

# ***LA CHIRURGIA DELLA VALVOLA AORTICA***

**Dr.P.Panisi,**

**ISTITUTO CLINICO SANT'AMBROGIO**  
*Milan, Italy*



# Radice aortica

## UNITA' FUNZIONALE

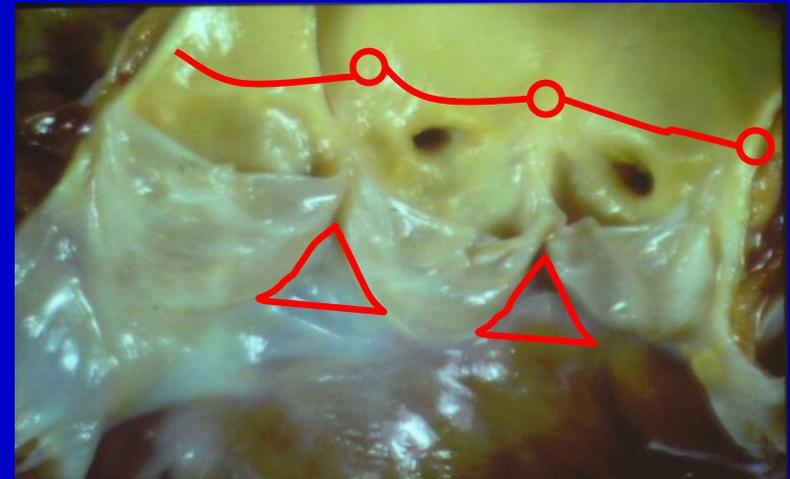
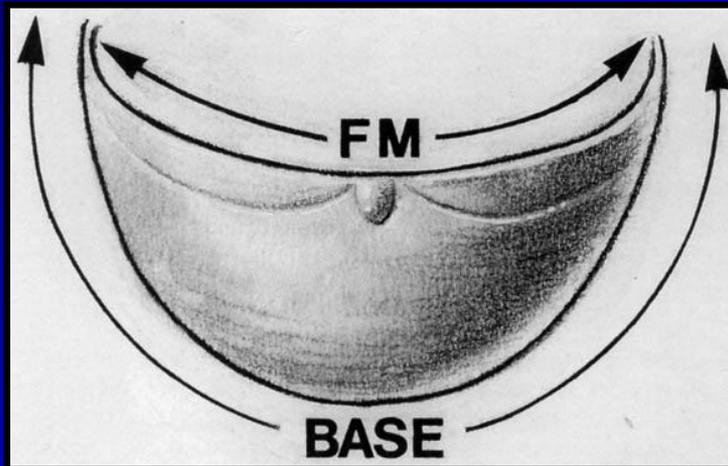
**La funzione della valvola aortica dipende dall'integrità di:**

- ✓ cuspidi con la loro area di coaptazione
  - ✓ anulus
  
  - ✓ Seni di Valsalva
  - ✓ commissure
  - ✓ giunzione sino-tubulare
- } apparato sopra-valvolare

*“Aortic repair succeeds if all affected components are restored as close to nature as possible...”*

# LEMBI VALVOLARI

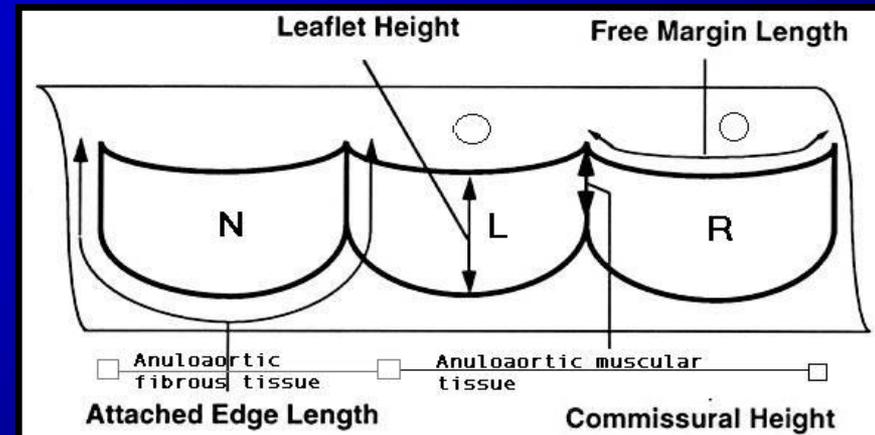
Sono attaccati alla radice aortica a forma di semiluna e sono tre: destro, sinistro e non coronarico.



Lo spazio triangolare al di sotto di due lembi valvolari è parte del ventricolo sinistro.

