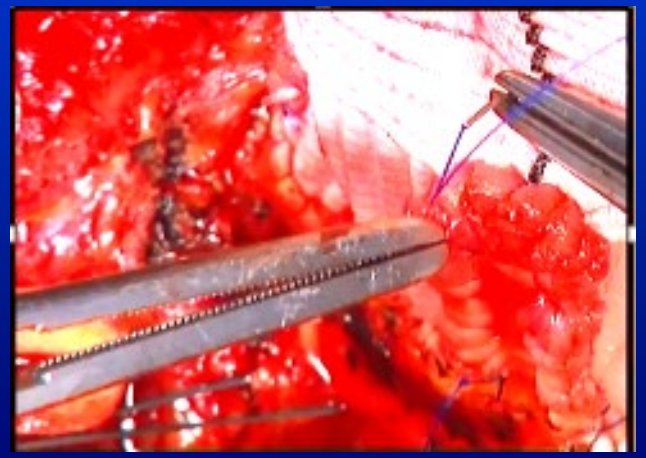
Aligment of cusp free edges prior Remodeling

Remodeling commissure at same level

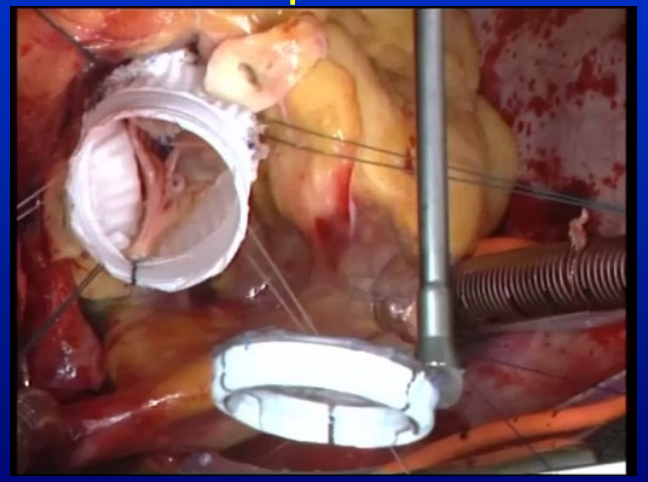
Tri 120°

Bi 180°

Cusp resuspension after the Remodeling (effective height ≥9 mm)



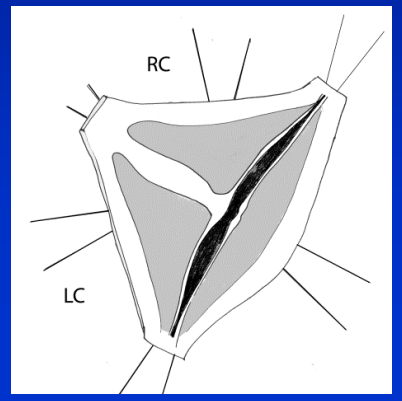
Subvalvular ring implantation



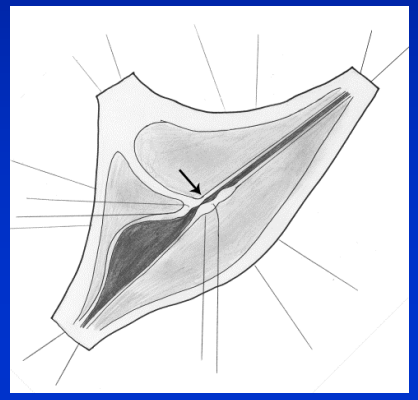
Bicuspid valve repair with root replacement

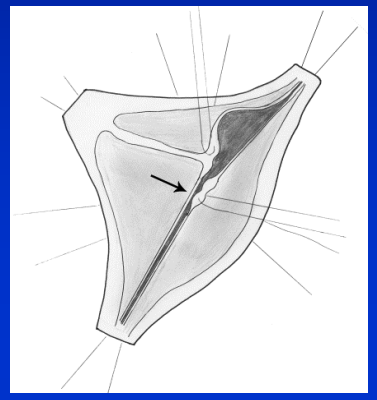
(Sinus Valsalva Ø ≥ 45 mm)

