

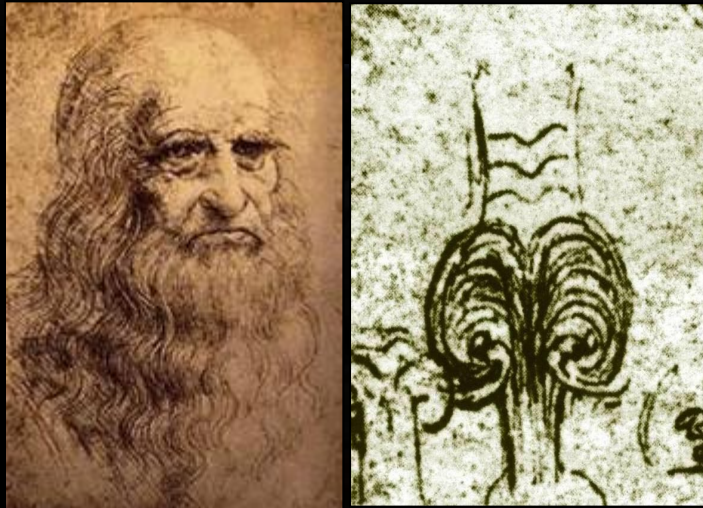
# INDICAZIONE ALL'INTERVENTO DI RIPARAZIONE DELLA RADICA AORTICA NELLA DILATAZIONE DEL BULBO CON O SENZA INSUFFICIENZA AORTICA. COSA CAMBIA NELLA **VALVOLA BICUSPIDE?**

*Cosa vuole sapere il cardiocirurgo per scegliere questo intervento? Timing e cenni di tecnica dell'intervento*

Fabrizio Settepani MD  
Humanitas research hospital

# LEONARDO DA VINCI

Vinci 1452 - Amboise 1519



# ANTONIO MARIA VALSALVA

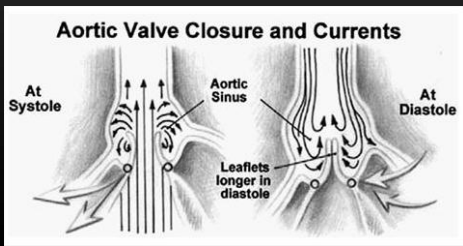
Imola 1666 - Bologna 1723



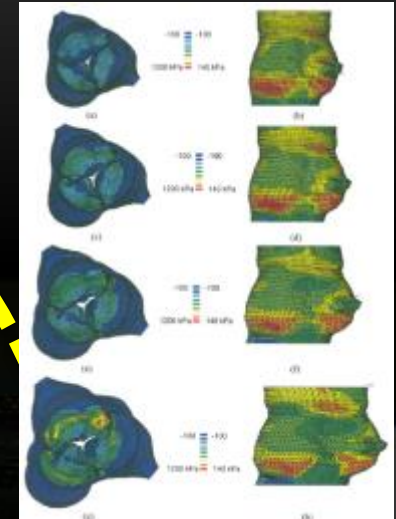
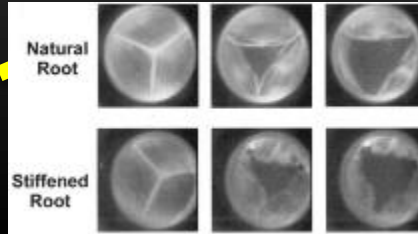
BASI ANATOMO-FUNZIONALI



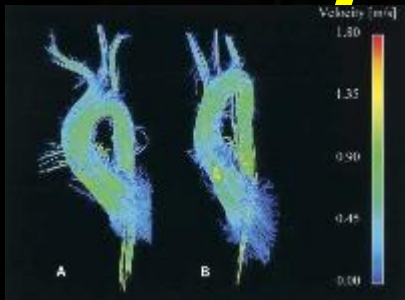
# RADICE AORTICA= UNITÀ ANATOMO-FUNZIONALE



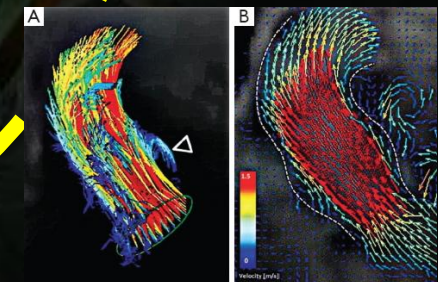
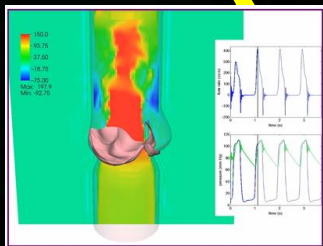
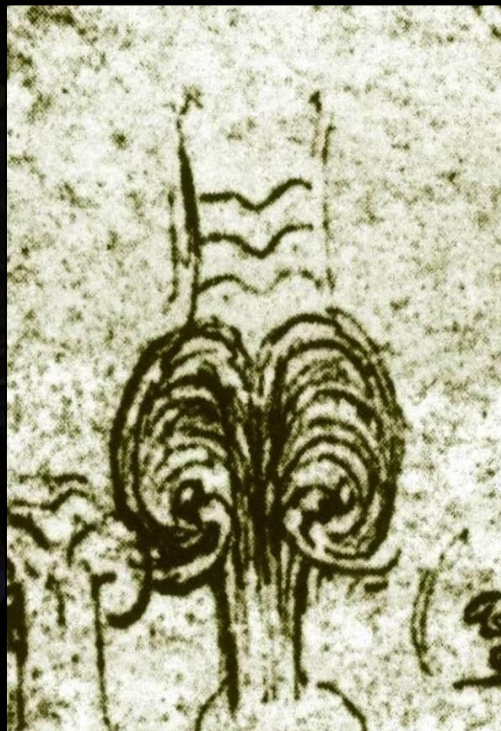
The American Journal of Cardiology Vol. 84 October 15, 1999



Grande-Allen et al J Thorac Cardiovasc Surg 2001



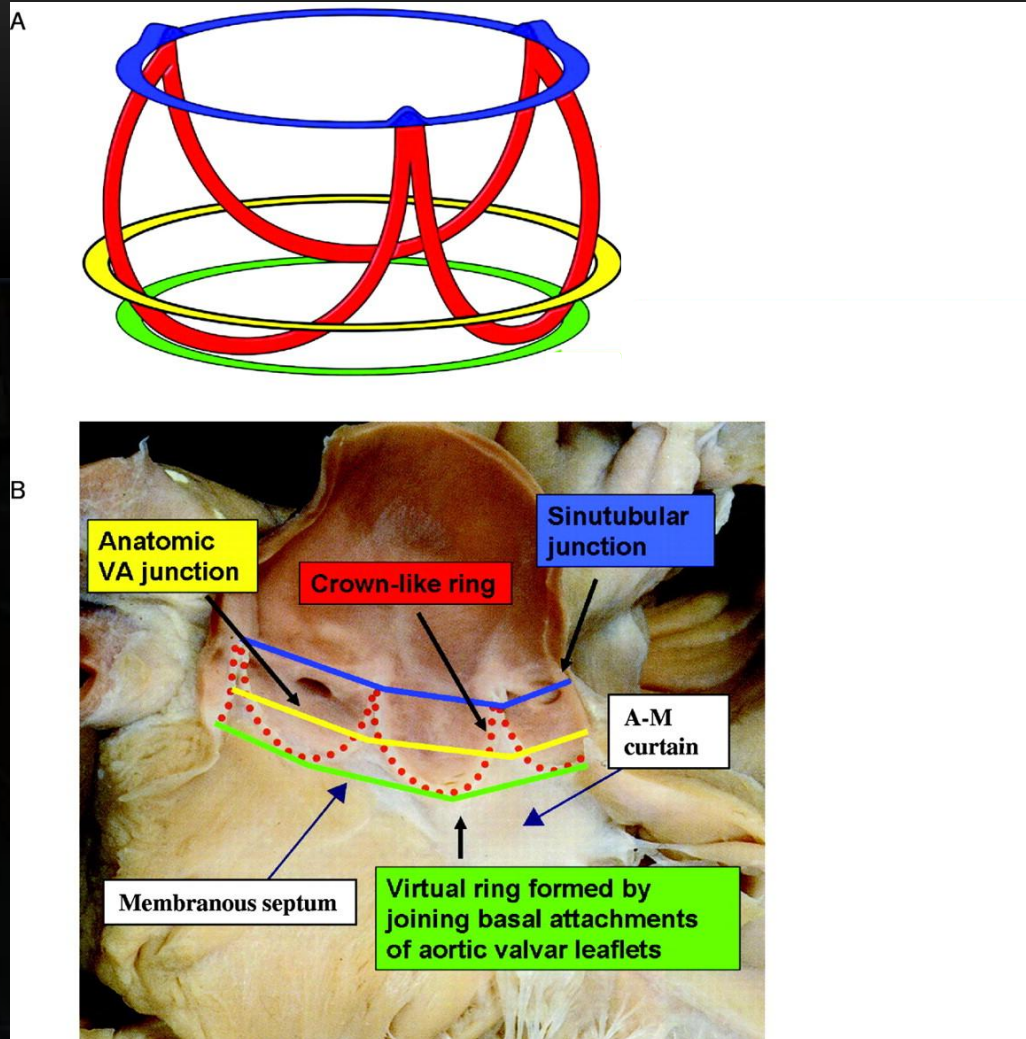
Kvitting J Thorac Cardiovasc Surg 2004



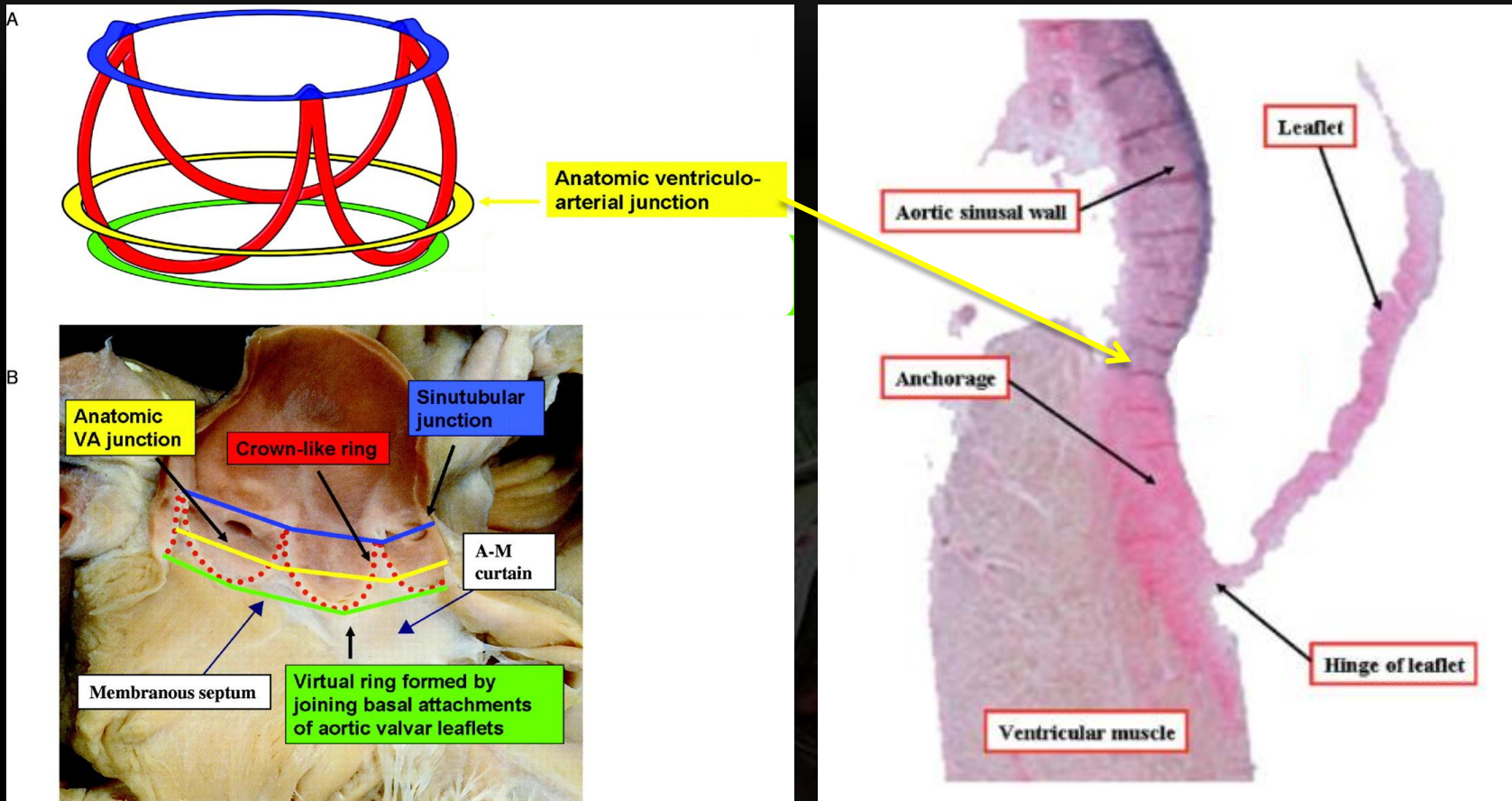
Charitos Ann Cardiothorac Surg 2013



# GIUNZIONE VENTRICOLO-ARTERIOSA



# GIUNZIONE VENTRICOLO-ARTERIOSA

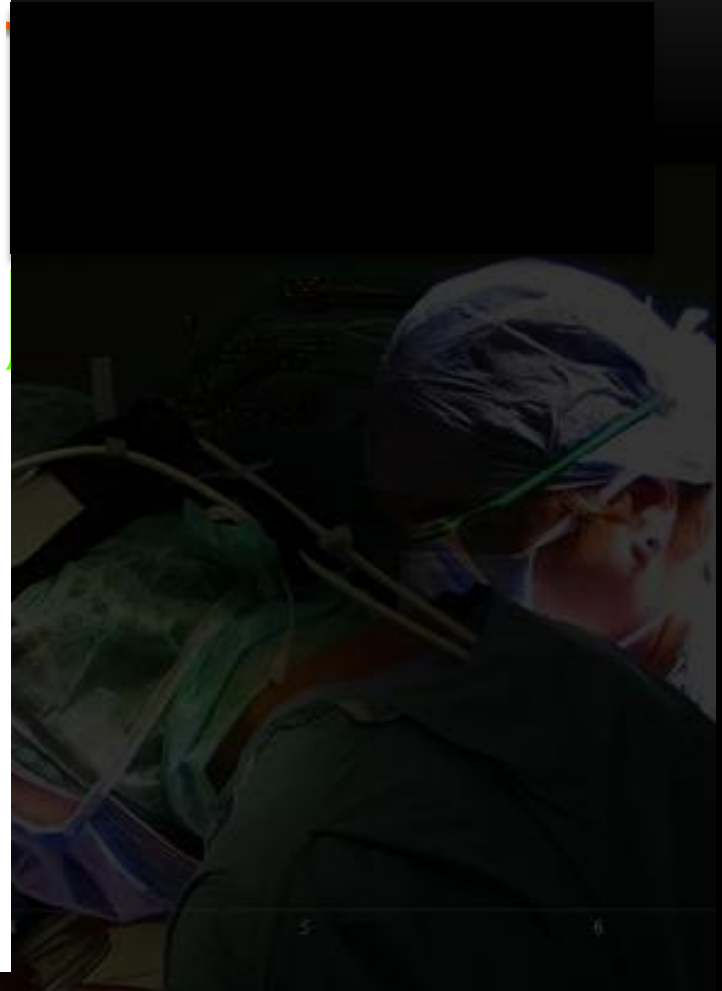
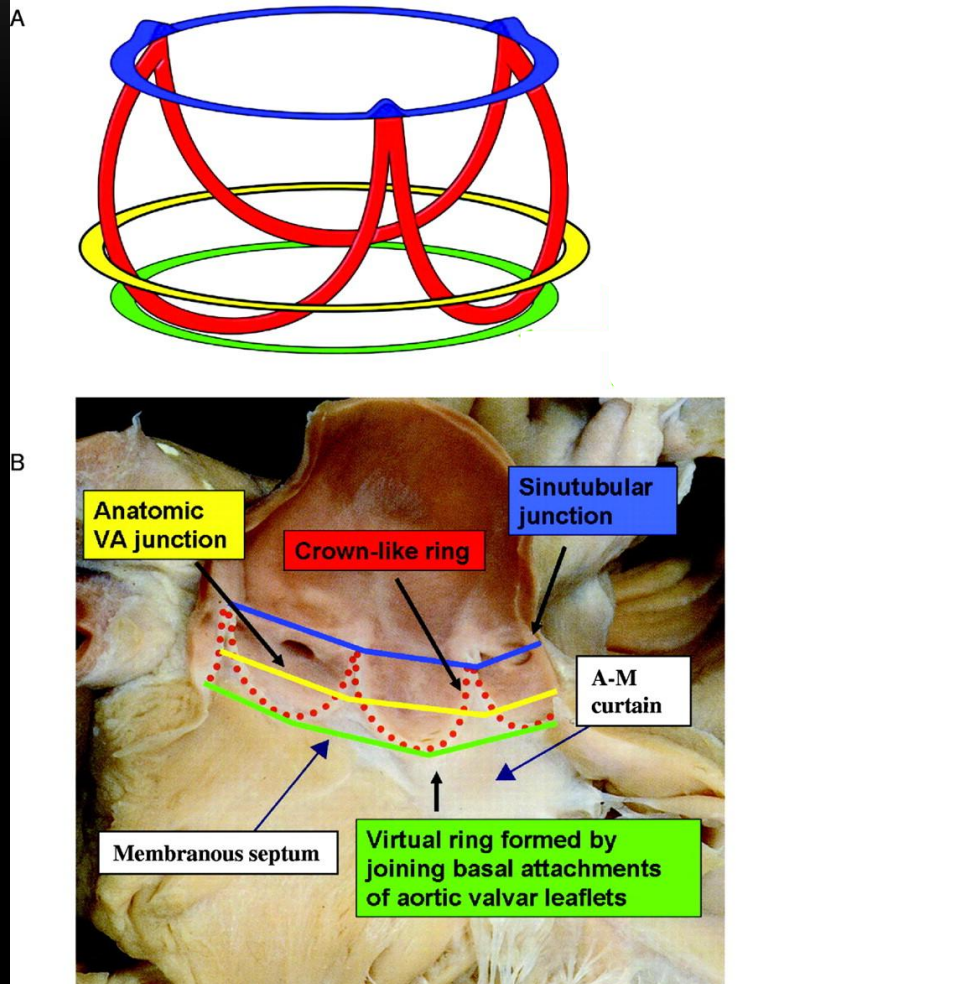


Piazza N et al. *Circ Cardiovasc Interv.* 2008;1:74-81

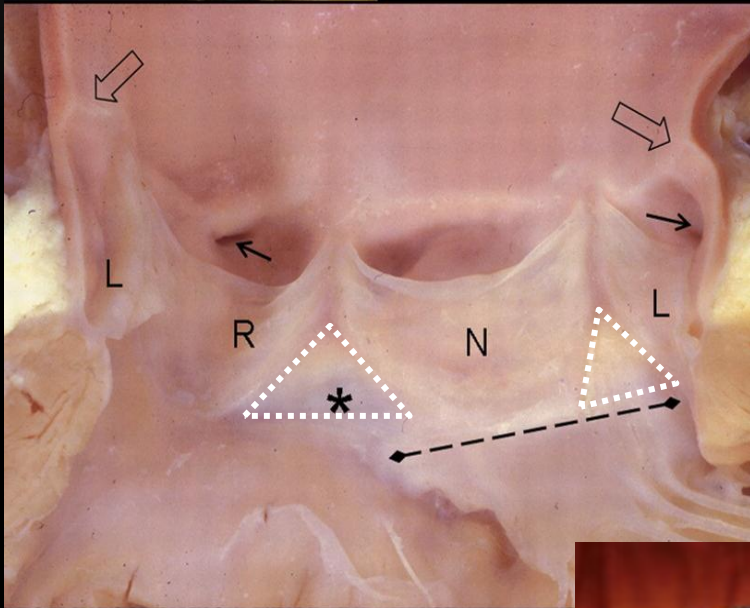
Loukas et *Clinical Anatomy* 00:00-00 (2013)