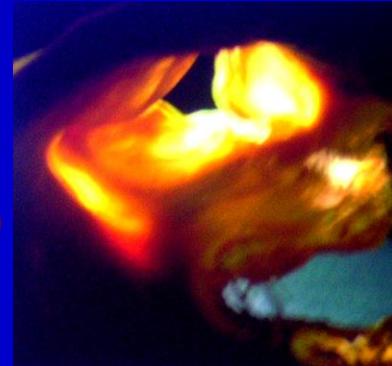
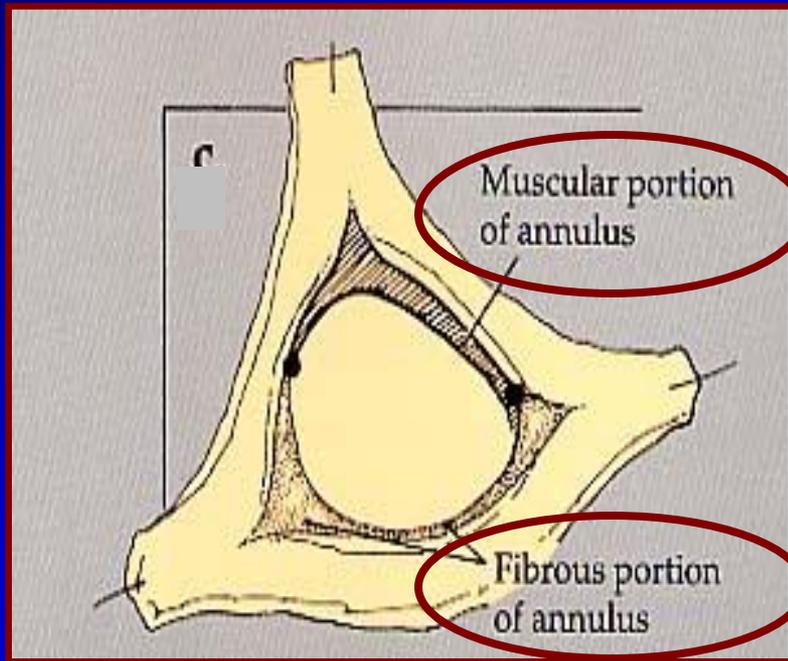
Il punto più alto del triangolo dove i due lembi si inseriscono, è chiamato *commissura*. Questa è localizzata immediatamente al di sotto della *giunzione senotubulare*.

Due triangoli sono fibrosi (quelli del lembo non coronarico) e l'altro (tra i due lembi coronarici) è una struttura muscolare.

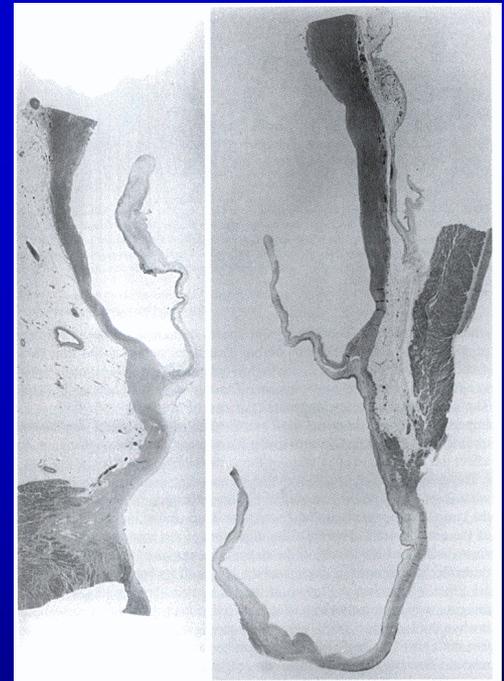


# ANELLO VALVOLARE o Giunzione Ventricolo-Aortica

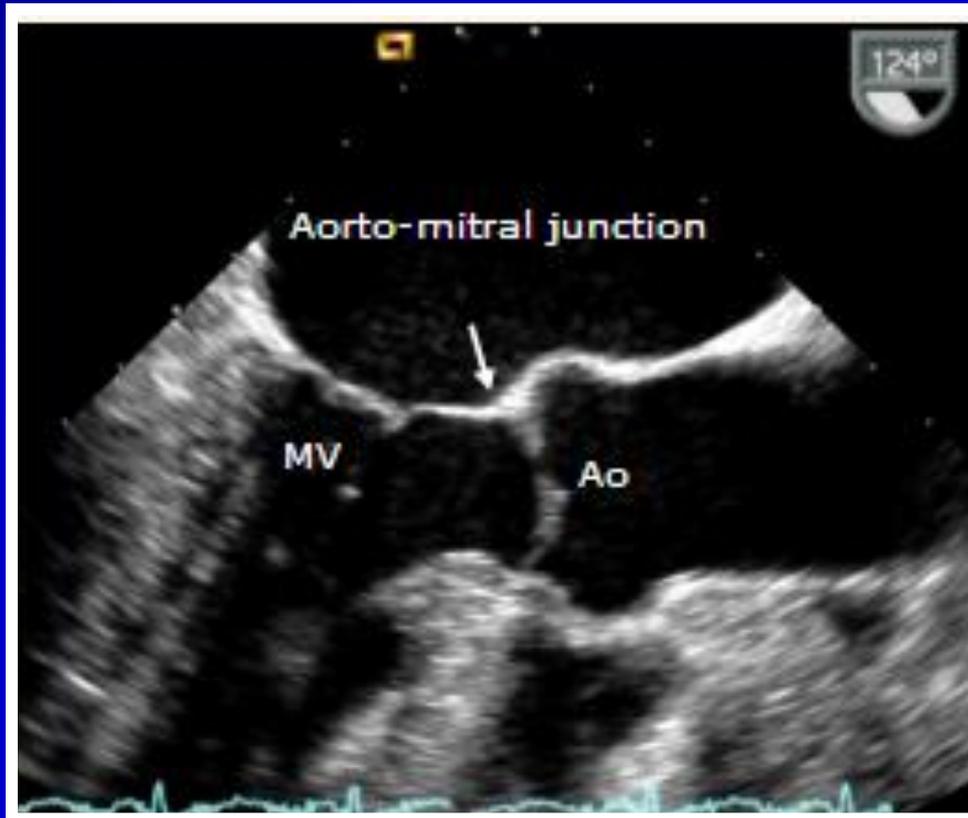
Si inserisce sul miocardio ventricolare sinistro per il 45% della propria circonferenza ed a strutture fibrose (valvola mitralica e setto membranoso) per il 55%.