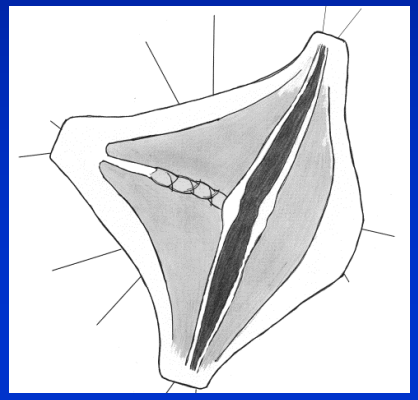
6 subvalvular « U » stitches



Aligment of cusp free edges

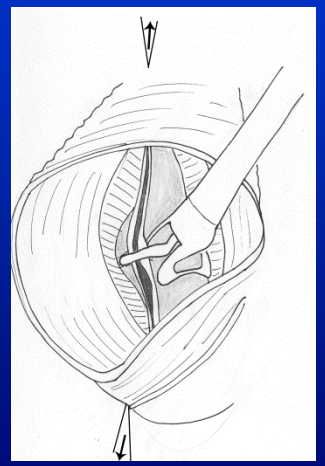




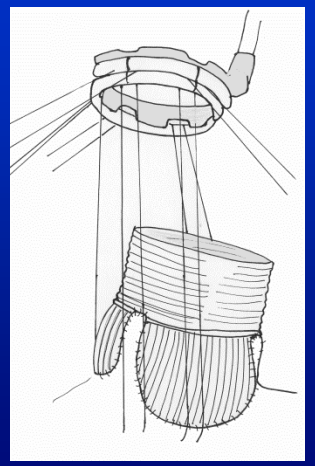


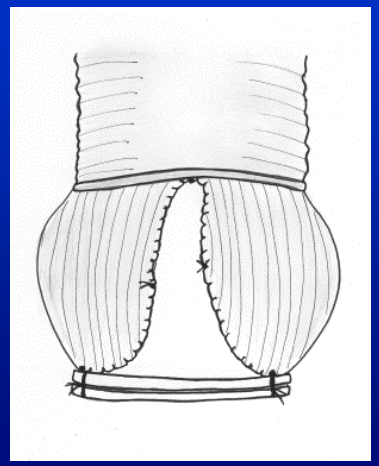
Commissures at 180°

Effective height measurement



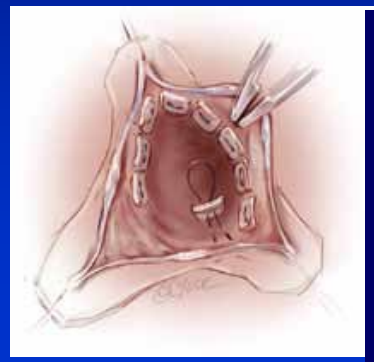
Subvalvular aortic annuloplasty

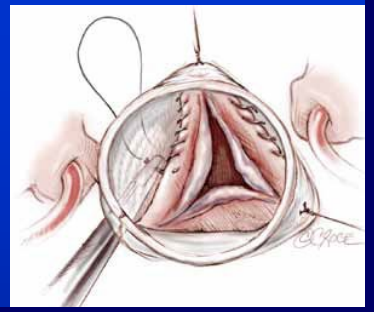




Moving from Valve Sparing to Aortic valve Repair

Reimplantation





Highly Selected cases

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

Caceres EJTCS 2014

15% rate of VSRR Stable
Stamou JTCVS 2015

80 % of bentall for dystrophic AR
Gaudino JTCVS 2015

How high do I pl
How do I place tl

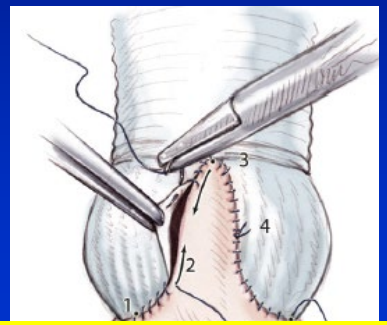