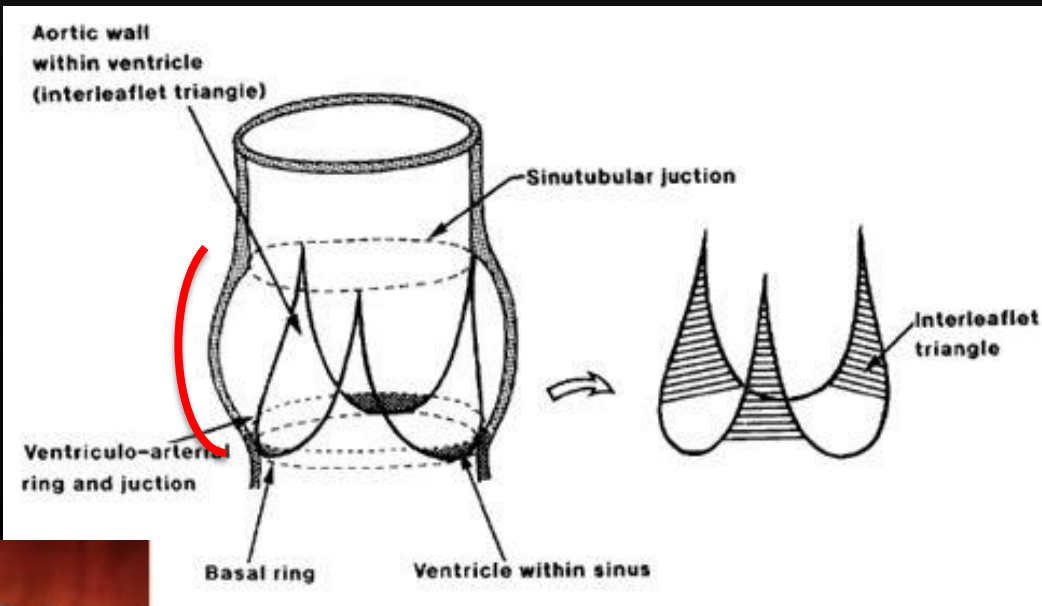
# INDICAZIONE ALL'INTERVENTO DI RIPARAZIONE DELLA RADICE AORTICA



# TRIANGOLI INTERLEAFLET



Ho S Y Eur J Echocardiogr 2009



SUTTON ET AL  
SURGICAL ANATOMY OF THE AORTIC VALVE

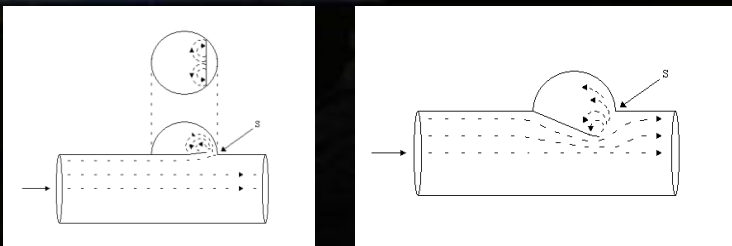
Ann Thorac Surg  
1995;95:419-27



# RADICE AORTICA= UNITÀ ANATOMO-FUNZIONALE

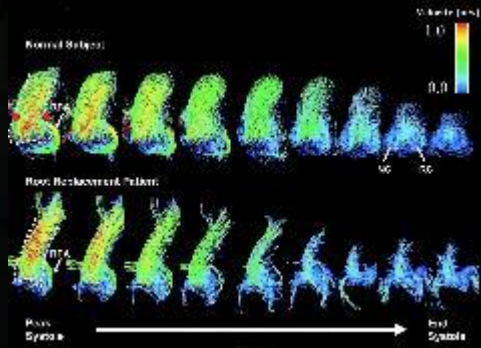
ADEGUATO MUOVIMENTO DI APERTURA E CHIUSURA DELLA VALVOLA

Bellhouse & bellhouse (1968)



DISTRIBUZIONE DEL CARICO DELLA PRESSIONE DIASTOLICA DALLE CUSPIDI VERSO LA PARETE AORTICA

J.P. kvitting (2004)



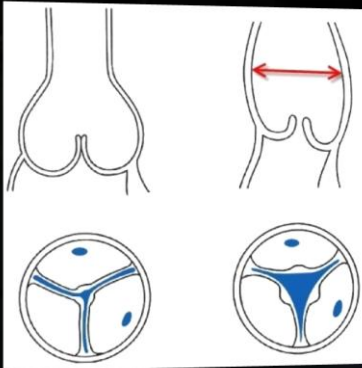
RIDUZIONE DELLO **STRESS MECCANICO** DELLE CUSPIDI



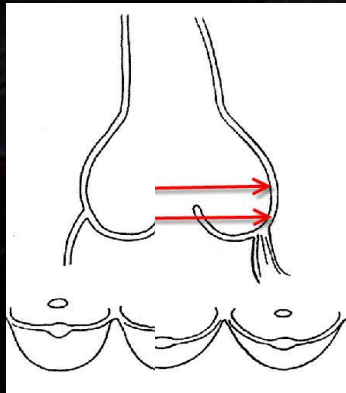


# FISIOPATOLOGIA DELL'INSUFFICIENZA AORTICA SECONDARIO ALLA PERDITA DELLA NORMALE GEOMETRIA DELLA RADICE

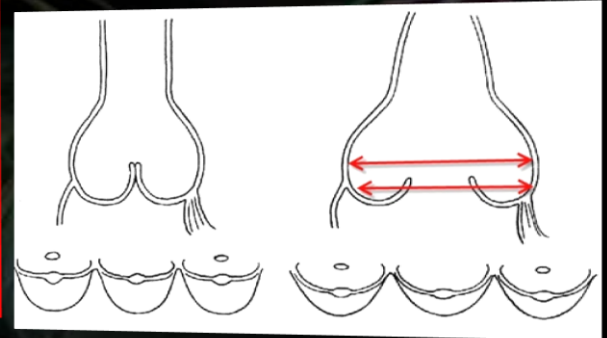
**DILATAZIONE  
GIUNZIONE S-T**



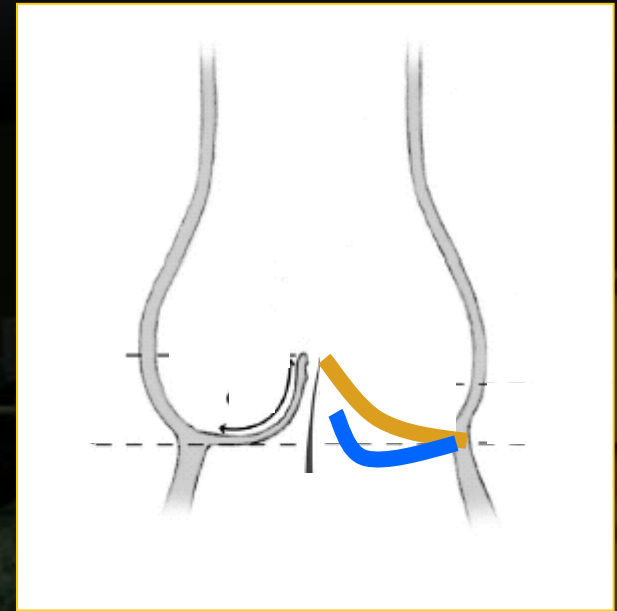
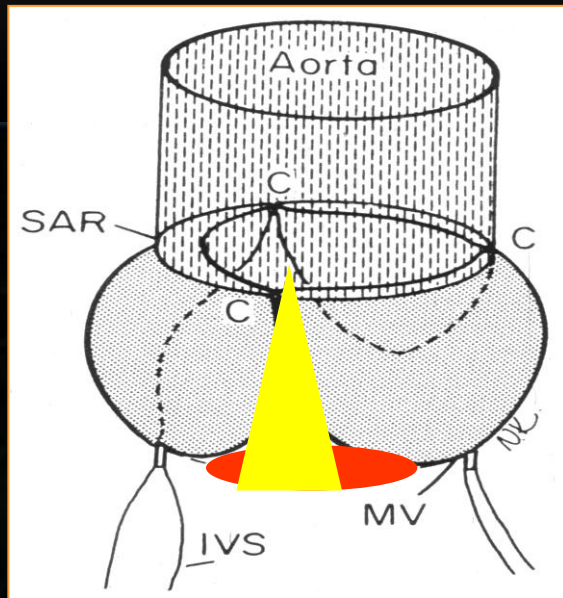
**DILATAZIONE DI UN  
SENO CORONARICO**



**ECTASIA  
ANULO- AORTICA**



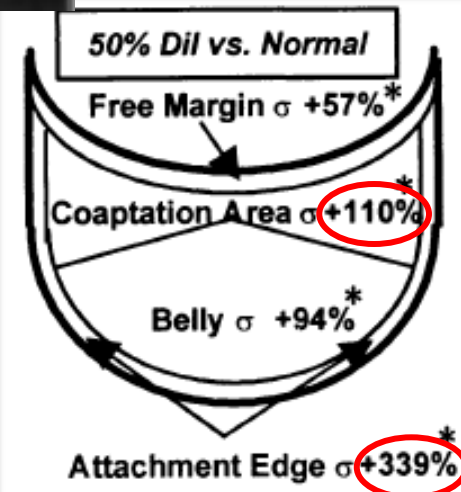
# IAO SECONDARIA ALLA PERDITA DELLA NORMALE GEOMETRIA DELLA RADICE



- ✓ Dilatazione della giunzione ventricolo-arteriosa
- ✓ L'altezza dei triangoli interlaflet è ridotta
- ✓ Perdita del normale livello di coaptazione (prolasso delle cuspidi)



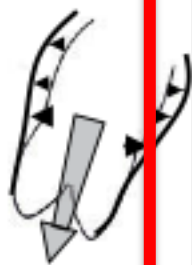
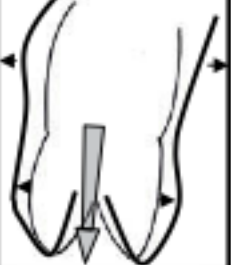
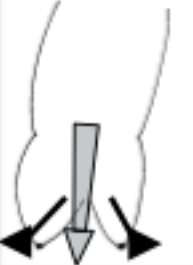



# AUMENTO DELLO **STRESS** SULLE CUSPIDI



GRANDE ET AL Ann Thorac Surg 2000;69:1851-7



# CLASSIFICAZIONE IAO

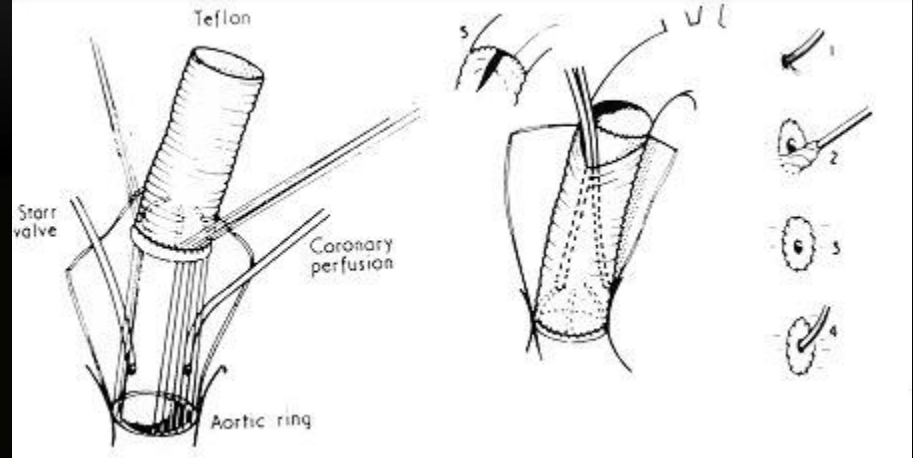
AI Class	Type I Normal cusp motion with FAA dilatation or cusp perforation				Type II Cusp Prolapse	Type III Cusp Restriction
	Ia	Ib	Ic	Id		
Mechanism						
Repair Techniques (Primary)	STJ remodeling <i>Ascending aortic graft</i>	Aortic Valve sparing: <i>Reimplantation or Remodeling with SCA</i>	SCA	Patch Repair <i>Autologous or bovine pericardium</i>	Prolapse Repair <i>Plication Triangular resection Free margin Resuspension Patch</i>	Leaflet Repair <i>Shaving Decalcification Patch</i>
(Secondary)	SCA		STJ Annuloplasty	SCA	SCA	SCA

Munir Boodhwani, J Thorac Cardiovasc Surg 2009;137:286-94



## BENTALL OPERATION

Hugh Bentall (1920-2012)



1966, London

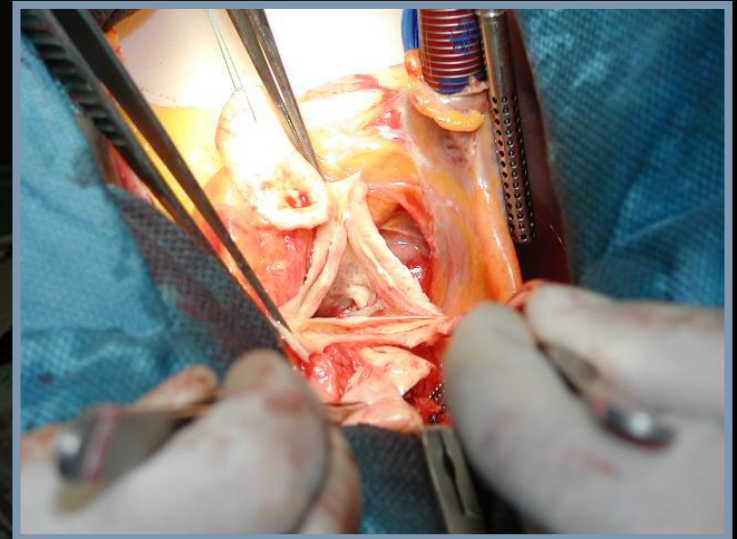
- > 30 years
- GOLD STANDARD
- SICURA
- LUNGO FOLLOW-UP
- BASSO RISCHIO



# 1/3 DEI PZ CHE ARRIVANO ALLA CHIRURGIA PER ANEURISMA DELLA RADICE AORTICA PRESENTA CUSPIDI "NORMALI" O MINIMAMENTE ALLUNGATE



PERCHÉ RIMUOVERE  
UNA VALVOLA  
ANATOMICAMENTE  
"NORMALE"?

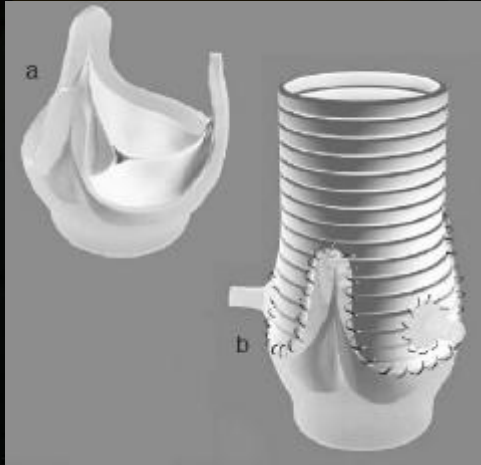




## AORTIC VALVE-SPARING OPERATIONS

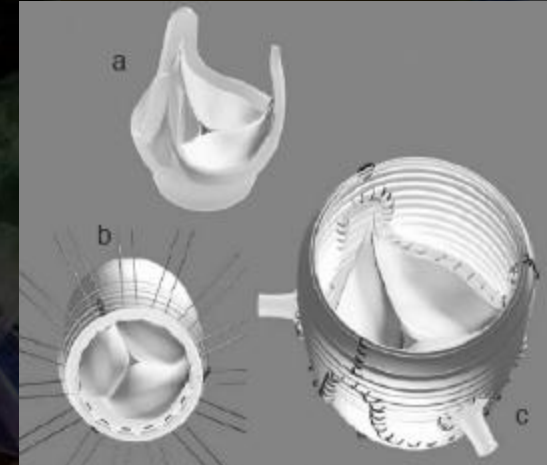


**Dr. Magdi Yacoub**



**REMDELING 1979**

**Dr. Tirone David**



**REIMPLANATION 1988**

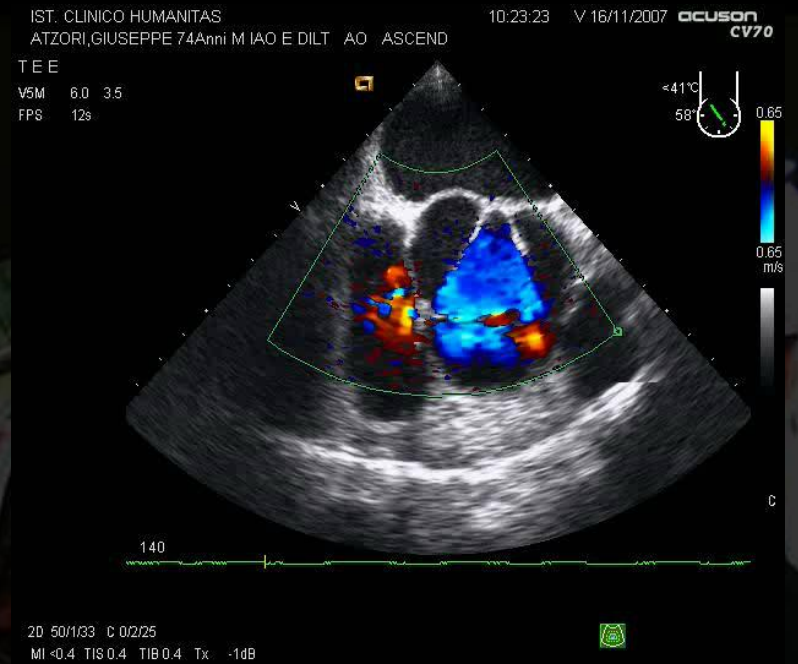


# PAZIENTI **CANDIDATI** ALLE VALVE- SPARING OPERATIONS

ANEURISMA DELLA RADICE AORTICA  
ASSOCIATO O MENO A IAO  
CON CUSPIDI VALVOLARI NON FIBROTICHE  
NE' CALCIFICHE  
E MOBILITA' CONSERVATA