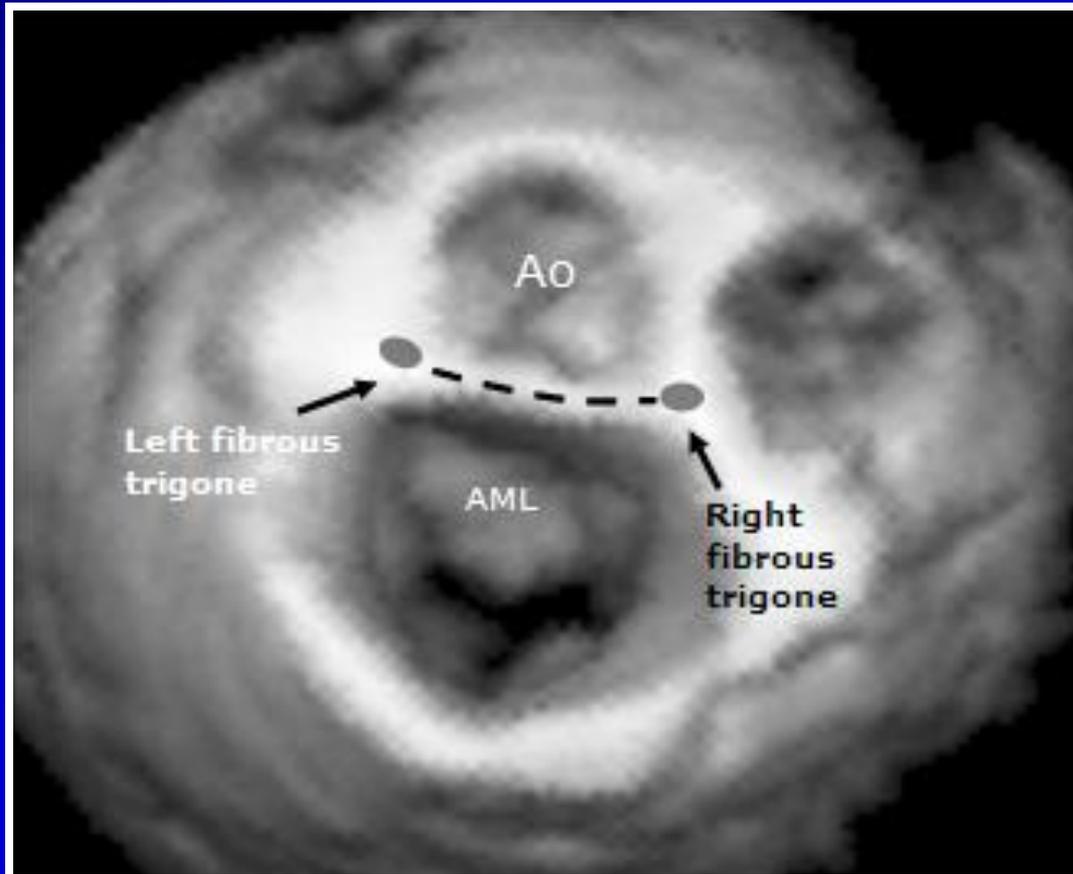
***Istologia:***  
la radice aortica ha una continuità fibrosa con il lembo anteriore della valvola mitrale ed il setto membranoso; è poi attaccata al SIV muscolare attraverso fibre muscolari intrecciate.



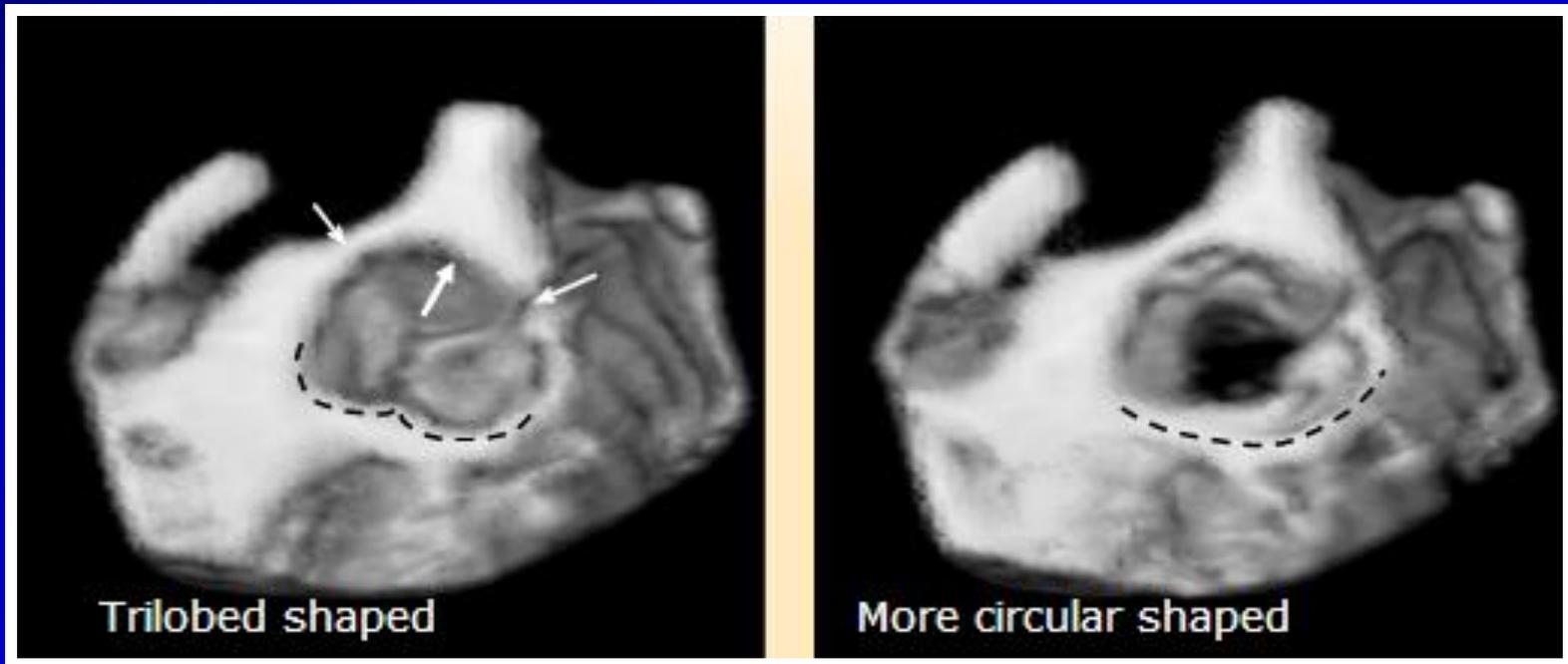
# *Aorto-mitral junction: 2D echocardiography*