Eye Balling valve repair

3) Leaflets

Remodeling + Ring

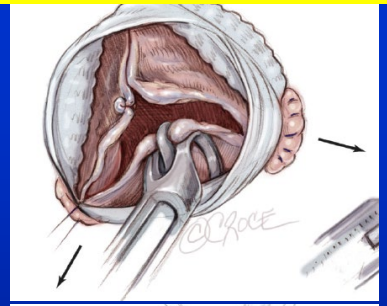
1) Leaflet lenght

2) Root

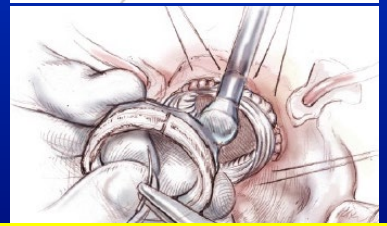


3 commissures at the same level
And symmetrical circumferentially

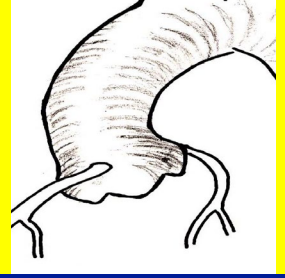
3) Leaflets eH



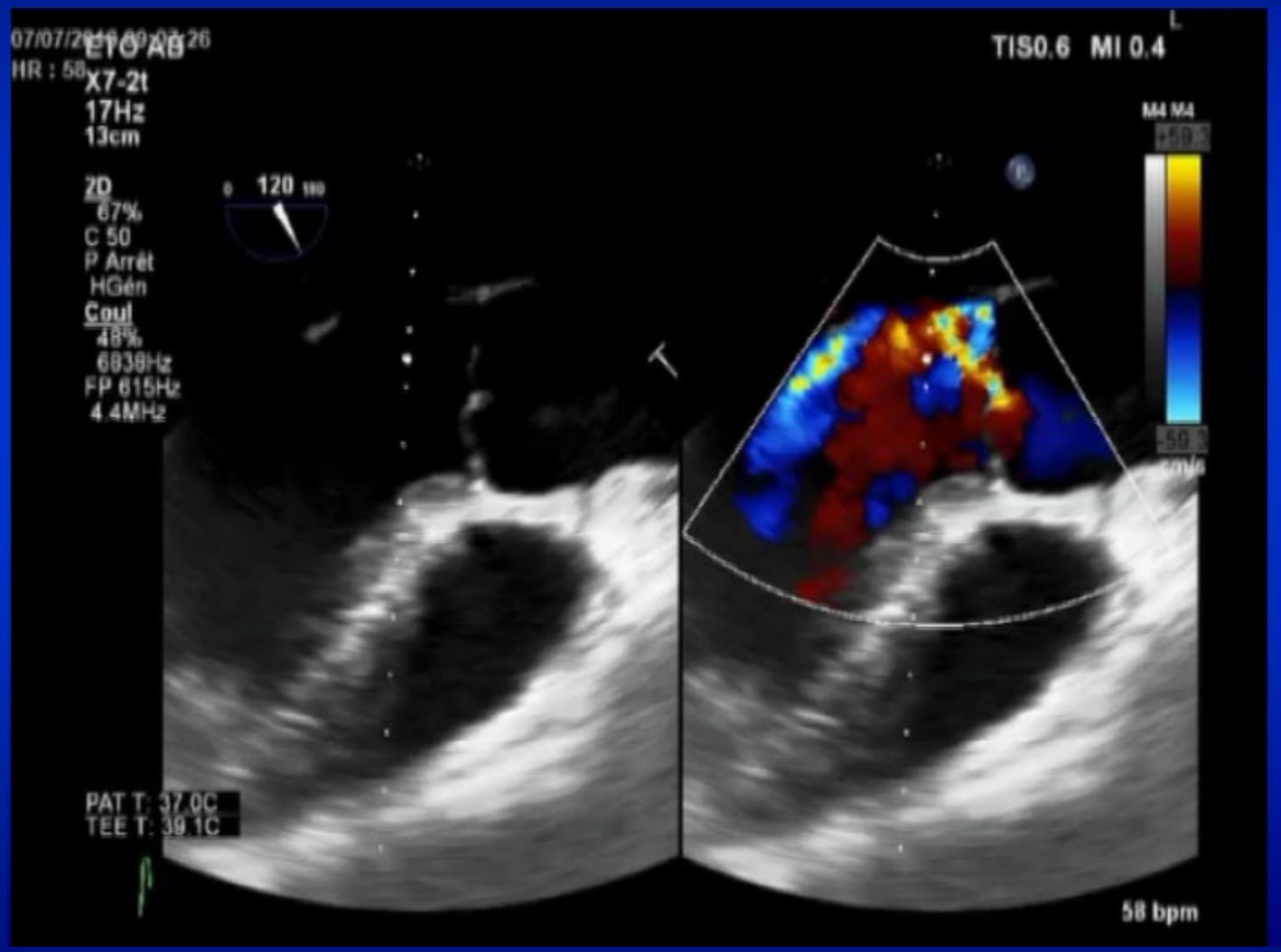
4) Annuloplasty

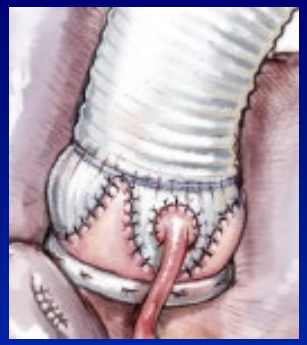


Standardize Valve repair
With a physiological root reconstruction

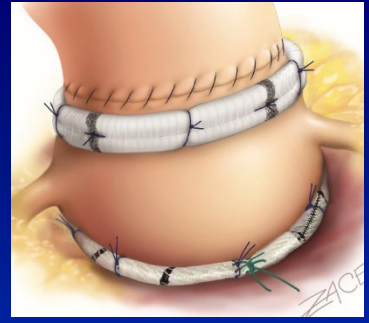


Double annuloplasty
For Isolated aortic valve repair
(all diameters ≤ 40 mm)





AV repair with external Ao ring



> 2200 implants multicentric

99.1 % freedom from reoperation at 7 years for remodeling root repair + ExAo ring