# ECTASIA ANULO-AORTICA



INDICAZIONE ALL'INTERVENTO DI RIPARAZIONE DELLA RADICE AORTICA

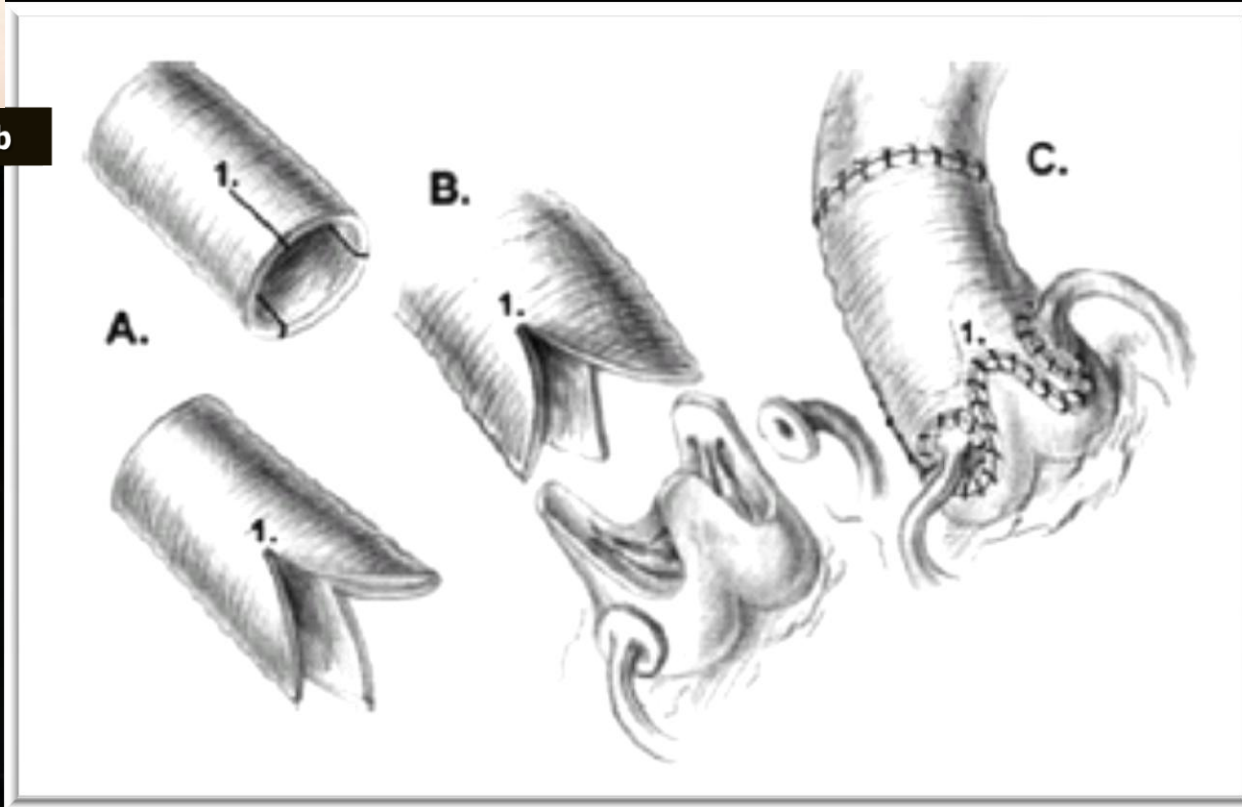


# TECNICHE CHIRURGICHE



Dr. Magdi Yacoub

## REMDELING 1979

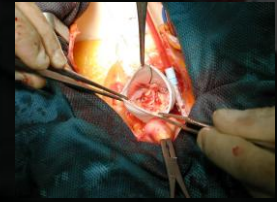
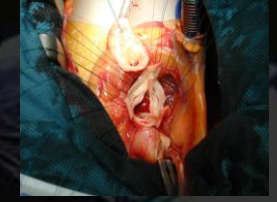
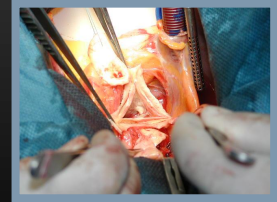
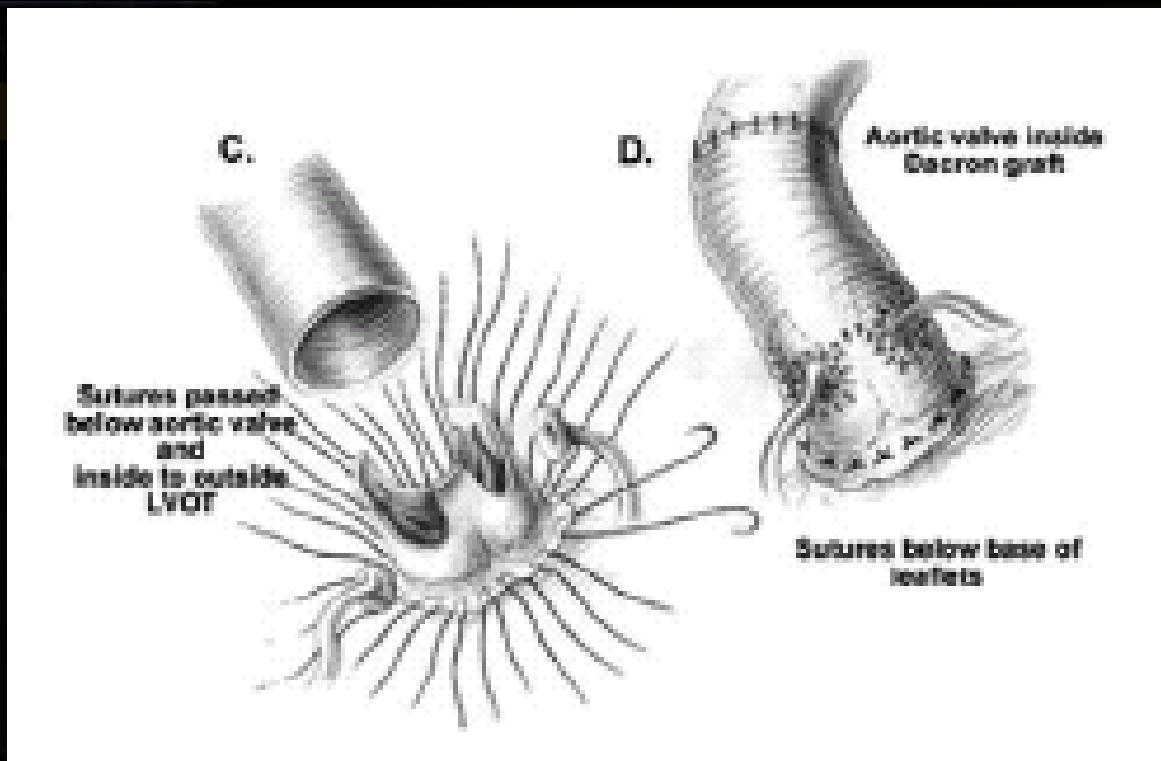


# TECNICHE CHIRURGICHE



Dr. Tirone David

## REIMPLANATION 1988



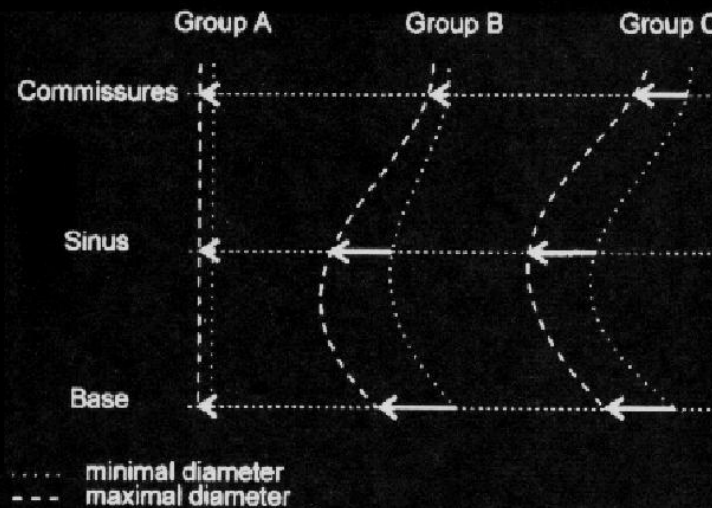
# CYCLIC CHANGES IN DIMENSIONS

NORMAL AORTIC ROOT

REMODELING

REIMPLANTATION STRAIGHT  
GRAFT

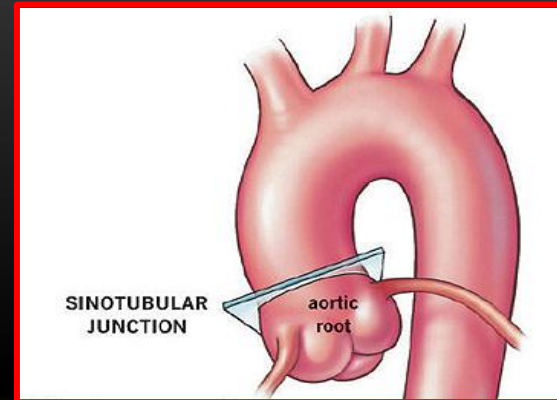
## MECHANICAL PROPERTIES



**Figure 5.** Diagram of cyclic changes in dimensions derived from mean values of measured data at base, sinus, and commissural levels. Note reduced distensibility in group A at all levels of aortic root.

Leyh et al. Circulation 1999;100:2153-2160

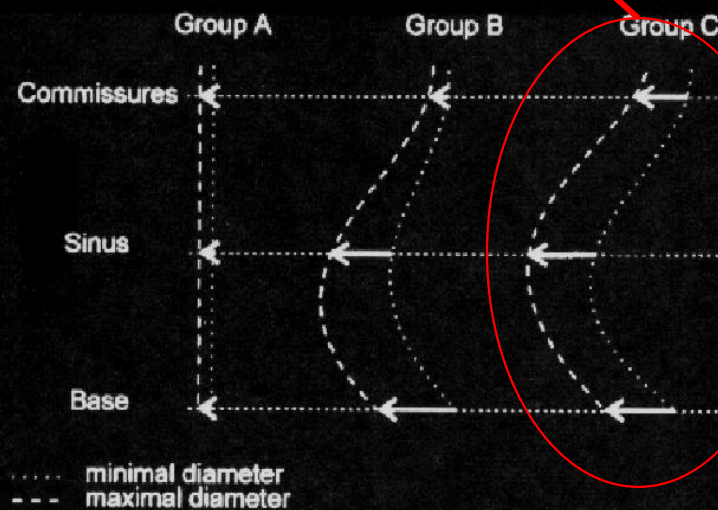




NORMAL AORTIC ROOT

REMODELING

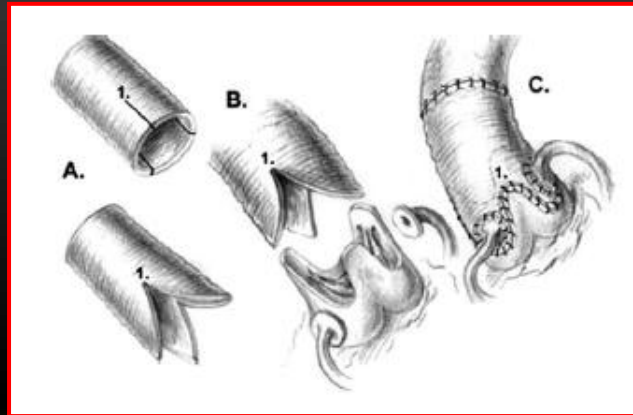
REIMPLANTATION STRAIGHT  
GRAFT



**Figure 5.** Diagram of cyclic changes in dimensions derived from mean values of measured data at base, sinus, and commissural levels. Note reduced distensibility in group A at all levels of aortic root.

Leyh et al. Circulation 1999;100:2153-2160

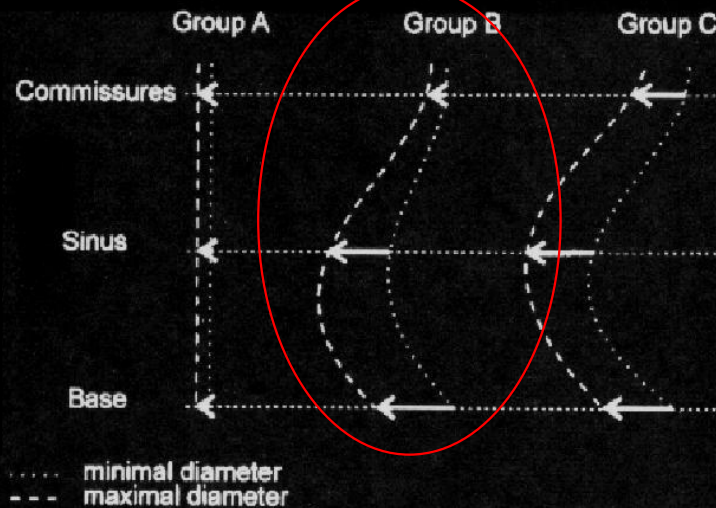




NORMAL AORTIC ROOT

REMODELING

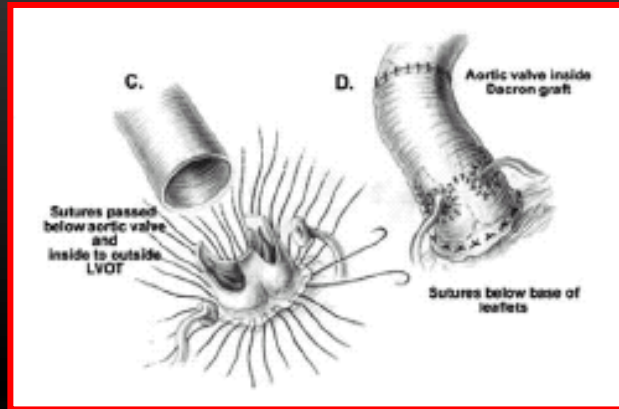
REIMPLANTATION STRAIGHT GRAFT



**Figure 5.** Diagram of cyclic changes in dimensions derived from mean values of measured data at base, sinus, and commissural levels. Note reduced distensibility in group A at all levels of aortic root.

Leyh et al. Circulation 1999;100:2153-2160

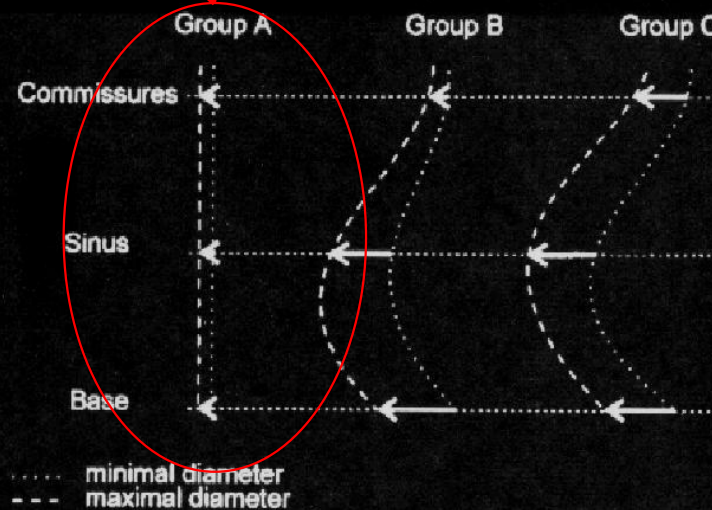




NORMAL AORTIC ROOT

REMODELING

REIMPLANTATION STRAIGHT GRAFT

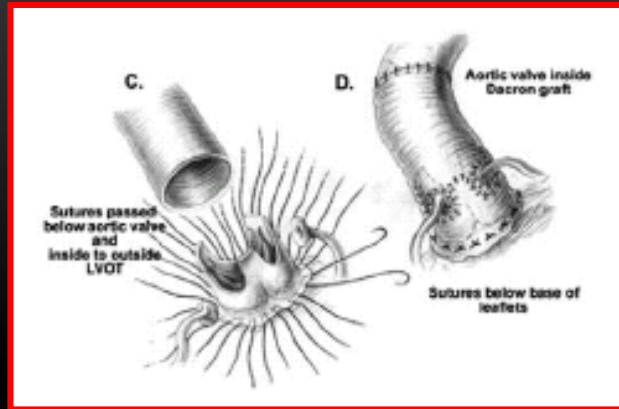


**Figure 5.** Diagram of cyclic changes in dimensions derived from mean values of measured data at base, sinus, and commissural levels. Note reduced distensibility in group A at all levels of aortic root.

Leyh et al. Circulation 1999;100:2153-2160



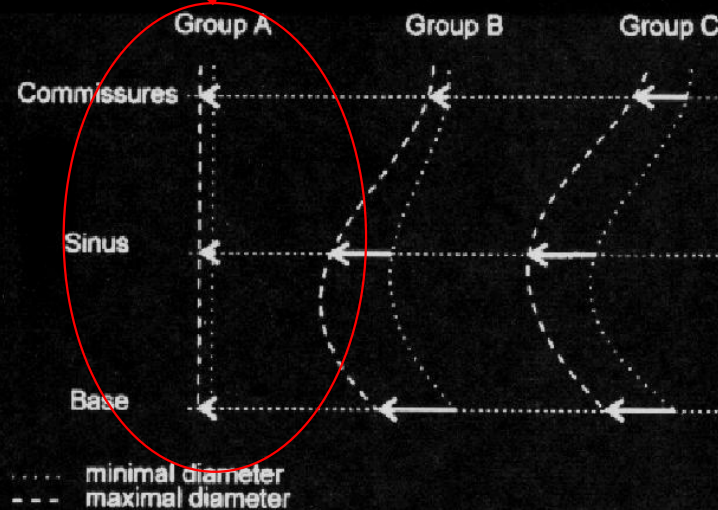




NORMAL AORTIC ROOT

REMODELING

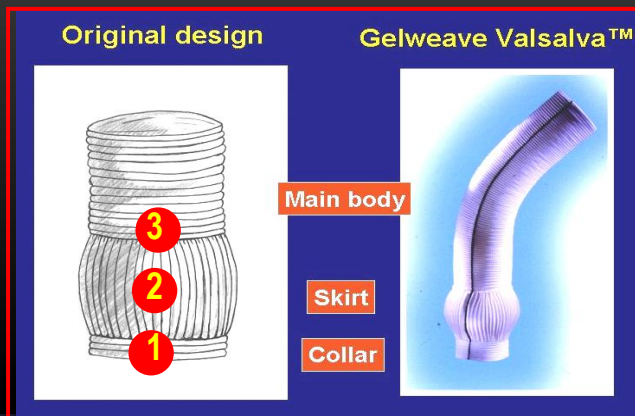
REIMPLANTATION STRAIGHT GRAFT



**Figure 5.** Diagram of cyclic changes in dimensions derived from mean values of measured data at base, sinus, and commissural levels. Note reduced distensibility in group A at all levels of aortic root.

Leyh et al. Circulation 1999;100:2153-2160





NORMAL AORTIC ROOT

REMODELING

REIMPLANTATION STRAIGHT GRAFT

REIMPLANTATION VALSALVA GRAFT

David + Valsalva

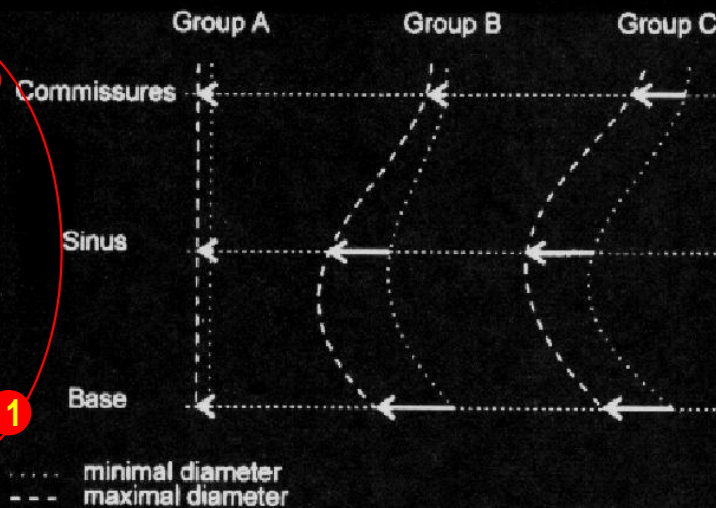
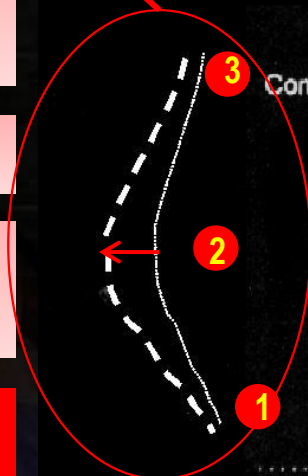
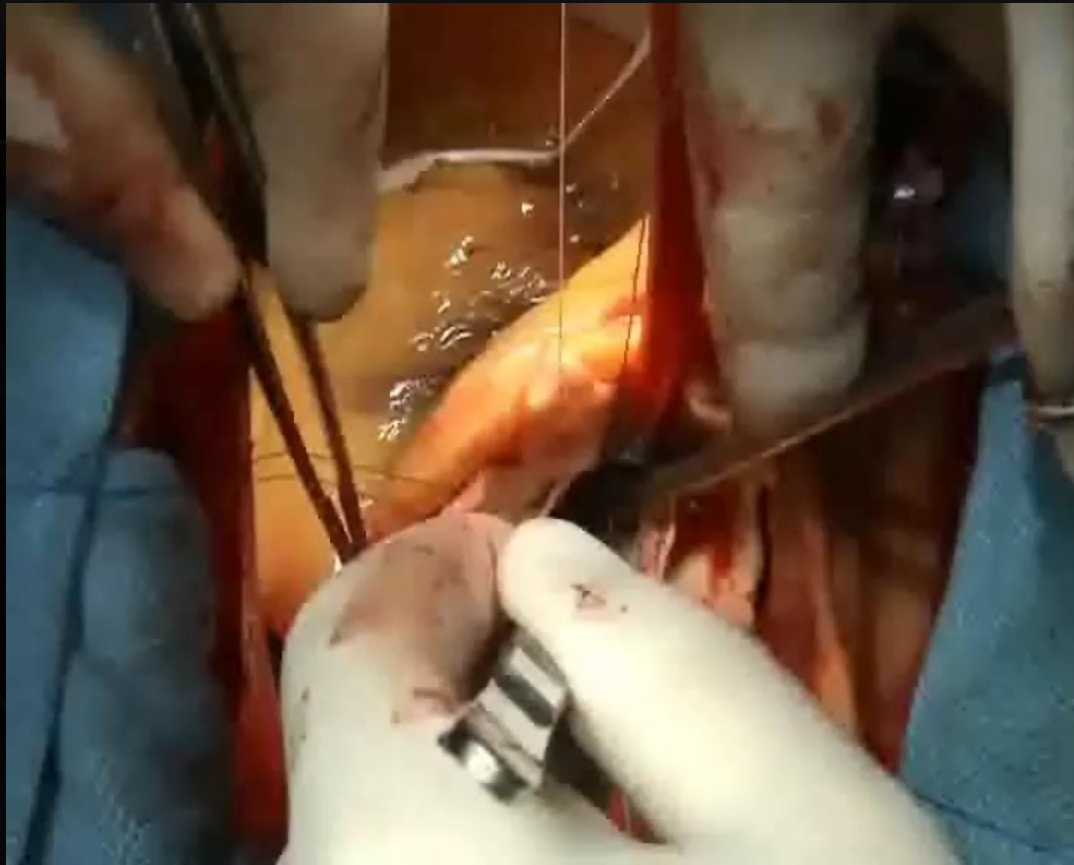