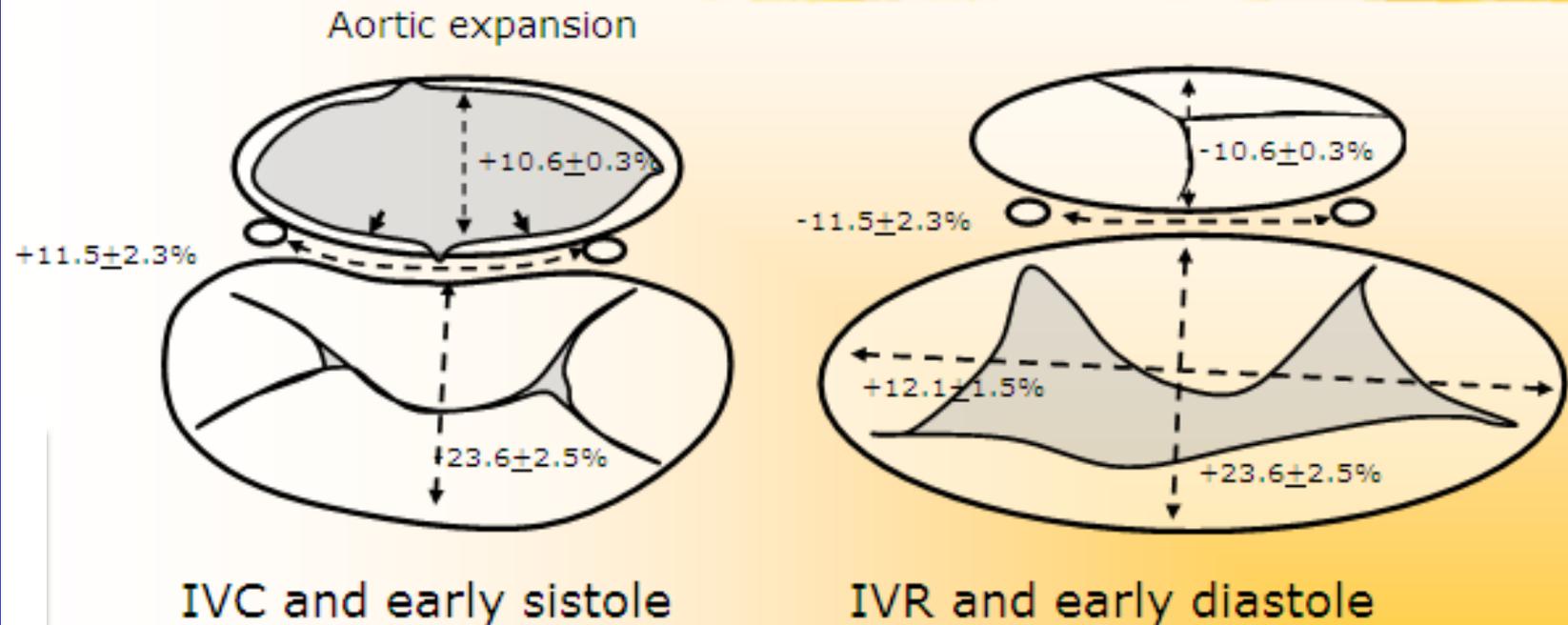
# *Aorto-mitral junction: 3D echocardiography*