Multicentric Comparative trial (CAVIAAR) to Mechanical Bentall

At 4 years : reduction of valve related deaths (p 0.031)

reduction of Major Adverse Valve Related Events (p 0.011)

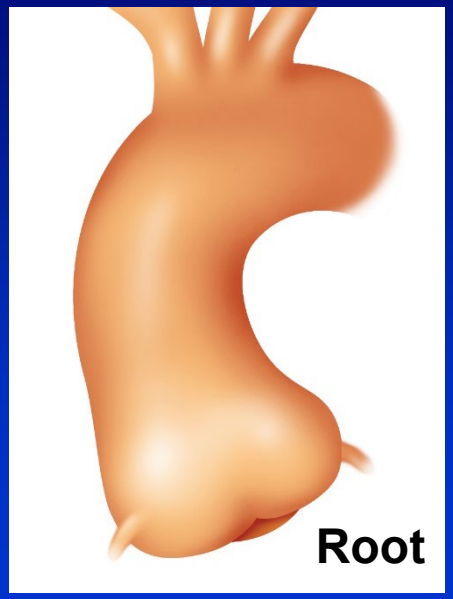
No difference in valve reoperation rate (p.172)

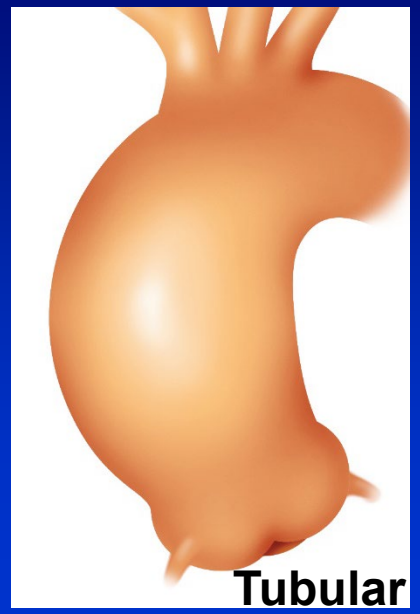
97.5 % freedom from reoperation at 7 years for Isolated AI

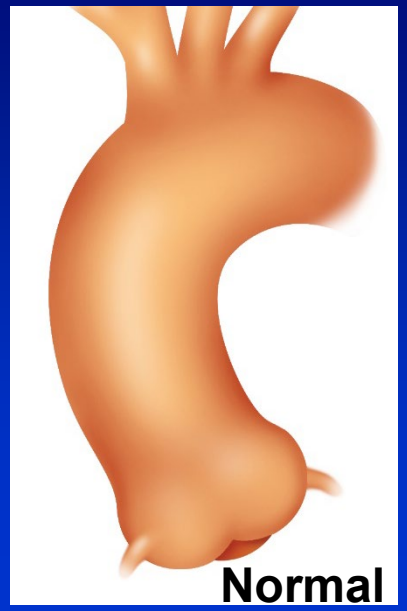
No device – related adverse events

Lansac et al JTCVS 2015; EJTCVS 2016; JTCVS 2017

Moving from Valve Sparing to Aortic valve Repair







Standardized approach according to each aorta phenotype

Annuloplasty for AV repair : a standardized approach

EACTS technical course

Paris March 27-29th 2019

(Live surgery, video, lecture, wetlab)