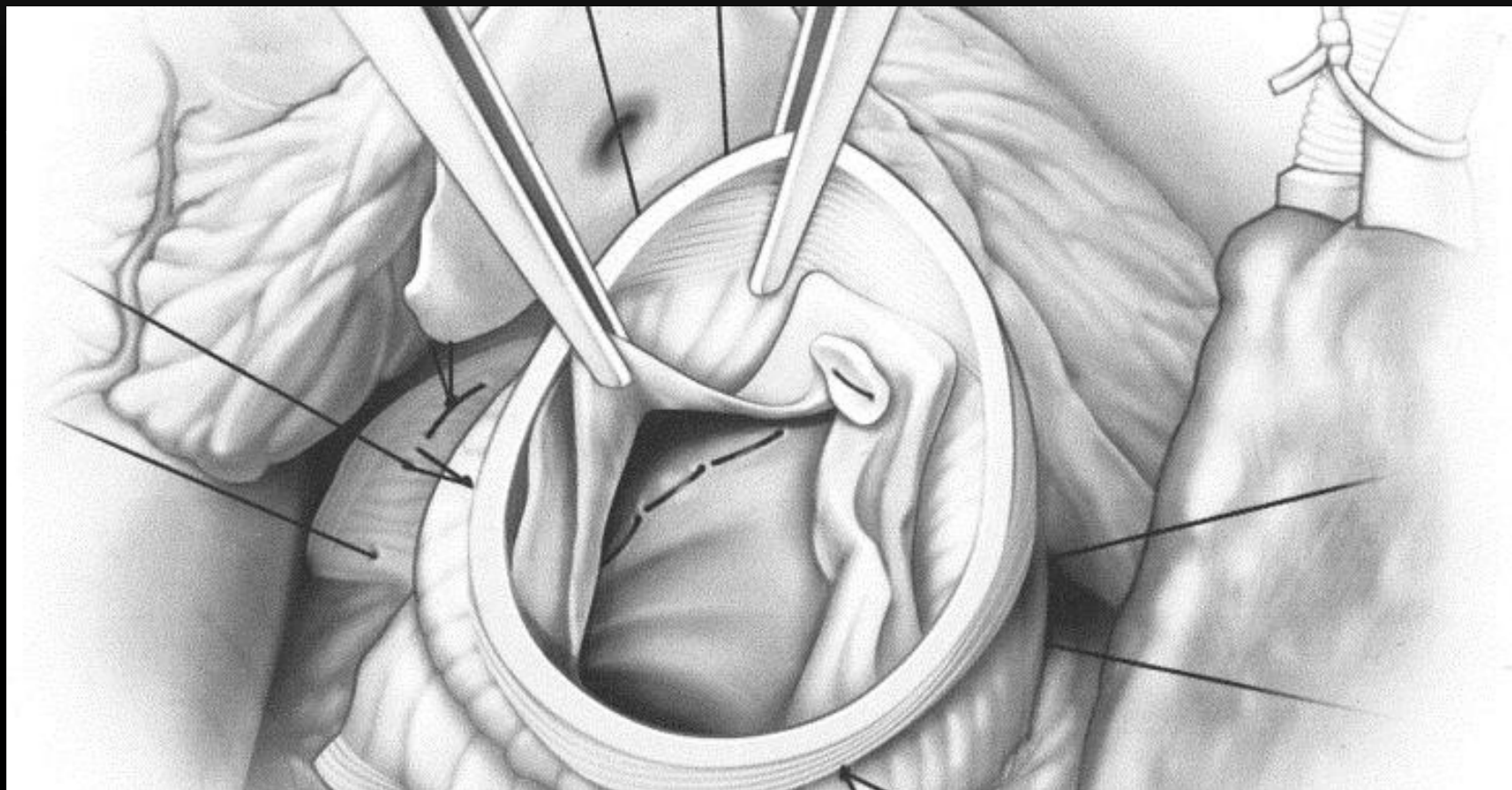
Figure 5. Diagram of cyclic changes in dimensions derived from mean values of measured data at base, sinus, and commissural levels. Note reduced distensibility in group A at all levels of aortic root.



# ANULOPLASTICA

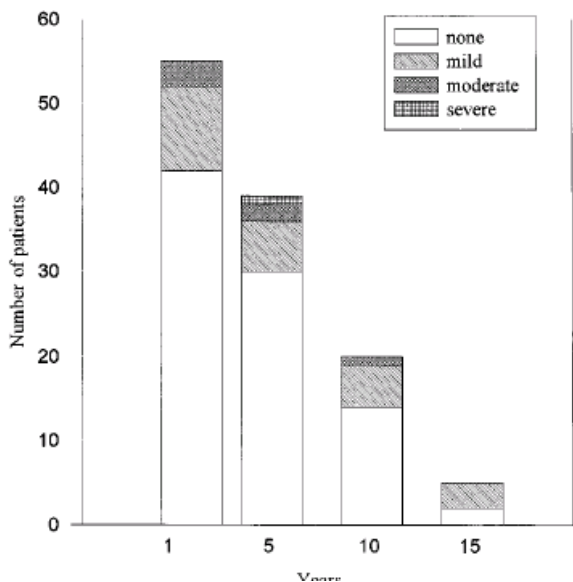


# ANULOPLASTICA



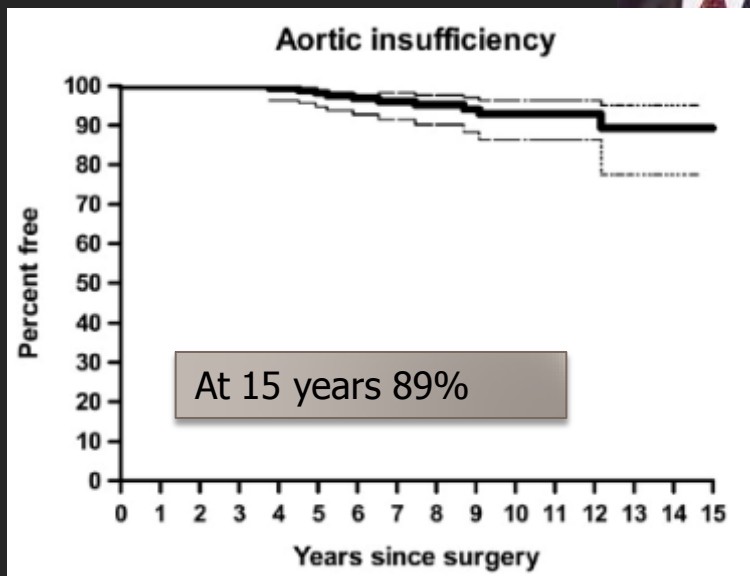
# TECNICHE A CONFRONTO

## REMODELING



15 years freedom from AI  
 No/trivial 63.6%  
 mild/moderate 33.3% severe 3%

## REIMPLANTATION

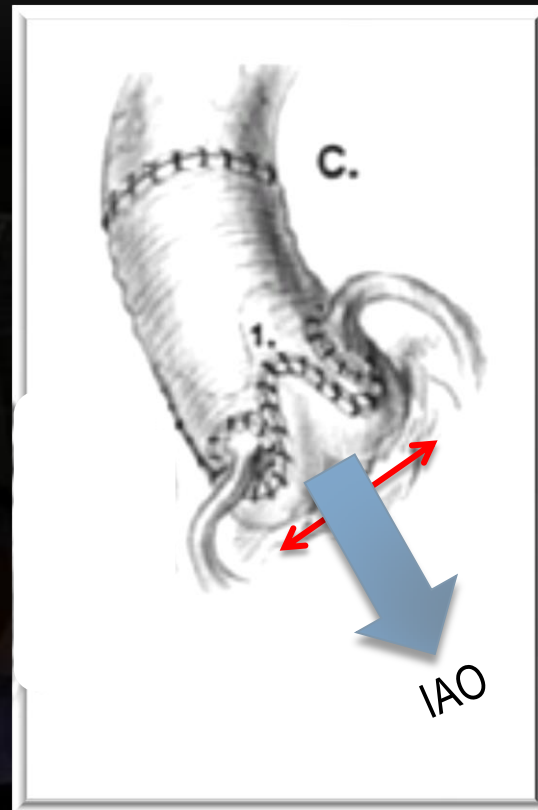


Freedom from AI mod/ severe

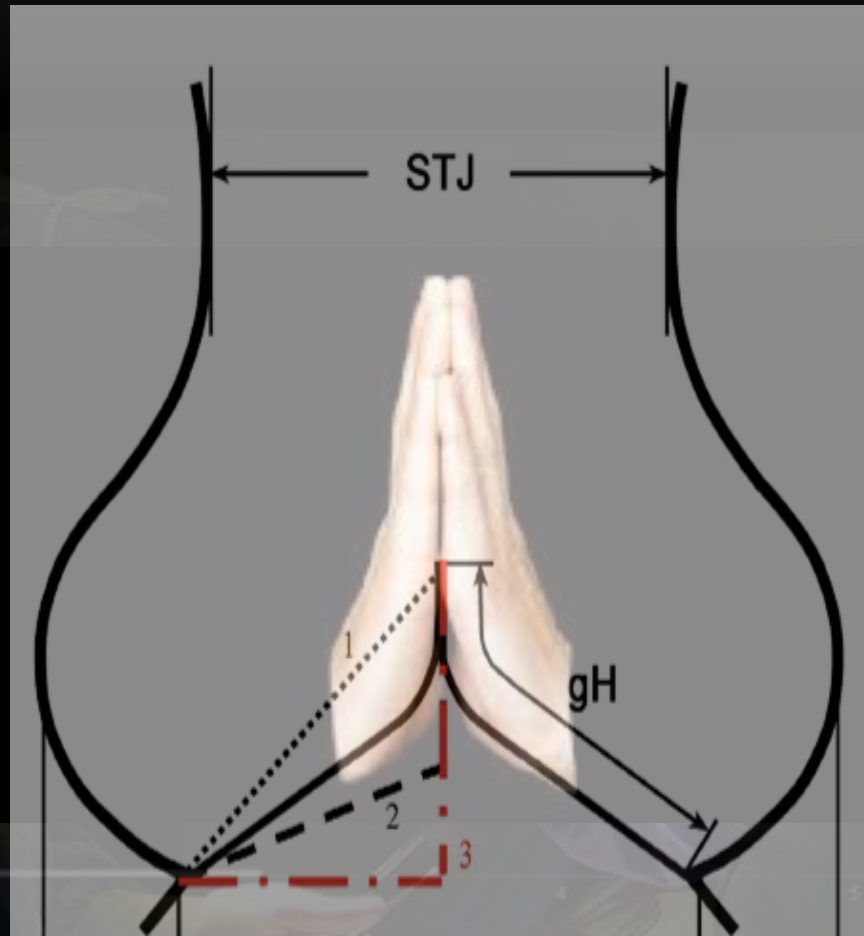




# DILATAZIONE DELL'ANULUS



# ALTEZZA DELLA CUSPIDI AORTICHE



Duke Edward Cameron, MD

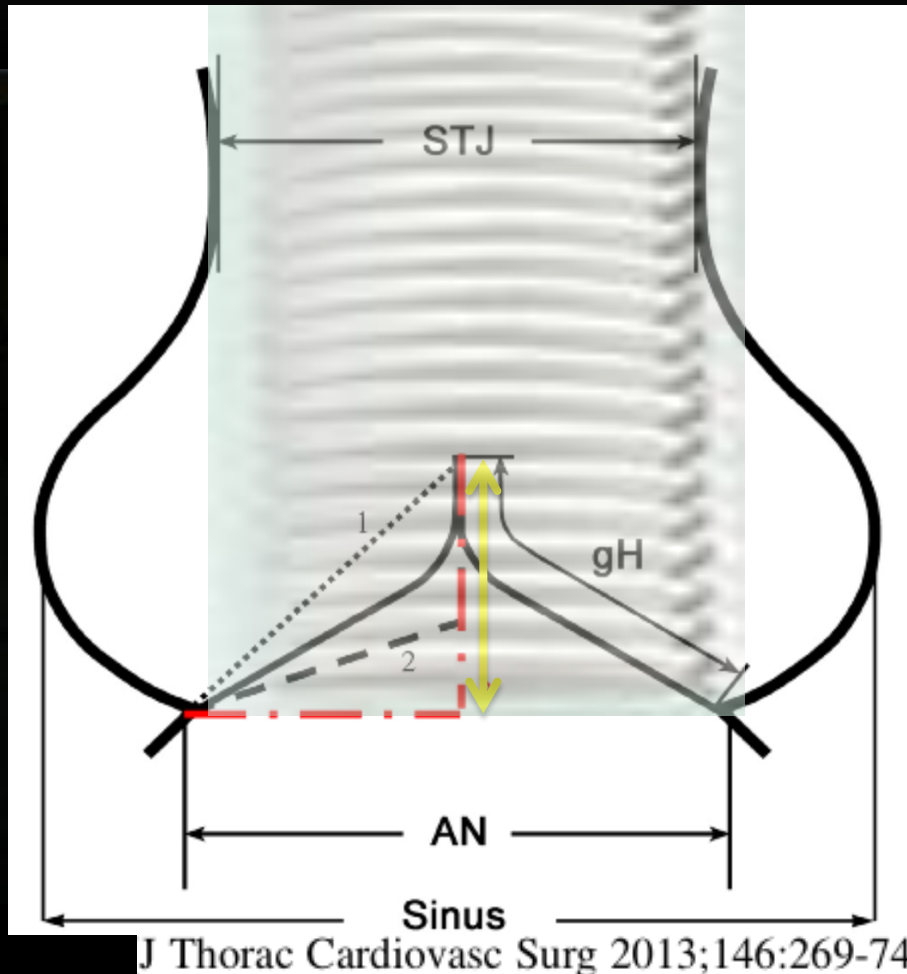




# ALTEZZA DELLA CUSPIDI AORTICHE



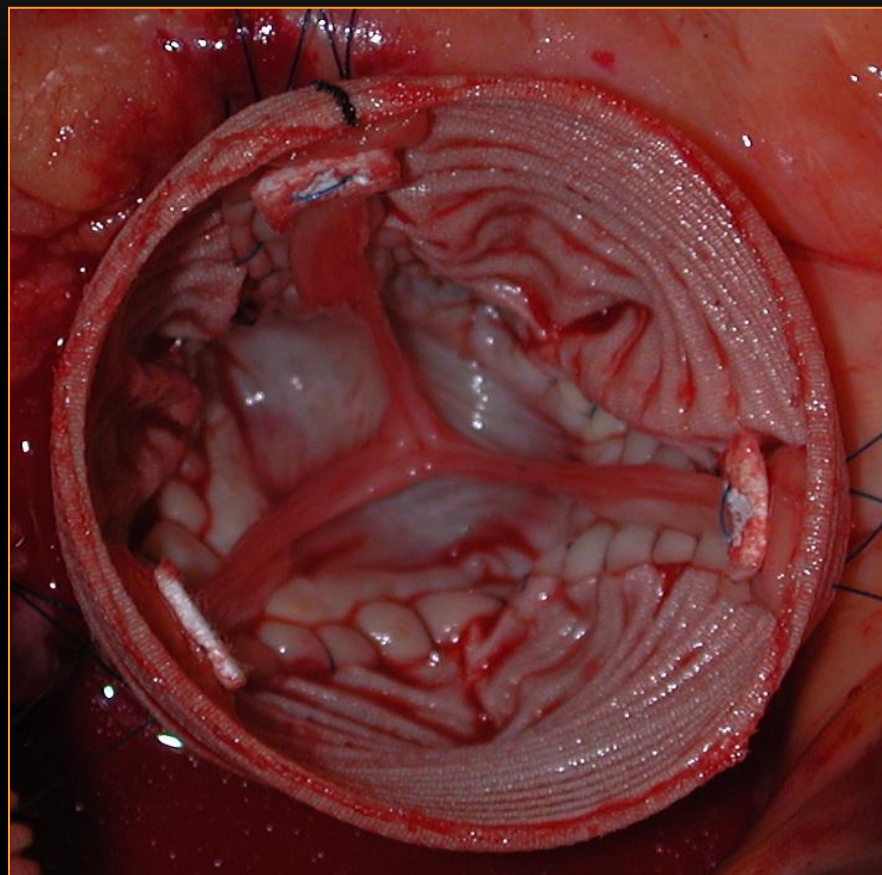
Hans-Joachim Schäfers, MD



**Effective height** = distanza tra il margine libero delle cuspidi e il piano aorto-ventricolare

Negli individui sani = **8-10 mm**





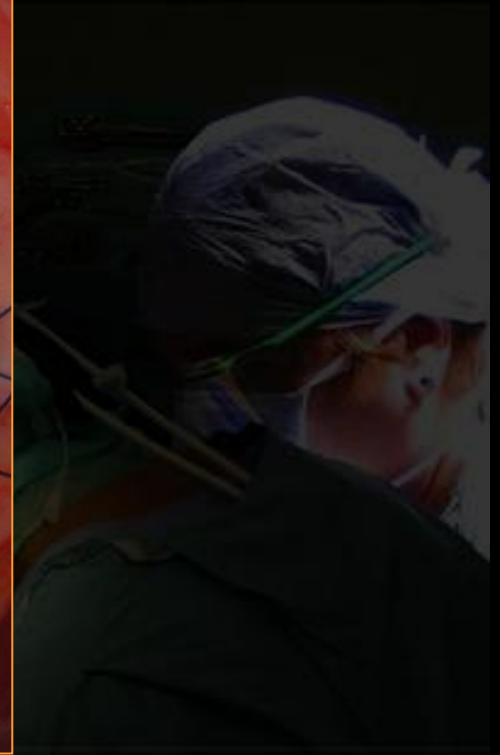
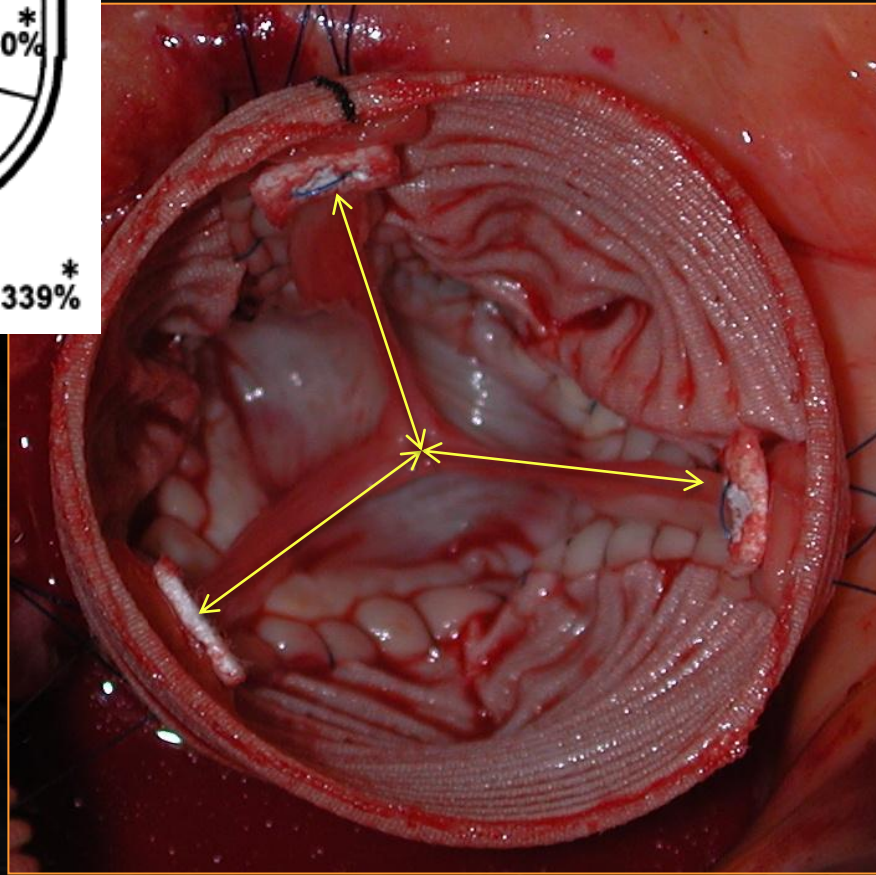
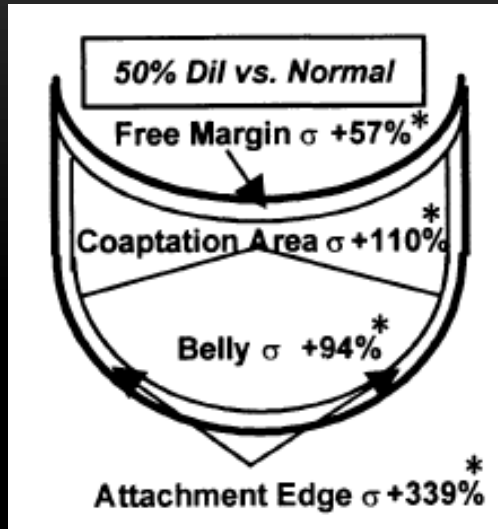
CORRETTA POSIZIONE DI  
CHIUSURA DELLA VALVOLA

ASSENZA DI "RESTRICTED  
MOTION"