# *Valsalva sinuses: sharing stress*



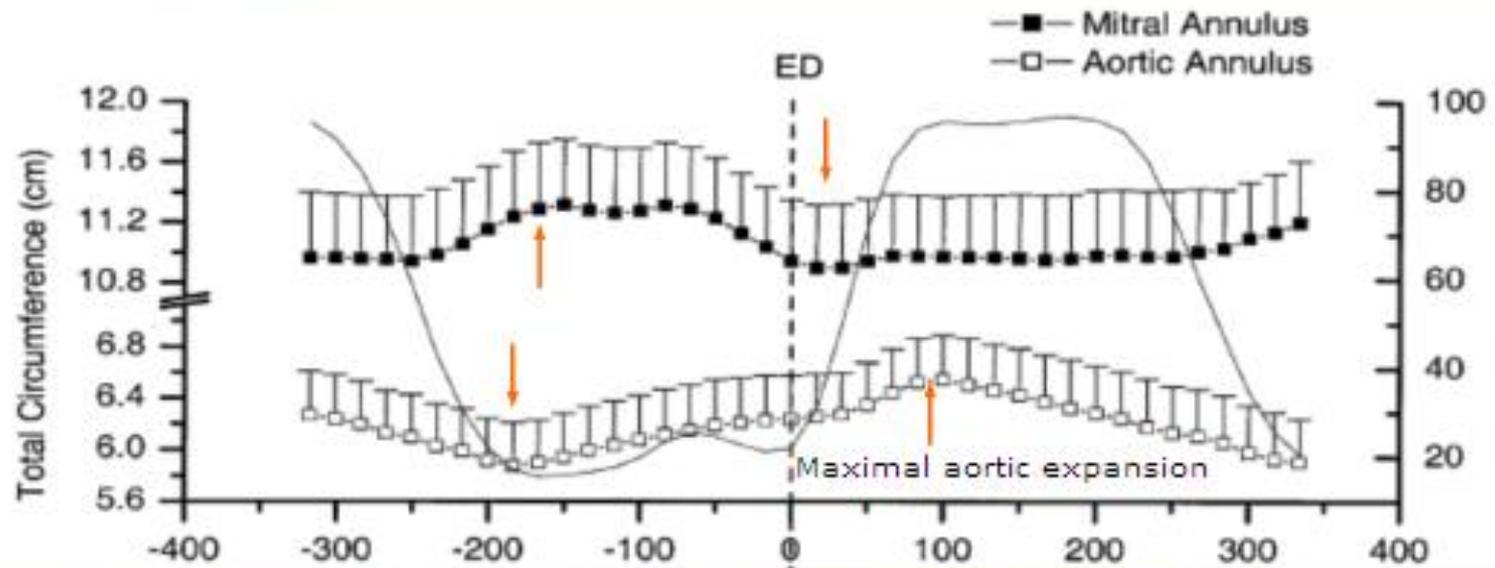
# Aorto-mitral junction dynamics



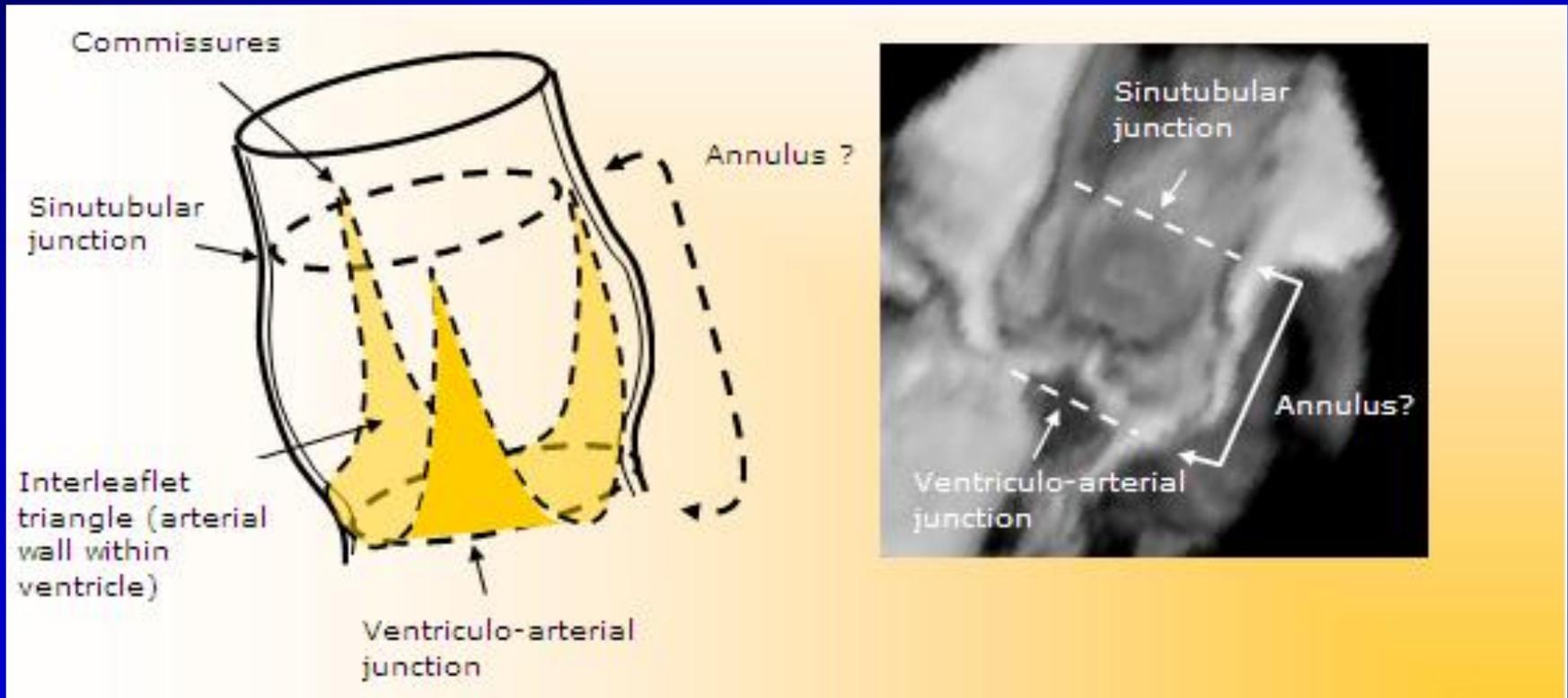
Modified from Lansac E et al. J Thorac Cardiovasc Surg 2002; 123:911-8 and by Dagum P et al. Circulation 1999;100:II-54



