Aortic annuloplasty
Effective and geometric height
to standardize valve repair

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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

Standardisation = reproducibility
The surgical correction of aortic insufficiency by circumclusion


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
= partial subvalvular annuloplasty

Plicating U stitches at the comissures
= partial supravalvular annuloplasty

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

Useful to protect a commissural repair or as a bailout technique

External Dissection of the Subvalvular Plane
Aortic annuloplasty can be performed in the subvalvular plan, except at the level of the infundibulum where the dissection stops 1,4±1,8 mm above the nadir of the right coronary sinus.
External aortic annuloplasty (ring or proximal suture of reimplantation) induces a minimum of 5 mm reduction of aortic annulus diameter, corresponding to tissue thickness.
Reasons for valve sparing failures

Cusp prolapse

Remodeling / Reimplantation

Reduction of the STJ

Symmetrical prolapse

↓ eH : - 3 to - 4 mm

No eH resuspension (Eye balling repair)

Risk factor for AI recurrence
Reoperation

Schäfers et al., JTCVS 2006
Soncini. MEP 2009
Oka ATS 2011
Bierbach E. JTCVS 2010
Kunihara JTCVS 2011
Jeanmart ATS 2007
Marom JTCVS 2012
De Paulis 2010
Zacek with permission
Inspection of cusp lesions
Geometric height

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

Schäfers et al., JTCVS 2013
Candidates for Aortic valve repair/sparing

- Root aneurysm
  - Valsalva ≥ 45 mm

- Supra coronary aneurysm
  - Valsalva ≤ 40 mm

- Isolated AI
  - All Ø ≤ 40 mm

Cusp motion

- Normal (I)
  - Central jet

- Prolaps (II)
  - Eccentric jet

- Retracted (III)

Bicuspid or tricuspid pliable cusps

Physiological and standardized approach to Valve Sparing Root Replacement

RF Annulus > 25 mm

Reimplantation 1992 David

Remodeling + subvalvular annuloplasty
Remodeling root repair + aortic ring

- 6 subvalvular « U » stitches
- Aligment of cusp free edges prior Remodeling
- Suture of the Remodeling

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

Subvalvular ring implantation
Pre and Post Remodeling with expansible Extra Aortic Ring Annuloplasty

Pre-op

Post-op
Supra-coronary aneurysms
Bicuspid R-L (sinus Ø 40 – 45 mm)

6 subvalvular « U » stitches

Alignment of cusp free edges

Commissures at 180°

Effective height measurement

Subvalvular aortic annuloplasty
Double annuloplasty
For Isolated aortic valve repair
(all diameters $\leq 40$ mm)

- 6 subvalvular « U » stitches
- Alignment of cusp free edges
- Placement of the open subvalvular ring below the coronaries
- Cusp resuspension (effective height $\geq 9$ mm)
- Final aspect

Double annuloplasty
For Isolated aortic valve repair
(all diameters $\leq 40$ mm)
Standardization based on aortic annulus Ø

<table>
<thead>
<tr>
<th>STJ ring Ø (mm)</th>
<th>Aortic annular base Ø (Hegar dilators, mm)</th>
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<tbody>
<tr>
<td></td>
<td>25-27</td>
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<tr>
<td>STJ ring Ø (mm)</td>
<td>25</td>
</tr>
<tr>
<td>Extra aortic ring® Ø (mm)</td>
<td>25</td>
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</tbody>
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Aortic ring = down size from one size

![Aortic ring images](image1.png) ![Aortic ring images](image2.png)
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%

Lansac et al EJTCS sept 2016
Isolated AI repair + open aortic ring
Single or double annuloplasty?

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

97.4 % Freedom from reoperation at 7 years

Lansac et al EJTCS sept 2016
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
- + aortic annuloplasty

Supra-coronary graft
- + aortic annuloplasty
  (annulus > 25 mm)

First EACTS Aortic valve repair master class
Paris March 22-24th 2017
(live surgery)
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

The Heart Valve Society
Open to all center, Join us!
AVIATOR@HeartValveSociety.org

The Heart Valve Society