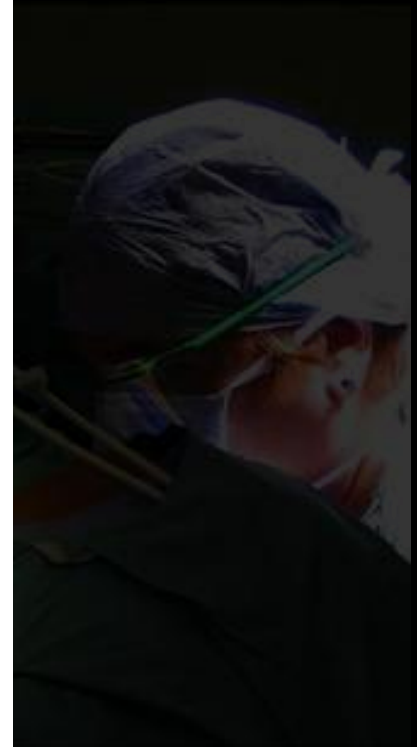
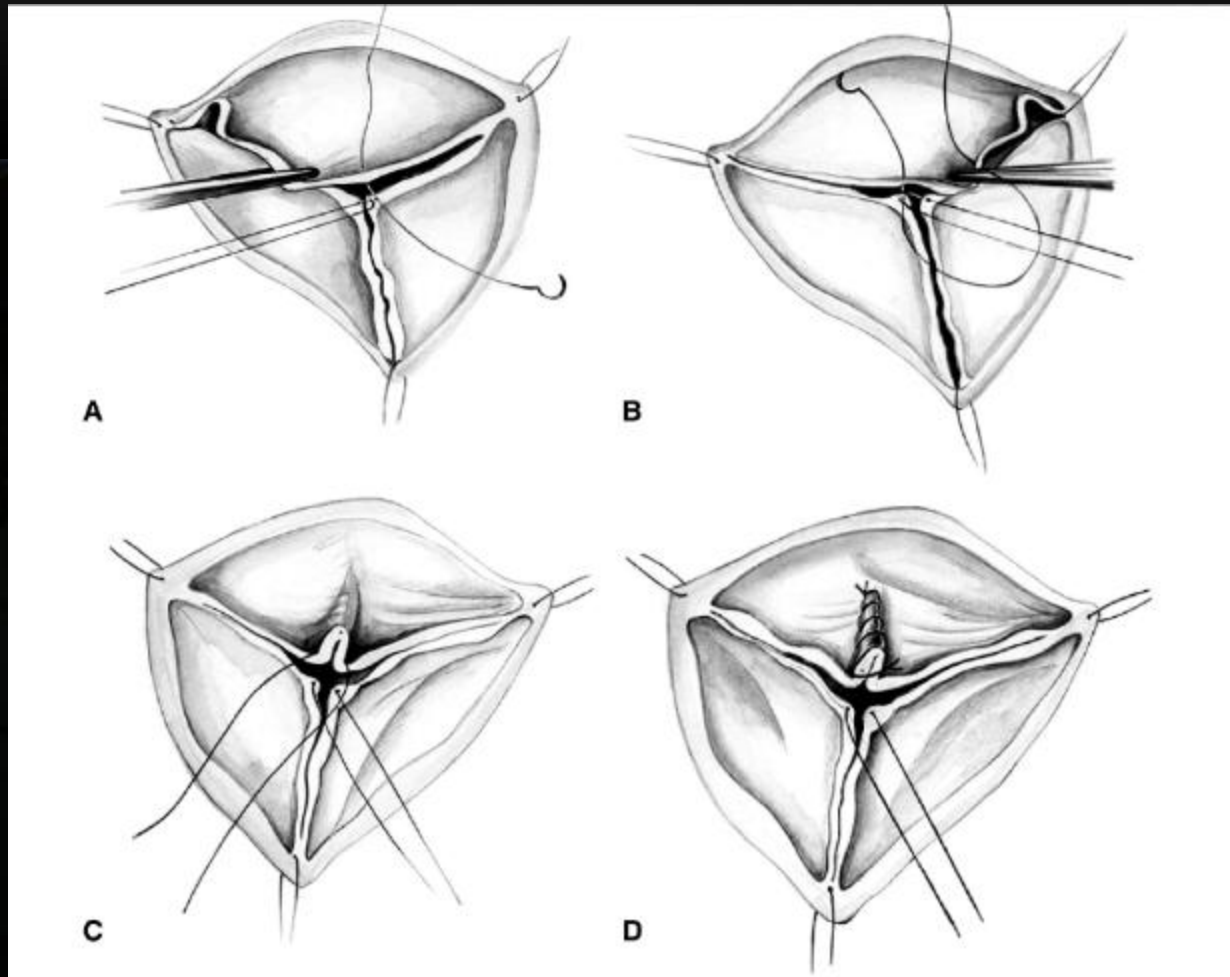
AI Class	Type I Normal cusp motion with FAA dilatation or cusp perforation				Type II Cusp Prolapse	Type III Cusp Restriction
	1a	1b	1c	1d		
Mechanism						
Repair Techniques (Primary)	STJ remodeling <i>Ascending aortic graft</i>	Aortic Valve sparing: <i>Reimplantation or Remodeling with SCA</i>	SCA	Patch Repair <i>Autologous or bovine pericardium</i>	Prolapse Repair <i>Plication Triangular resection Free margin Resuspension Patch</i>	Leaflet Repair <i>Shaving Decalcification Patch</i>
(Secondary)	SCA		STJ Annuloplasty	SCA	SCA	SCA

Munir Boodhwani, J Thorac Cardiovasc Surg 2009;137:286-94

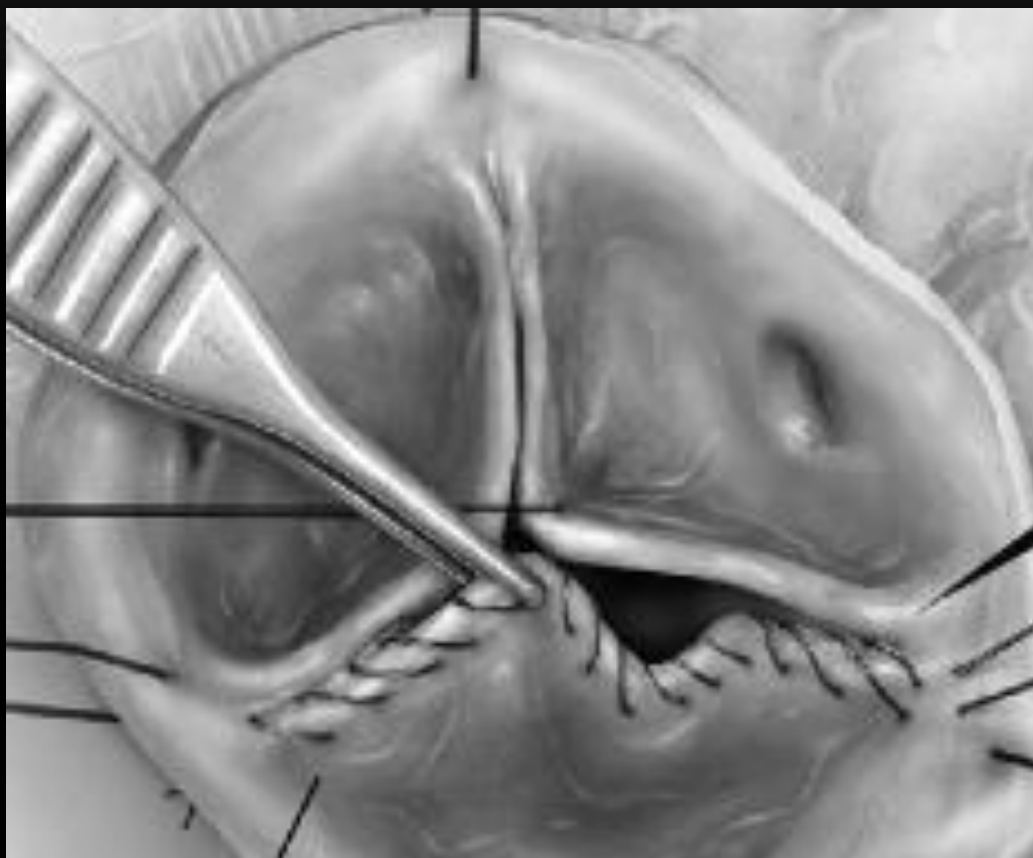
# PLASTICA AGGIUNTIVA DELLE CUSPIDI



# PLICATURA DEL NODULO DI ARANZIO



# ACCORCIAMENTO DEL MARGINE LIBERO



# RIPARAZIONE FENESTRAZIONE



## Cusp repair during aortic valve-sparing operation: technical aspects and impact on results

Fabrizio Settepani, Antioco Cappai, Giuseppe M. Raffa, Alessio Basciu, Alessandro Barbone, Daniele Berwick, Enrico Citterio, Diego Ornaghi, Giuseppe Tarelli and Pietro G. Malvindi

J Cardiovasc Med 2014, 15:000-000

Table 2 Characteristics and results of cusp repair during valve-sparing operation in **tricuspid** aortic valve

Authors	David and Armstrong <sup>16</sup>	de Kerchove <i>et al.</i> <sup>14</sup>	Aicher <i>et al.</i> <sup>21</sup>	Oka <i>et al.</i> <sup>22</sup>
Sparing operation	267	39	193	101
Tricuspid aortic valve (TAV)/bicuspid aortic valve (BAV)	TAV	TAV	TAV	TAV/BAV
Valve repair	64 (24%)	39 (100%)	103 (53%)	51 (50%)
Reimplantation	58 (90.7%)	36 (92.3%)	0	51 (100%)
Remodeling	6 (9.3)	3 (7.6%)	103 (100%)	0
Free margin shortening/resuspension	4 (6.25%)	14 (35.8%)	0	15 (29.4%)
Plication of Arantius nodule	0	18 (46.1%)	102 (99%)	32 (62.7%)
Plication at the commissures	0	0	0	2 (2.9%)
Free margin shortening/resuspension + plication of Arantius nodule	60 (93.7%)	6 (15.3%)	0	0
Triangular resection	0	0	2 (1.9%)	0
Pericardial patch	0	0	4 (3.8%)	8 (15.6%)
Reoperation for valve failure	1/64 (1.5%)	2/39 (5.1%)	n.a.	7/51 (13.7%) (5 TAV + 2 BAV)

BAV, bicuspid aortic valve; TAV, tricuspid aortic valve.



# PLASTICA AGGIUNTIVA DELLE CUSPIDI

J Cardiovasc Med 2014, 15:000–000

Table 2 Characteristics and results of cusp repair during valve-sparing operation in **tricuspid** aortic valve

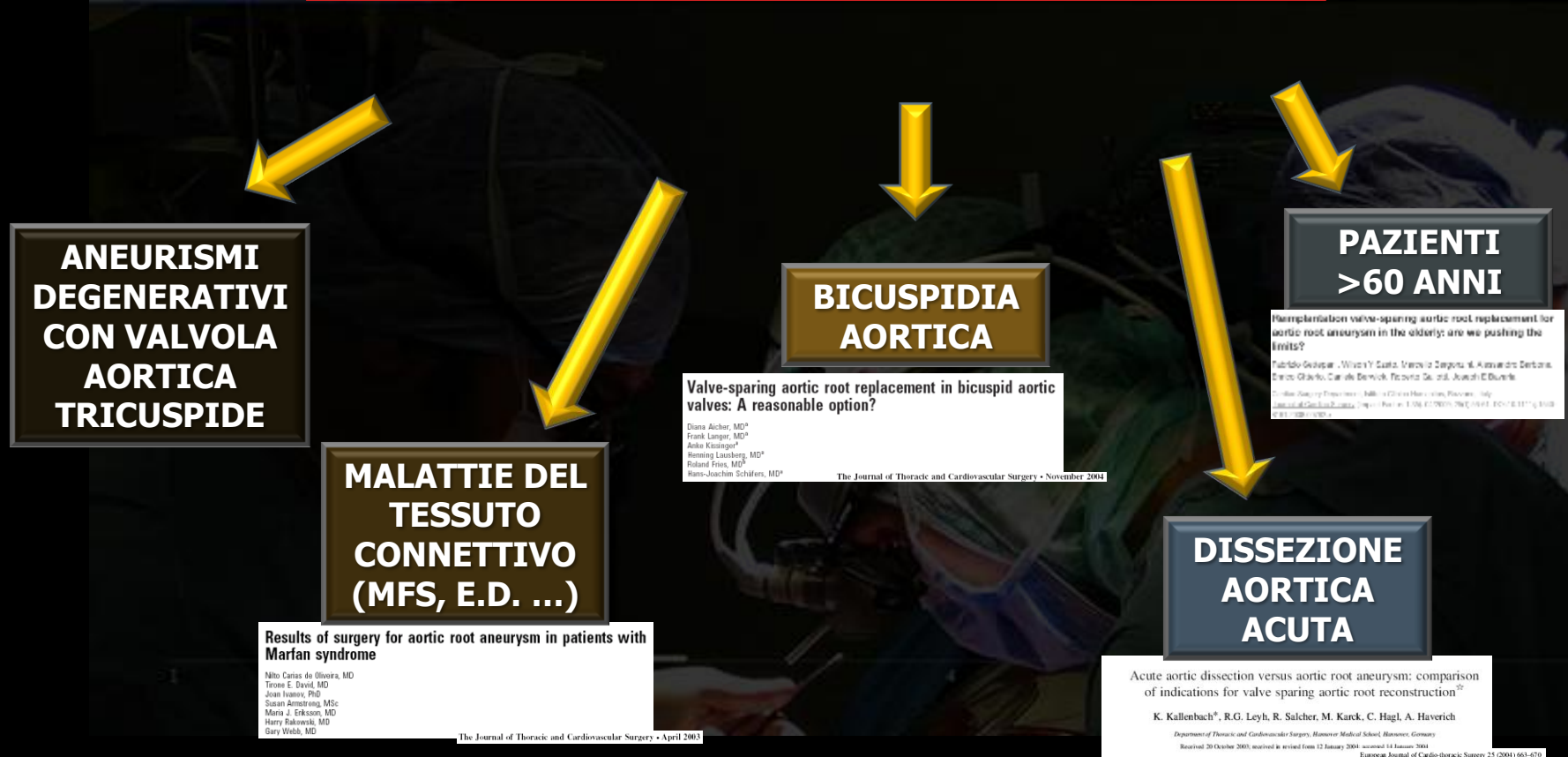
Authors	David and Armstrong <sup>16</sup>	de Kerchove <i>et al.</i> <sup>14</sup>	Aicher <i>et al.</i> <sup>21</sup>	Oka <i>et al.</i> <sup>22</sup>
Sparing operation	267	39	193	101
Tricuspid aortic valve (TAV)/bicuspid aortic valve (BAV)	TAV	TAV	TAV	TAV/BAV
Valve repair	64 (24%)	39 (100%)	103 (53%)	51 (50%)
Reimplantation	58 (90.7%)	36 (92.3%)	0	51 (100%)
Remodeling	6 (9.3)	3 (7.6%)	103 (100%)	0
Free margin shortening/resuspension	4 (6.25%)	14 (35.8%)	0	15 (29.4%)
Plication of Arantius nodule	0	18 (46.1%)	102 (99%)	32 (62.7%)
Plication at the commissures	0	0	0	2 (2.9%)
Free margin shortening/resuspension + plication of Arantius nodule	60 (93.7%)	6 (15.3%)	0	0
Triangular resection	0	0	2 (1.9%)	0
Pericardial patch	0	0	4 (3.8%)	8 (15.6%)
Reoperation for valve failure	1/64 (1.5%)	2/39 (5.1%)	n.a.	7/51 (13.7%) (5 TAV + 2 BAV)

BAV, bicuspid aortic valve; TAV, tricuspid aortic valve.



# ALLARGAMENTO INDICAZIONI

## AORTIC VALVE-SPARING OPERATIONS



Results of surgery for aortic root aneurysm in patients with Marfan syndrome

Nilo Carlos de Oliveira, MD  
Terone E. David, MD  
Joan Hansen, PhD  
Susan Armstrong, MSc  
Marie J. Eriksson, MD  
Harry Rakowski, MD  
Gary Webb, MD

The Journal of Thoracic and Cardiovascular Surgery • April 2003

Valve-sparing aortic root replacement in bicuspid aortic valves: A reasonable option?

Diane Aicher, MD<sup>a</sup>  
Frank Langer, MD<sup>a</sup>  
Ailke Koolenget<sup>b</sup>  
Henning Lamsberg, MD<sup>a</sup>  
Roland Fries, MD<sup>b</sup>  
Hans-Joachim Schwaiblmair, MD<sup>a</sup>

The Journal of Thoracic and Cardiovascular Surgery • November 2004

Implantation valve-sparing aortic root replacement for aortic root aneurysm in the elderly: are we pushing the limits?

Fabrizio Gelsomari, Wilfried G. Castejón, Marco Di Biase, Alessandro Bertoni, Enrico Olivetti, Carlo de Bontis, Roberto Scatena, Alessio Di Biase

Journal of Thoracic and Cardiovascular Surgery • February 2005

Acute aortic dissection versus aortic root aneurysm: comparison of indications for valve sparing aortic root reconstruction<sup>27</sup>

K. Kallenbach<sup>a</sup>, R.G. Leyh, R. Salcher, M. Karck, C. Hagl, A. Haverich

Department of Thoracic and Cardiovascular Surgery, Hannover Medical School, Hannover, Germany

Received 20 October 2003; received in revised form 12 January 2004; accepted 14 January 2004

European Journal of Cardio-thoracic Surgery 25 (2004) 663-670



# COSA CAMBIA NELLA VALVOLA **BICUSPIDE**



# BICUSPIDIA AORTICA

- ANOMALIA CARDIACA CONGENITA PIU' **FREQUENTE** NELL'UOMO
- TENENDO CONTO DI TUTTE LE COMPLICANZE ASSOCIATE E' RESPONSABILE DI UNA **MORTALITA' E MORBILITA' SUPERIORE A TUTTE LE ALTRE CARDIOPATIE CONGENITE COMBinate**



# BICUSPIDIA AORTICA

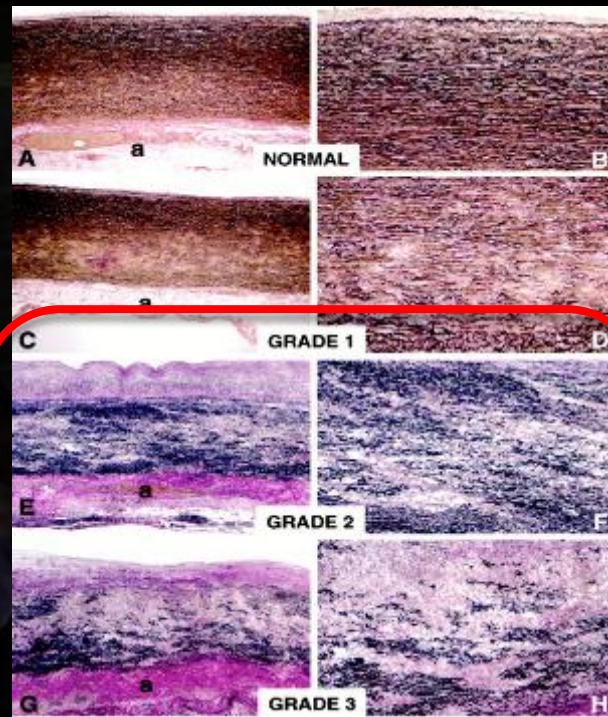
La dilatazione della radice aortica è una componente della  
“**BAV syndrome**”



RISCHIO DEL **40%** NEL LUNGO TERMINE DI  
RAGGIUNGERE UN DIAMETRO **> 40 mm**

# BICUSPIDIA AORTICA

## Histology of the BAV aorta



Niwa K, et al.  
*Circulation* (2001) 103:393-400



# BICUSPIDIA AORTICA

2 DIVERSI FENOTIPI DI **AORTOPATIA** ASSOCIATI A **BAV**

## **STENOSIS** PHENOTYPE

DILATAZIONE  
DELL'AORTA  
ASCENDETE SU BASE  
**EMODINAMICA**

PROGNOSI  
LONG-TERM DELLA  
PARETE E'  
**FAVOREVOLE**  
IN SEGUITO A  
SVAO

## **ROOT** PHENOTYPE

DILATAZIONE  
DELL'AORTA  
ASCENDETE  
SU BASE  
**GENETICA**

RISCHIO  
AUMENTATO DI  
**COMPLICANZE DI**  
**PARETE** A  
PRESCINDERA  
DALLA MALATTIA  
VALVOLARE



# BICUSPIDIA AORTICA

CHIRURGIA

GIOVANI

MASCHI

III – IV  
DECADE



ROOT PHENOTYPE

DILATAZIONE  
DELL'AORTA  
ASCENDETE  
SU BASE **GENETICA**

RISCHIO AUMENTATO  
DI **COMPLICANZE DI  
PARETE** A  
PRESCINDERA  
DALLA MALATTIA  
VALVOLARE





REVIEW

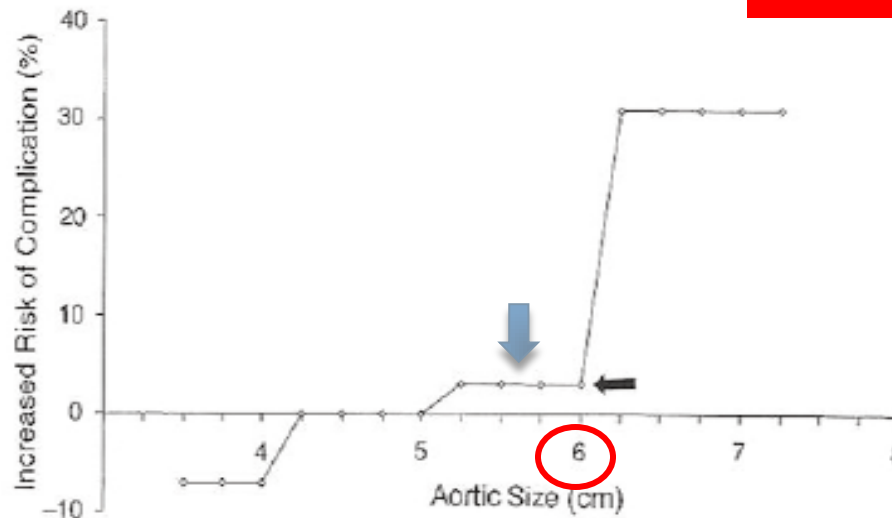
YALE JOURNAL OF BIOLOGY AND MEDICINE 81 (2008), pp.175-186.