# *Aorto-mitral junction dynamics*



# *Does the aortic valve have an annulus?*



# Terapia Chirurgica:

➤ **Conservativa**

➤ **Sostitutiva**

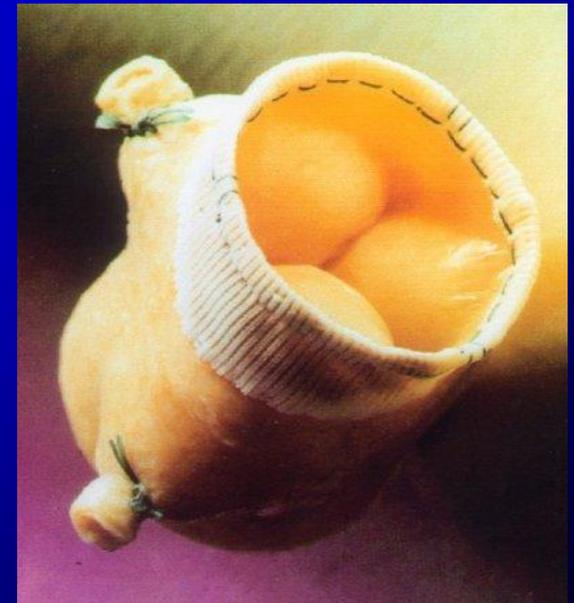
# LA PROTESI MECCANICA

- Impianto più semplice
- Maggior durata
- Costo contenuto
- Maggior gradiente
- Mismatch
- Anticoagulazione
- Traumatismo emazie
- Impatto psico-sociale



# LA BIOPROTESI

- **Maggior compatibilità**
- **Minor gradiente**
- **No traumatismo emazie**
- **No anticoagulanti**
- **Migliore impatto psico-sociale**
- **Impianto meno semplice**
- **Minore durata**
- **Costo maggiore**