## Thoracic Aortic Aneurysm: Reading the Enemy's Playbook

John A. Elefteriades, MD

*Section of Cardiothoracic Surgery, Yale University School of Medicine,  
New Haven, Connecticut*

ANEURISMA CON VALVOLA  
TRICUSPIDE



a. Ascending aorta



# INDICAZIONI: **DIAMETRO** DELLA RADICE

## SESSION 1: ASCENDING AORTA

### Surgical Treatment of the Dilated Ascending Aorta: When and How?

M. Arisan Ergin, MD, PhD, David Spielvogel, MD, Anil Apaydin, MD,  
Steven L. Lansman, MD, PhD, Jock N. McCullough, MD, Jan D. Galla, MD, PhD, and  
Randall B. Griepp, MD

Department of Cardiothoracic Surgery, Mount Sinai Medical Center, New York, New York

Ann Thorac Surg 1999;67:1834-9

*Table 1. Current Guidelines for Surgery*

Adult Age < 40 years BSA 2 m <sup>2</sup>	Diameter	Ratio
Marfan's (+family history)	> 4.3	1.3
Chronic dissections	> 4.3	1.3
Degenerative without AI	> 4.8	1.5
Degenerative with AI (degree!)	> 4.8	1.5
Bicuspid valve with dysfunction	> 4.5	1.4
Other cardiac surgery	> 4.8	1.5
Surgeons' experience	+0.5	0.15

AI = aortic insufficiency.

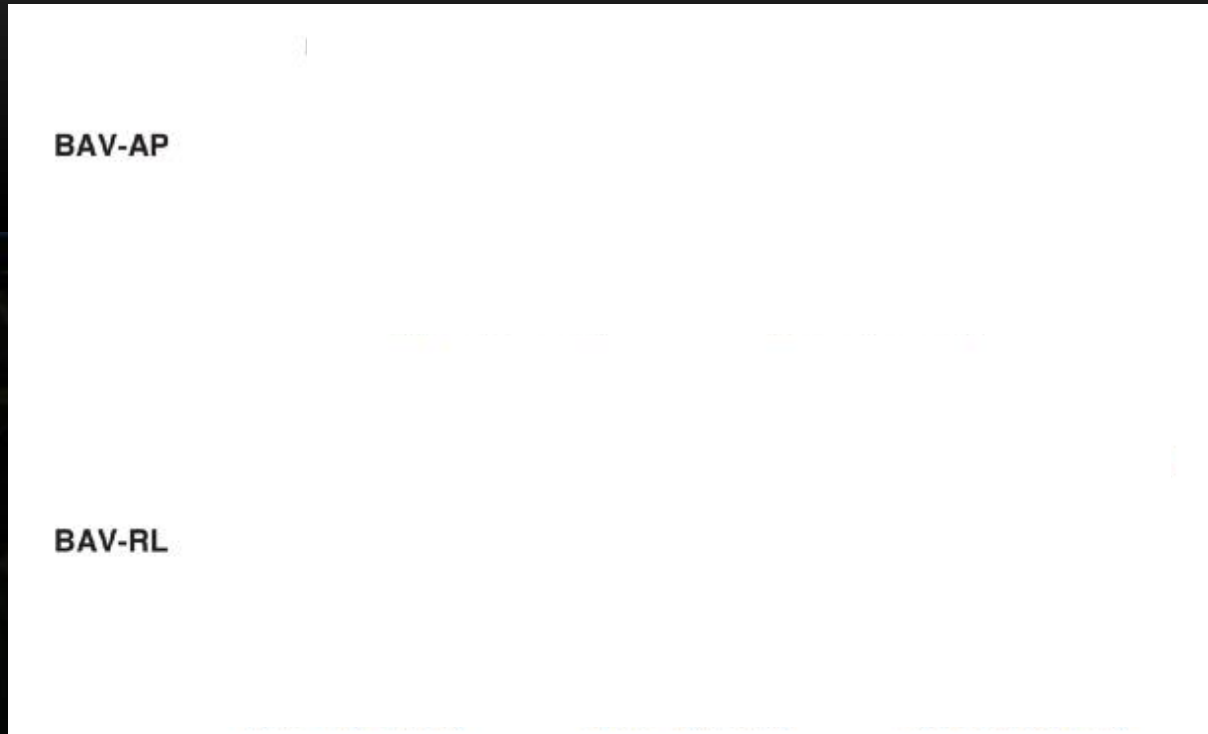


# VALVE-SPARING NELLA BICUSPIDIA

- LA MORFOLOGIA DELLA VALVOLA E' VARIABILE
- PIU' FREQUENTEMENTE RISPETTO ALLA TAV RICHIEDE UNA PLASTICA AGGIUNTIVA DELLE CUSPIDI
- IL PROLASSO DELLA CUSPIDE CONGENITAMENTE FUSA E' LA CAUSA PIU' FREQUENTE DI IAO RESIDUA



# MORFOLOGIA DELLA VALVOLA BICUSPIDE



**BAV-AP**

**BAV-RL**

Kang *et al.*  
Phenotypes of Bicuspid Aortic Valve

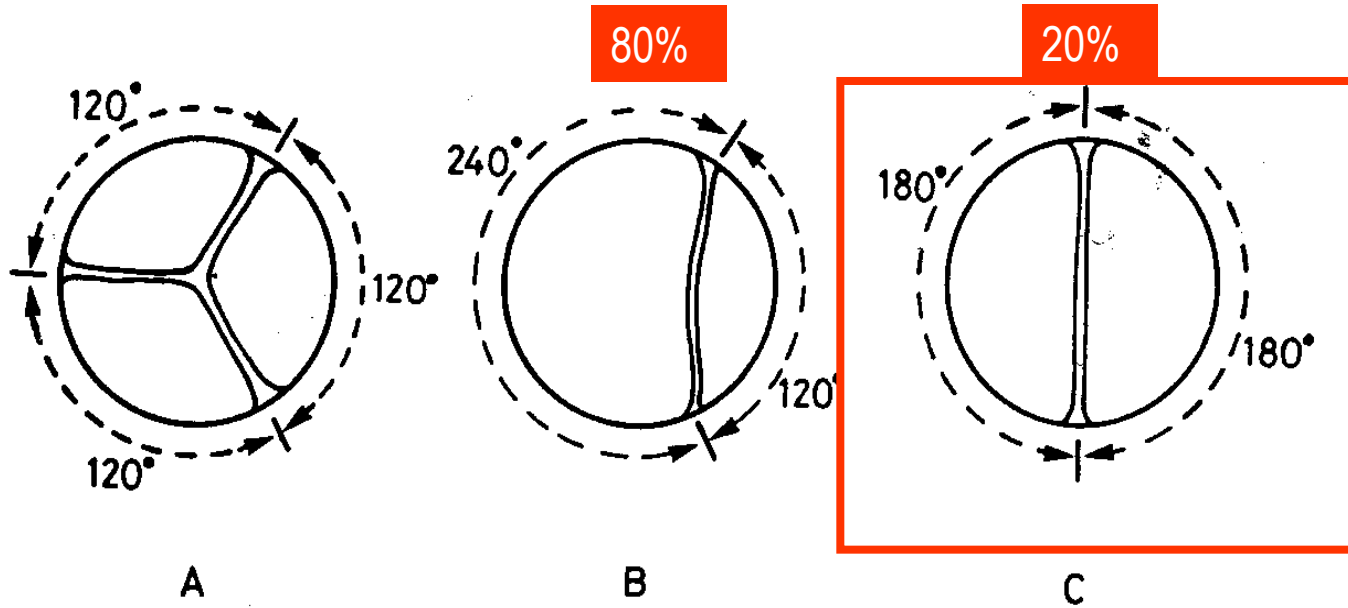
JACC: CARDIOVASCULAR IMAGING, VOL. 6, NO. 2, 2013  
FEBRUARY 2013:150-61



AI Class	Type I Normal cusp motion with FAA dilatation or cusp perforation				Type II Cusp Prolapse	Type III Cusp Restriction
	Ia	Ib	Ic	Id		
Mechanism						
Repair Techniques (Primary)	STJ remodeling <i>Ascending aortic graft</i>	Aortic Valve sparing: <i>Reimplantation or Remodeling with SCA</i>	SCA	Patch Repair <i>Autologous or bovine pericardium</i>	Prolapse Repair <i>Plication Triangular resection Free margin Resuspension Patch</i>	Leaflet Repair <i>Shaving Decalcification Patch</i>
(Secondary)	SCA		STJ Annuloplasty	SCA	SCA	SCA

Munir Boodhwani, J Thorac Cardiovasc Surg 2009;137:286-94

(Angelini et al. J Thorac



# VALVE-SPARING NELLA BICUSPIDIA

- LA MORFOLOGIA DELLA VALVOLA E' VARIABILE
- PIU' FREQUENTEMENTE RISPETTO ALLA TAV RICHIEDE UNA PLASTICA AGGIUNTIVA DELLE CUSPIDI
- IL PROLASSO DELLA CUSPIDE CONGENITAMENTE FUSA E' LA CAUSA PIU' FREQUENTE DI IAO RESIDUA



## Cusp repair during aortic valve-sparing operation: technical aspects and impact on results

Fabrizio Settepani, Antioco Cappai, Giuseppe M. Raffa, Alessio Basciu, Alessandro Barbone, Daniele Berwick, Enrico Citterio, Diego Ornaghi, Giuseppe Tarelli and Pietro G. Malvindi

J Cardiovasc Med 2014, 15:000–000

**Table 3 Characteristics and results of cusp repair during valve-sparing operation in bicuspid aortic valve**

Authors	de Kerchove <i>et al.</i> <sup>28</sup>	Schäfers <i>et al.</i> <sup>13</sup>	Kari <i>et al.</i> <sup>29</sup>
Sparing operation	53	78	75
Valve repair	49 (93%)	78 (100%)	50 (67%)
Reimplantation	49 (100%)	0	50 (100%)
Remodeling	0	78 (100%)	0
Plication free margin	0	56 (71%)	0
Triangular resection	0	33 (42%)	7 (9%)
Free margin shortening	0	0	50 (67%)
Commissural neochord	0	0	3 (4%)
Raphe shaving	12 (23%)	0	0
Raphe resection and closure	20 (38%)	0	0
Raphe resection and patch repair	6 (11%)	0	0
Cusp prolapse repair	41 (77%)	0	0
Pericardial patch repair for perforation	3 (6%)	0	0
Patch repair	9 (17%)	1 (1.2%)	0
Reoperation for valve failure	0	n.a.	1/50 (2%)



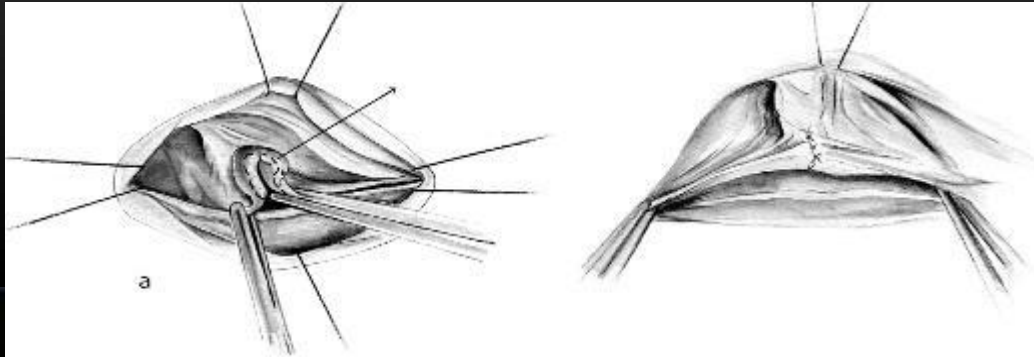
Table 1 Most frequent cusp repair techniques

Valve	Cusp repair techniques
TAV/BAV	Free margin shortening/resuspension
TAV/BAV	Nodule of Arantius plication
TAV/BAV	Triangular resection
BAV	Raphe shaving
BAV	Raphe resection and closure
BAV	Raphe resection and patch repair

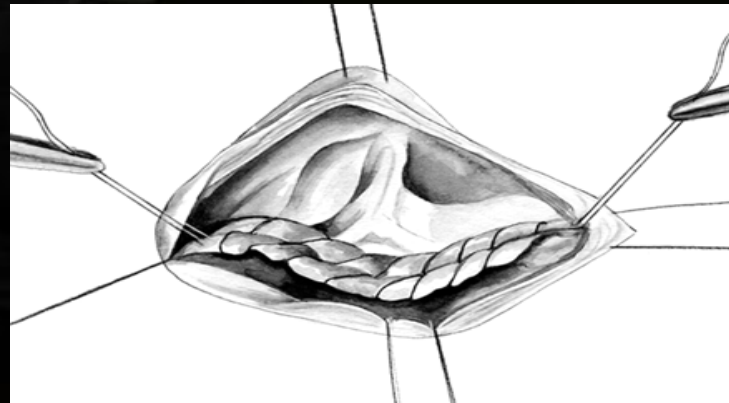
BAV, bicuspid aortic valve; TAV, tricuspid aortic valve.