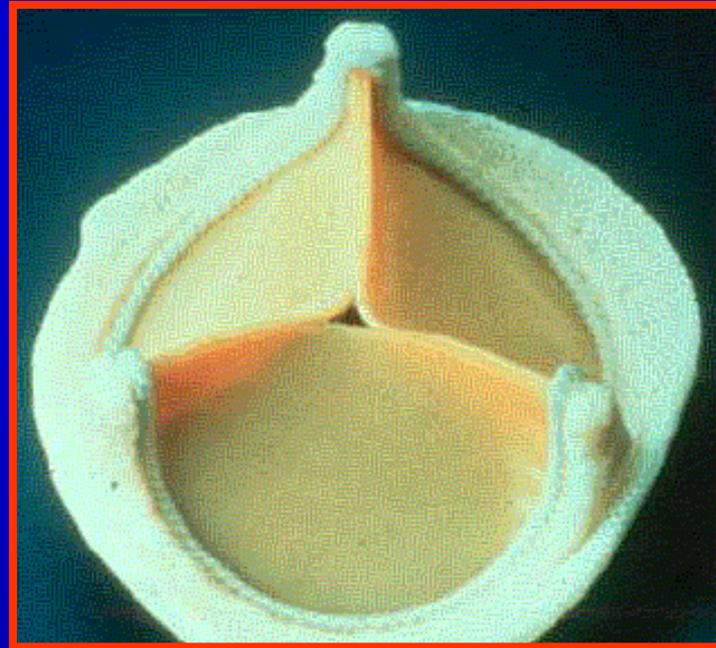


# *PROTESI BIOLOGICHE STENTED*

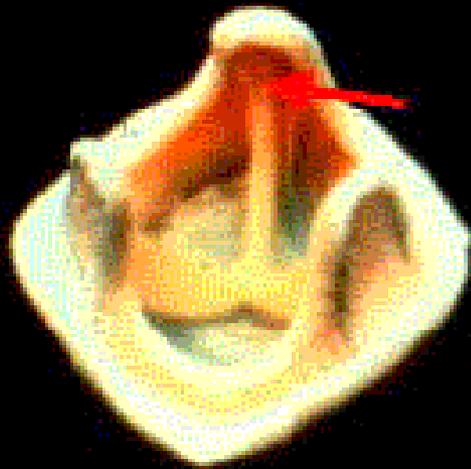
*PORCINA*



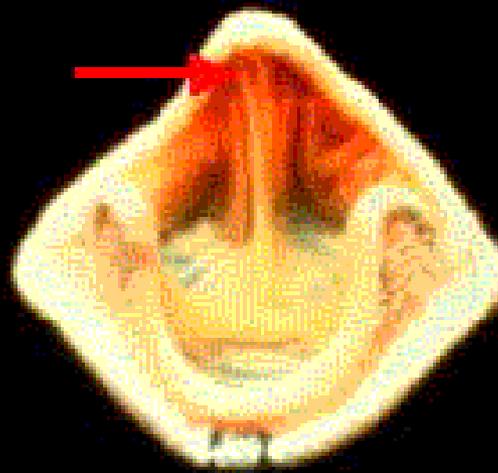
*PERICARDICA*



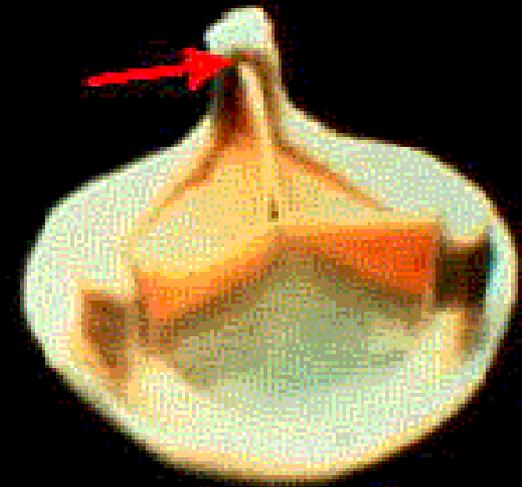
## Site of Highest Stress at Closure



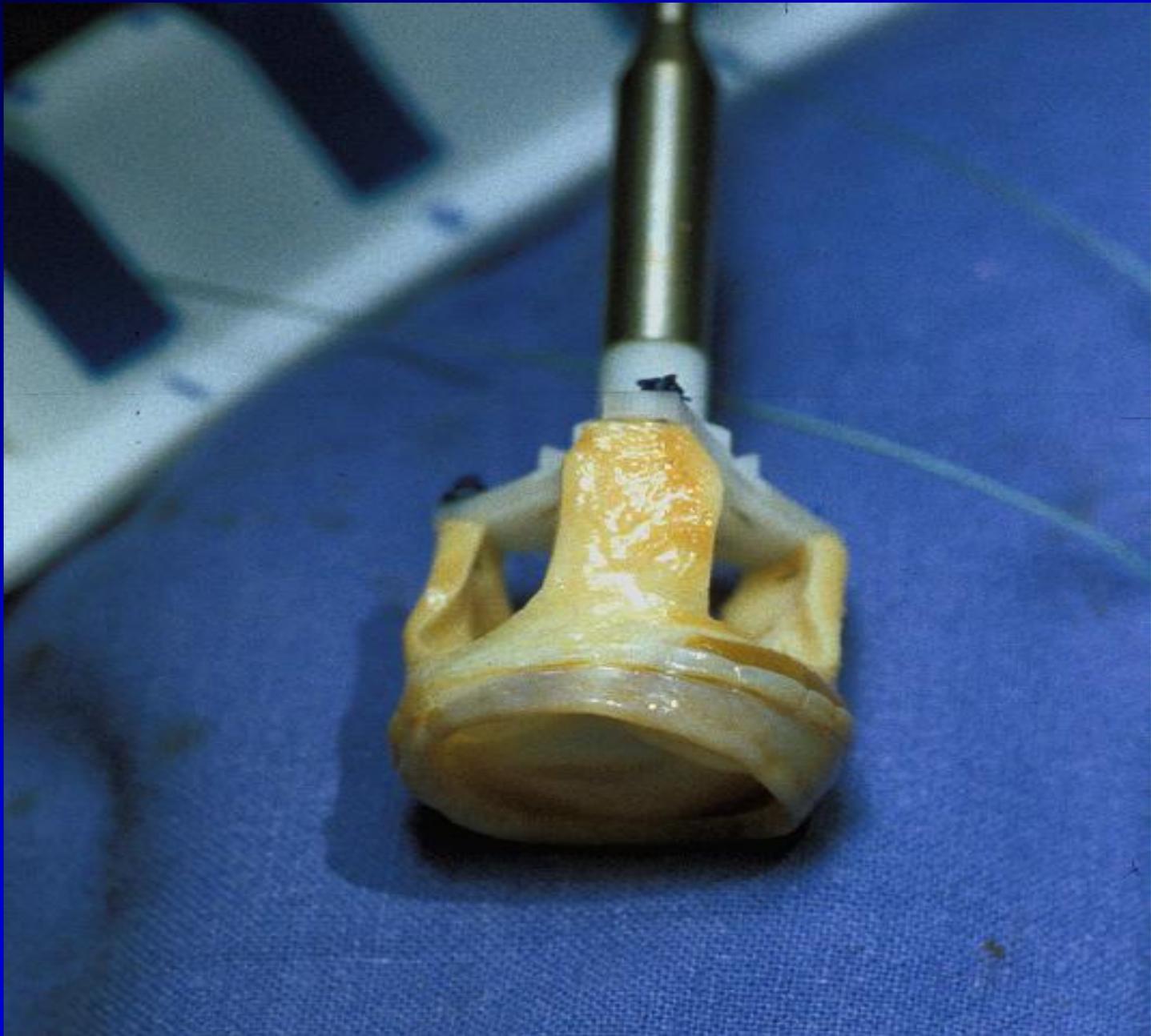
**Standard  
Porcine**



**Supra-Annular  
Porcine**



**Bovine  
Pericardial**



# Stentless Aortic Valve Replacement

- Subcoronary