J Cardiovasc Med 2014, 15:000-000

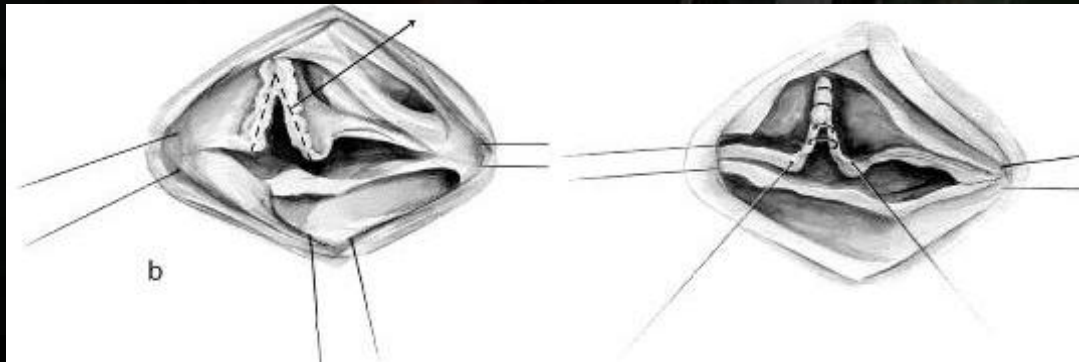
# PLASTICA DELLE CUSPIDI IN BAV



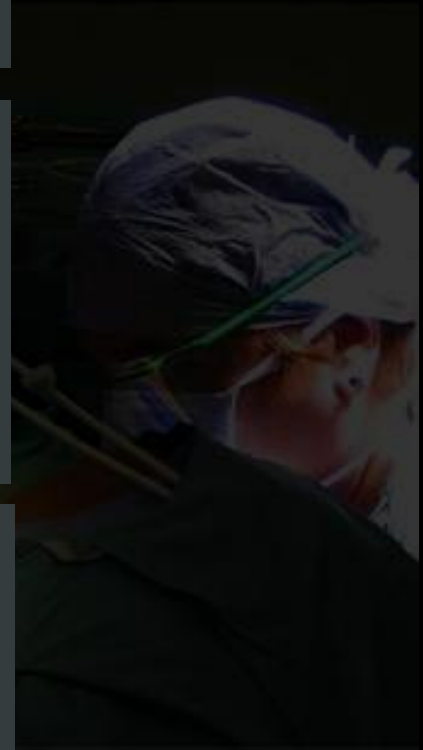
PLICATURA NODULO  
DI ARANZIO



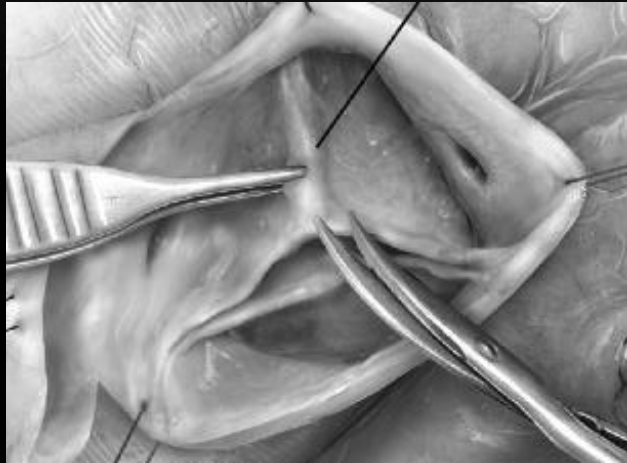
ACCORCIAMENTO  
MARGINE LIBERO



RESEZIONE DEL  
RAFE



# BICUSPIDIA AORTICA



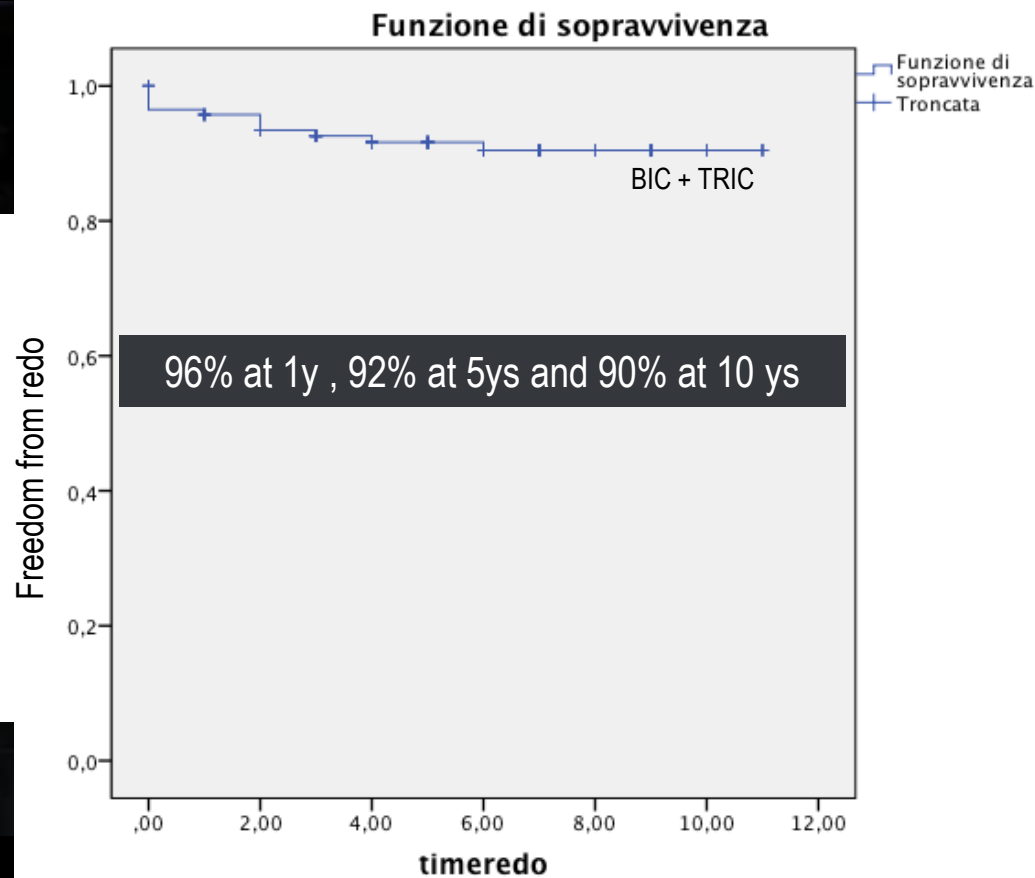
RAFE SHAVING

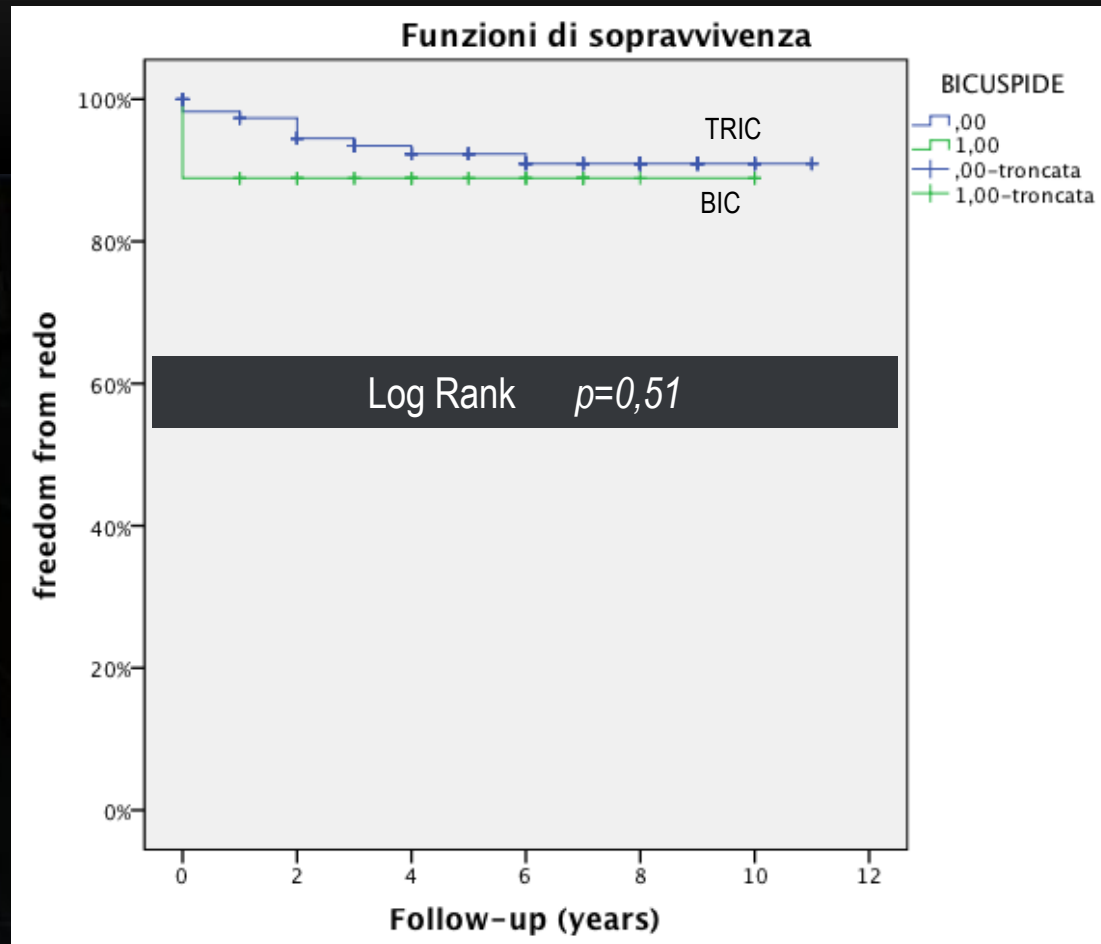


## Bicuspidy does not affect reoperation risk following aortic valve reimplantation

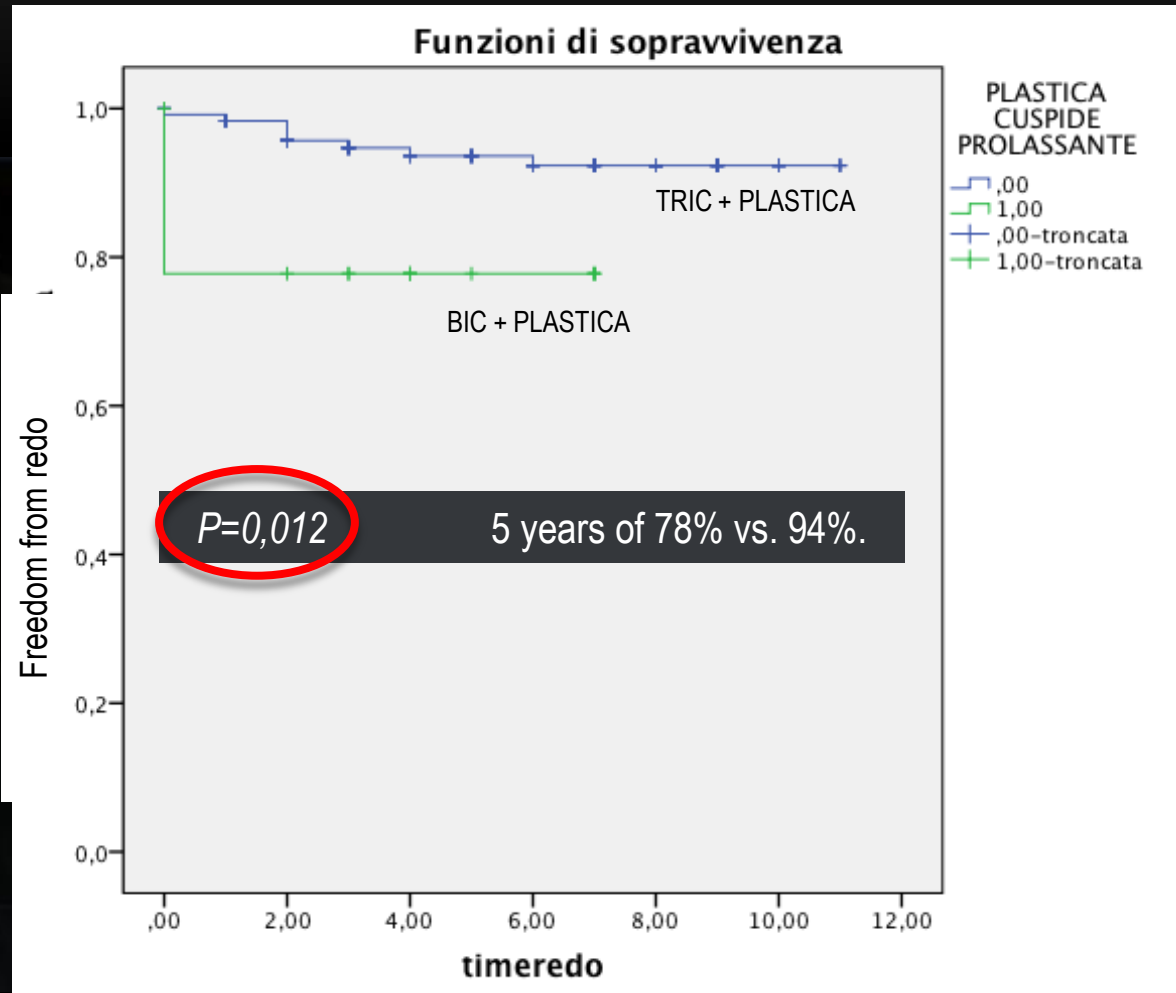
Pietro Giorgio Malvindi\*, Giuseppe Maria Raffa, Alessio Basciu, Enrico Citterio, Antioco Cappai, Diego Ornaghi, Giuseppe Tarelli and Fabrizio Settepani

Department of Cardiac Surgery, IRCCS Istituto Clinico Humanitas, Rozzano, Italy



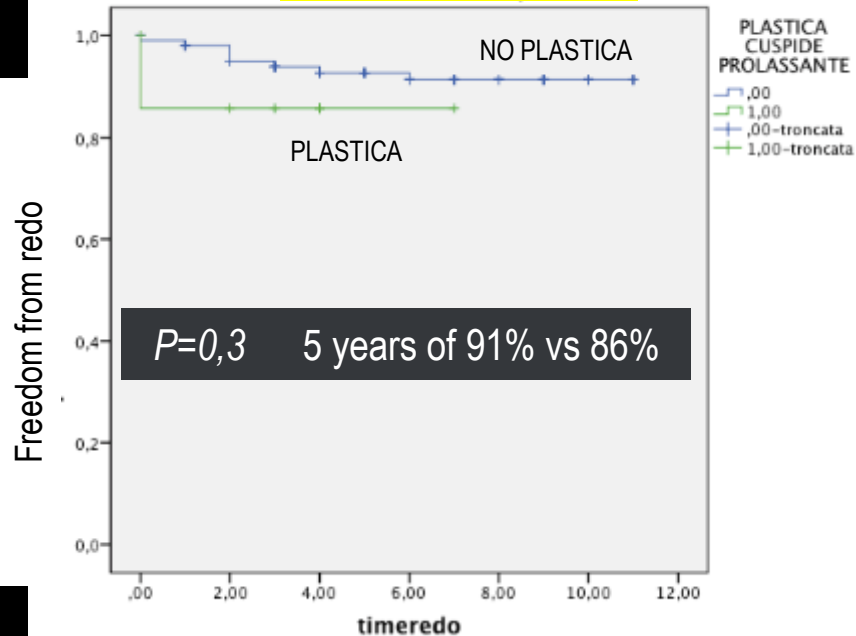


# EFFETTO DELLA PLASTICA AGGIUNTIVA

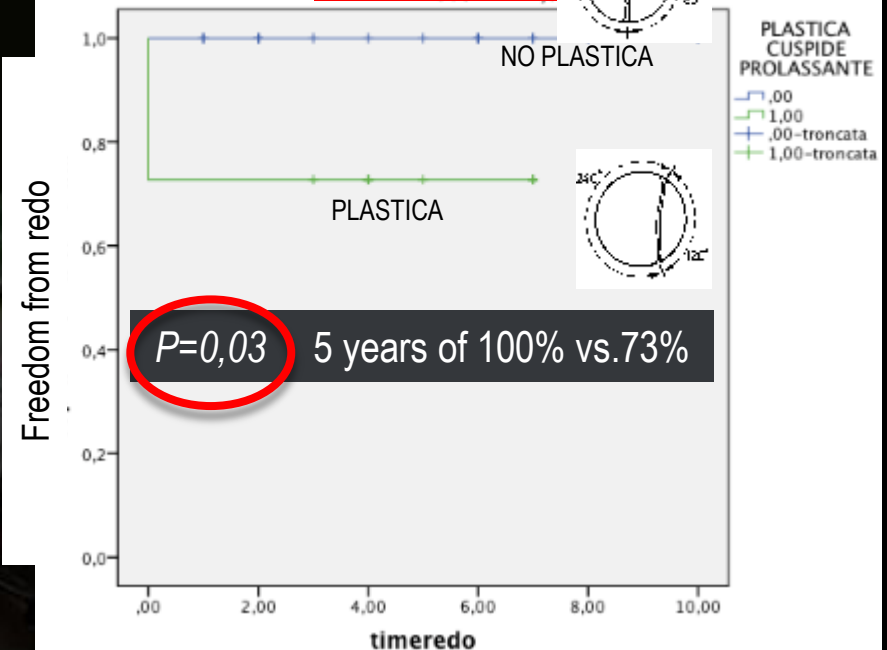


# EFFETTO DELLA PLASTICA AGGIUNTIVA

## TRICUSPIDE



## BICUSPIDE



COSA VUOLE SAPERE IL  
CHIRURGO **DALL'ECO**





## PREOPERATORIO

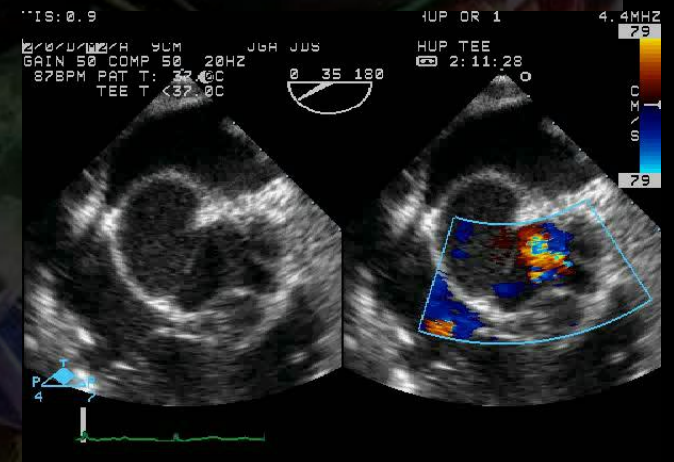
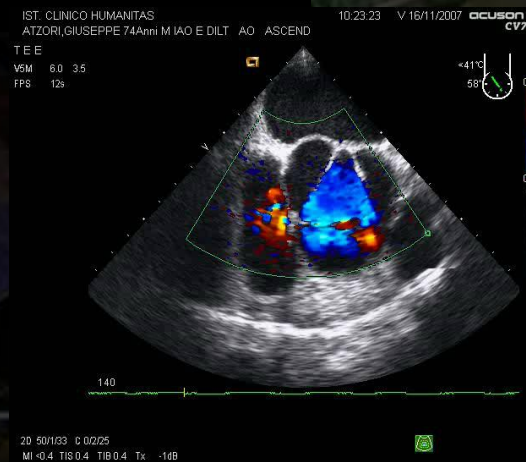
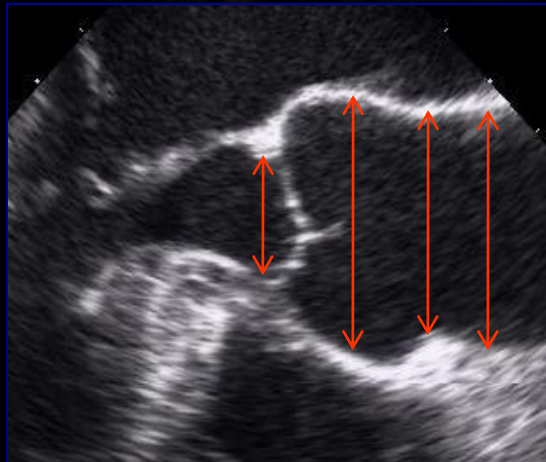
COSA VUOLE SAPERE IL  
CHIRURGO **DALL'ECO**



# RUOLO DELL'ECO NEL PREOPRATORIO

## • DIAMETRI:

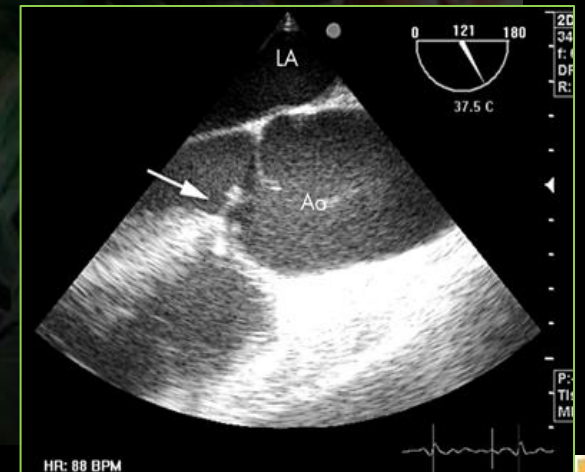
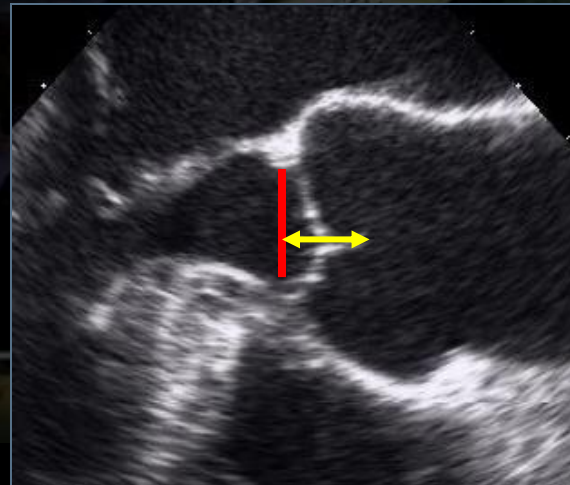
- ANULUS
- SENI di VALSALVA (asse corto per singola valutazione dei seni)
- GIUNZIONE SINO-TUBULARE
- AORTA ASCENDENTE



# RUOLO DELL'ECO NEL PREOPRATORIO

## • ASPETTI ANATOMO-FUNZIONALI:

- GRADO di INSUFFICIENZA (VC, Vol Rig, F Rig%, ERO)
- MORFOLOGIA DELLA VALVOLA (tricuspide, bicuspide ecc.)
- EVENTUALE PRESENZA di FIBROSI o CALCIFICAZIONI sulle CUSPIDI
- MOBILITÀ delle CUSPIDI, eventuali PROLASSI
- ALTEZZA EFFETTIVA (mm)



## POSTOPERATORIO

COSA VUOLE SAPERE IL  
CHIRURGO **DALL'ECO**



• **ASPETTI ANATOMO-FUNZIONALI:**

- PRESENZA/GRADO di INSUFFICIENZA
- EVENTUALE GRADIENTE (MOBILITA' DELLE CUSPIDI)
- ALTEZZA EFFETTIVA (mm)

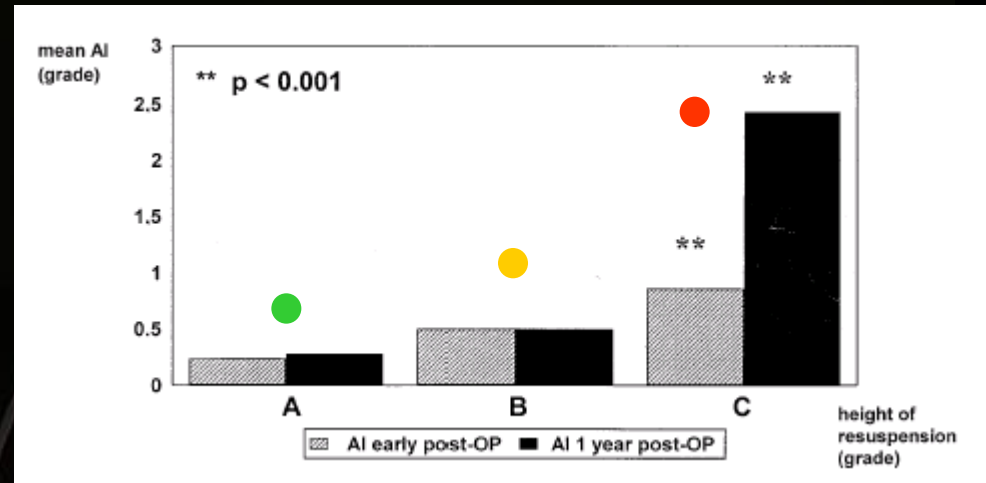
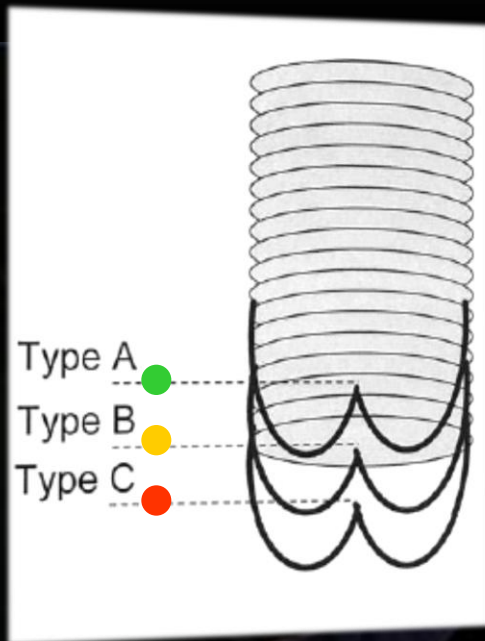


# Aortic Valve Reimplantation in Ascending Aortic Aneurysm: Risk Factors for Early Valve Failure

Klaus Pethig, MD, Andrea Milz, Christian Hagl, MD, Wolfgang Harringer, MD, and Axel Haverich, MD

Department of Thoracic and Cardiovascular Surgery, Division of Surgery, Hannover Medical School, Hannover, Germany

Ann Thorac Surg 2002;73:29-33



Type A: coaptation point  $\geq 2$  mm within the graft ●  
 Type B: coaptation point at the lower border of the graft ●  
 Type C: coaptation point  $\geq 2$  mm below the graft ●

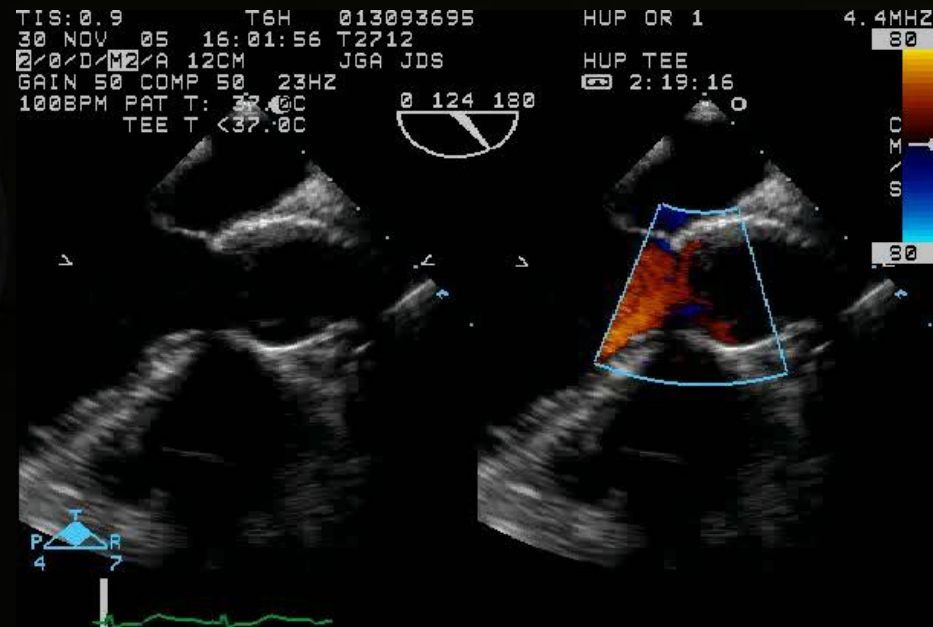
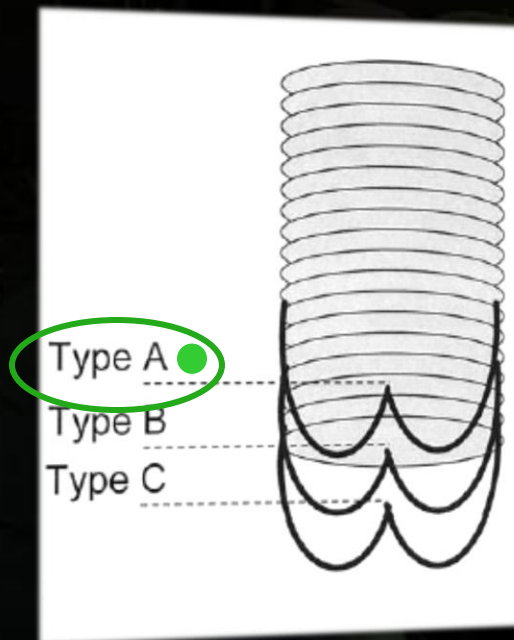


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Ann Thorac Surg 2002;73:29-33



Type A: coaptation point  $\geq 2$  mm within the graft ●

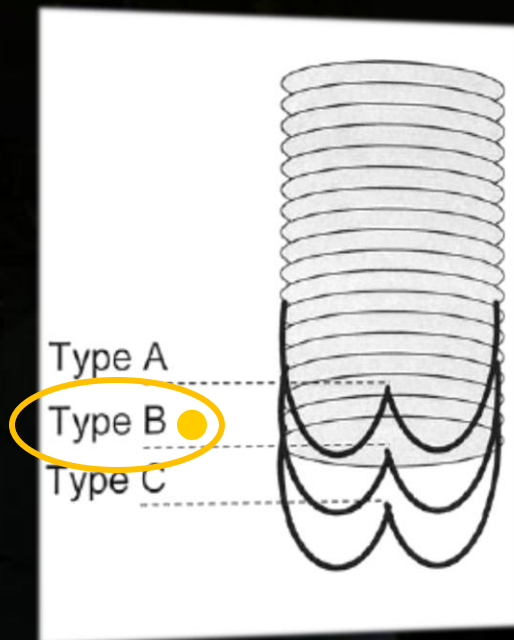


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Ann Thorac Surg 2002;73:29-33



Type B: coaptation point at the lower border of the graft ●



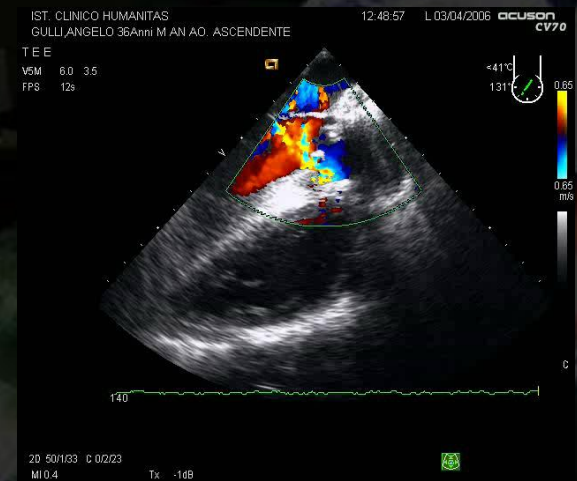
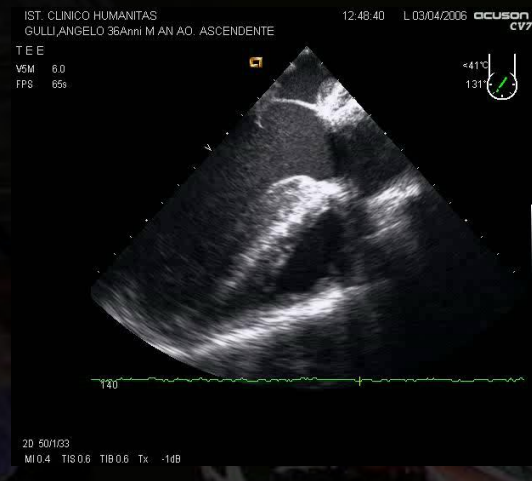
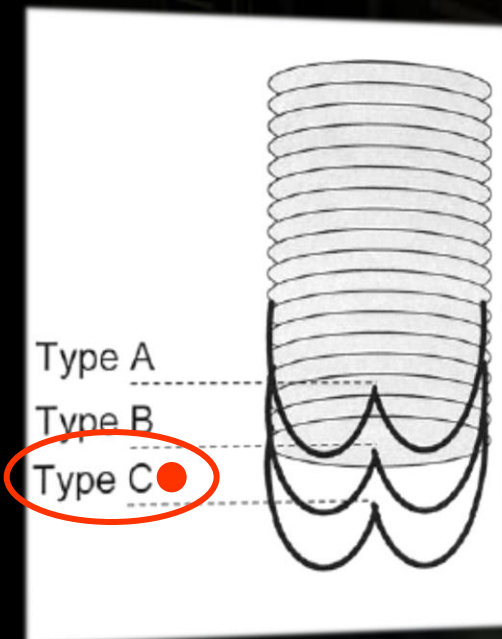


# Aortic Valve Reimplantation in Ascending Aortic Aneurysm: Risk Factors for Early Valve Failure

Klaus Pethig, MD, Andrea Milz, Christian Hagl, MD, Wolfgang Harringer, MD, and Axel Haverich, MD

Department of Thoracic and Cardiovascular Surgery, Division of Surgery, Hannover Medical School, Hannover, Germany

Ann Thorac Surg 2002;73:29-33



Type C: coaptation point  $\geq 2$  mm **below** the graft ●



# CONCLUSIONI

- LE “VALVE SPARING OPERATIONS” SI SONO DISMOSTRATE TECNICHE **AFFIDABILI** NEL TRATAMENTO DEI PAZIENTI CON ANEURISMA DELLA RADICE AORTICA E SONO OGGI IN MOLTI CENTRI L'INTERVENTO DI SCELTA IN CASO DI CUSPIDI AORTICHE “NORMALI”
- LA “**REIMPLANTATION TECHNIQUE**” HA MOSTRATO UNA MAGGIORE AFFIDABILITA' IN TERMNI DI IA0 RESIDUA AL FU RISPETTO ALLA “REMODELING TECHNIQUE”



# CONCLUSIONI

- E' LECITO, NEI CENTRI CON AMPIA ESPERIENZA NELLA CHIRURGIA DELL'AORTA , **ALLARGARE LE INDICAZIONI** DELLA "REIMPALTATION TECHNIQUE" A PZ CON **BICUSPIDIA** AORTICA
- LE VALVOLE BICUSPIDI CON **LEMBI SIMMETRICI** SEMBRANO GARANTIRE I MIGLIORI RISULTATI A DISTANZA

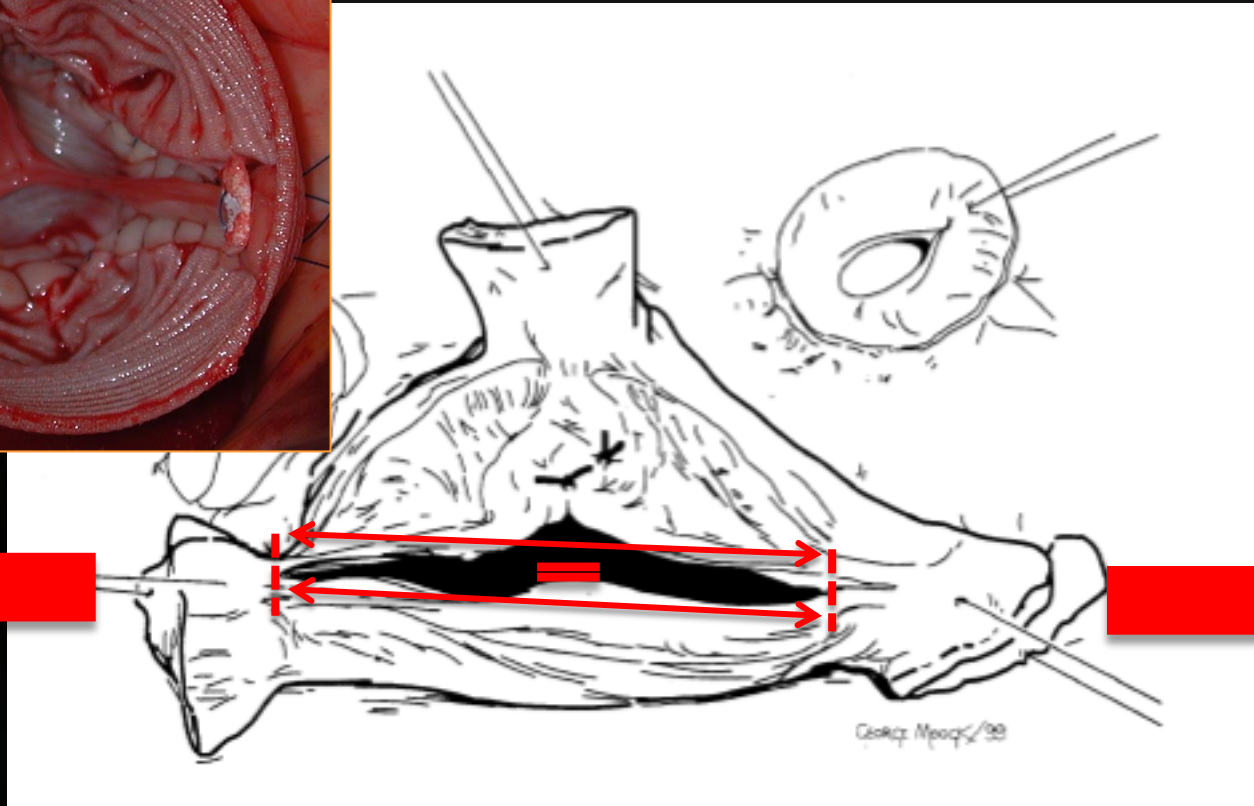
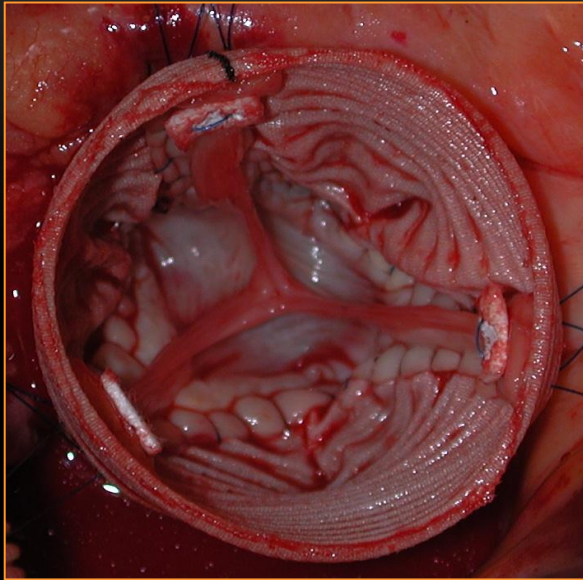


GRAZIE

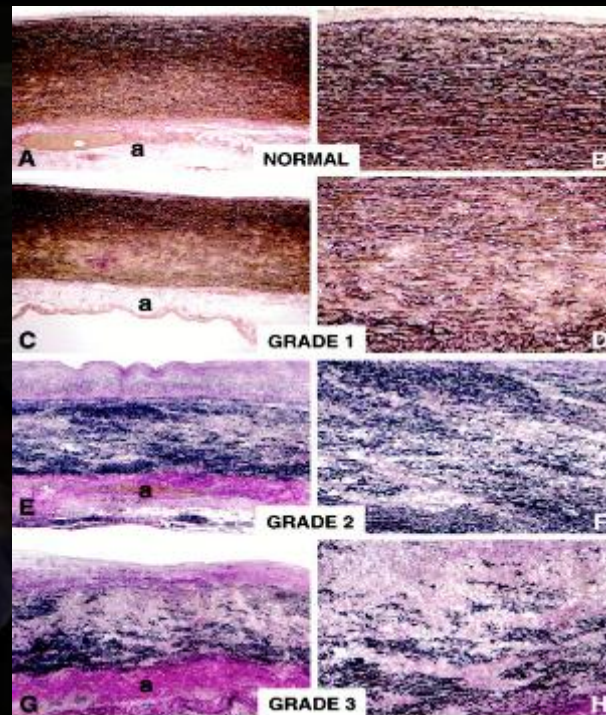




# TENSIONE RADIALE SULLE 2 COMMISSURE

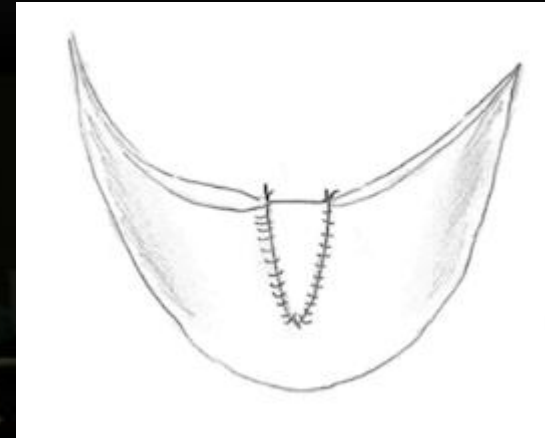
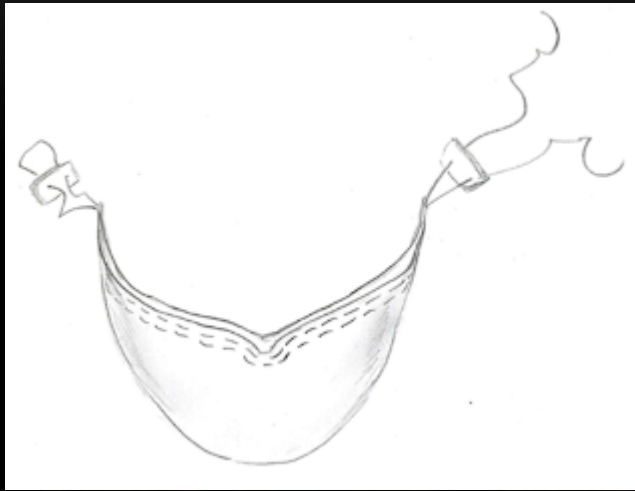


## Histology of the BAV aorta



Niwa K, et al.  
*Circulation* (2001) 103:393-400

INDICAZIONE ALL'INTERVENTO DI RIPARAZIONE DELLA RADICE AORTICA



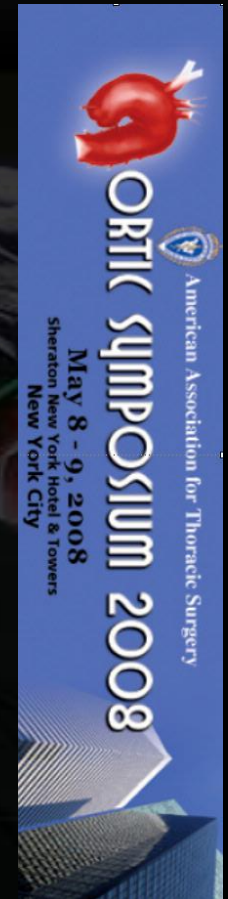


INDICAZIONI: **DIAMETRO** DELLA RADICE

Department of Cardiothoracic Surgery, Mount Sinai Medical Center, New York, New York

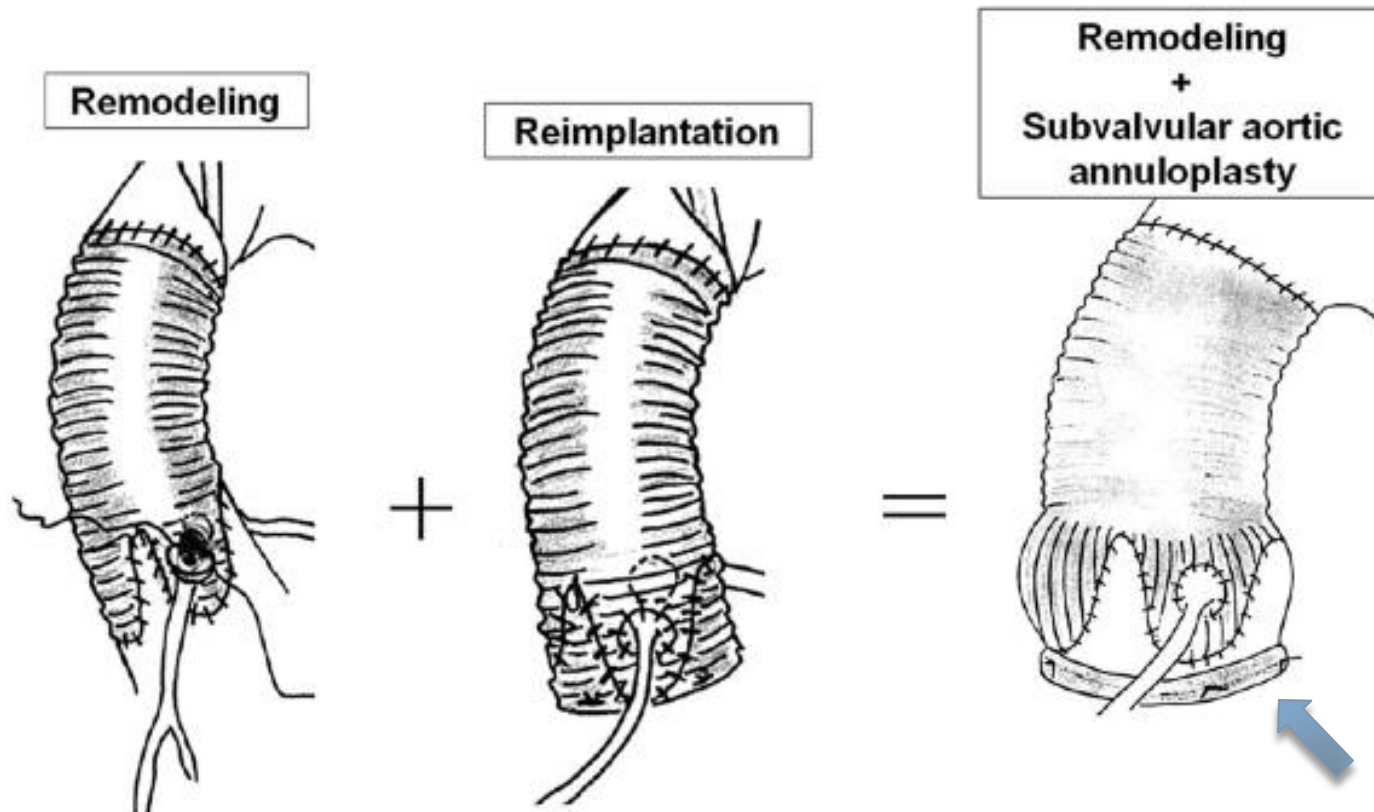
ASCENDING	Diameter (cm)	Size Index (cm/m <sup>2</sup> )
Degenerative	5.5	3.0
Chronic Dissection	5.0	2.75
Substrate Deficiency	4.5	2.5
Bicuspid		
Elective	5.0-5.5	3.0
At Surgery	4.5	2.5
Other Surgery	5-5.5	2.75-3.0

Dati non pubblicati





Emmanuel Lansac



European Journal of Cardio-Thoracic Surgery (2014) 1-9



## Aortic root remodeling: Ten-year experience with 274 patients

Diana Aicher, MD, Frank Langer, MD, Henning Lausberg, MD, Benjamin Bierbach, MD, and Hans-Joachim Schäfers, MD  
The Journal of Thoracic and Cardiovascular Surgery • Volume 134, Number 4



Hans-Joachim Schäfers, MD

“Root remodeling was chosen as the operative strategy whenever the sinuses and the STJ were enlarged and the aortoventricular junction preserved (<30 mm)”

ONLY 5 MARFAN PTS ENTERED THE CRITERIA