  - Aortech Elan

Technique



- Miniroot
  - Aortech Elan Root

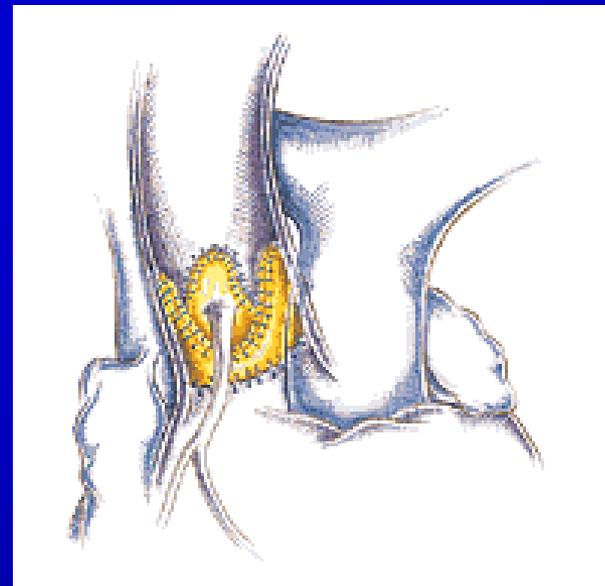
- Full root
  - Aortech Elan Root



# Stentless Aortic Valve Replacement

## Technique

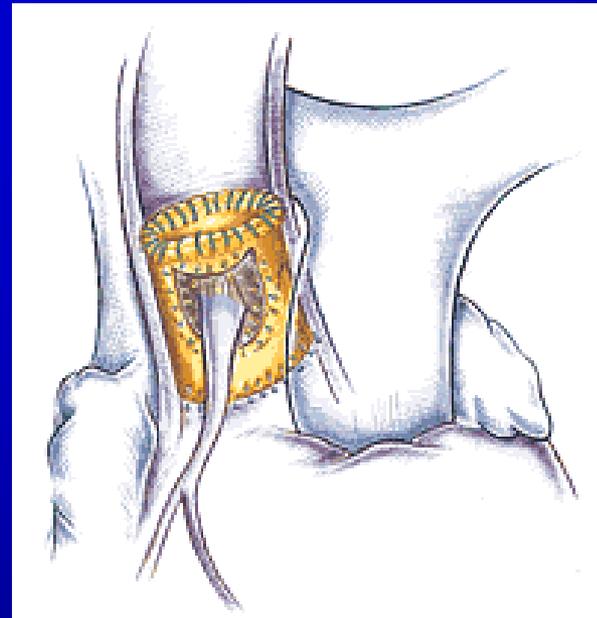
- Subcoronary
  - Aortech Elan



# Stentless Aortic Valve Replacement

## Technique

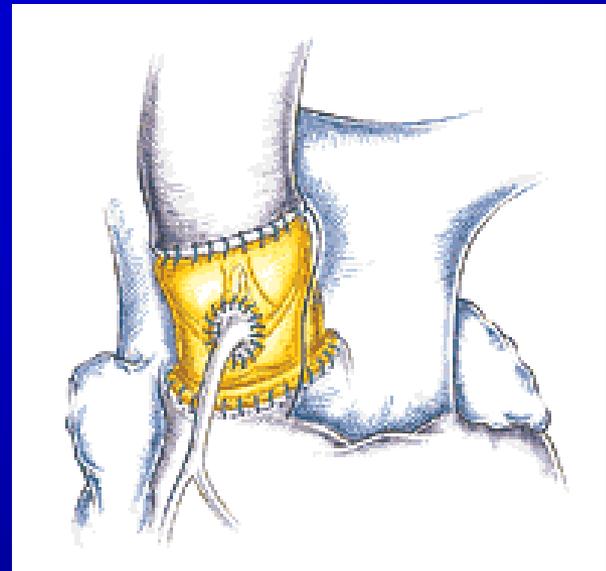
- Miniroot
  - Aortech Elan Root

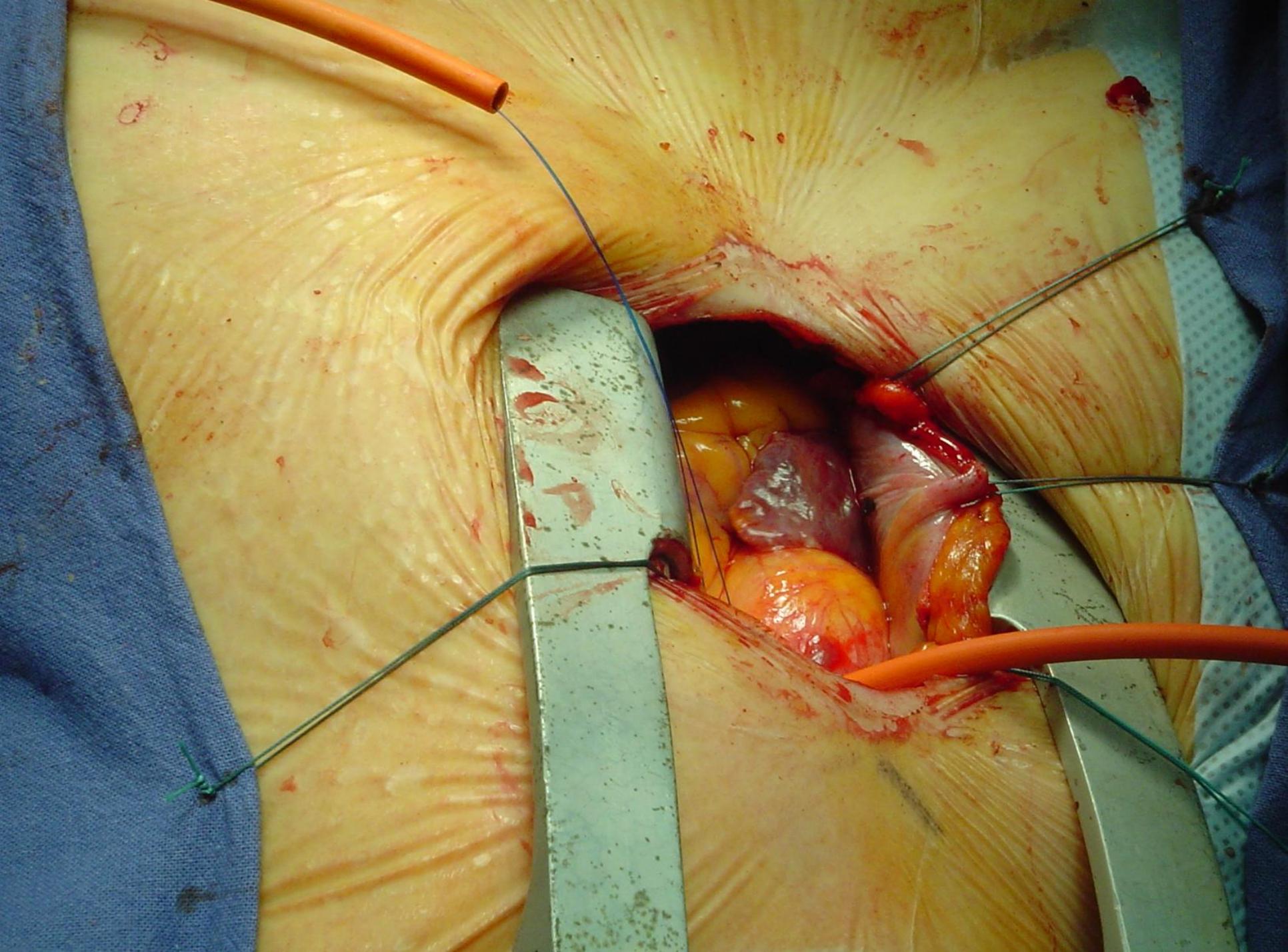


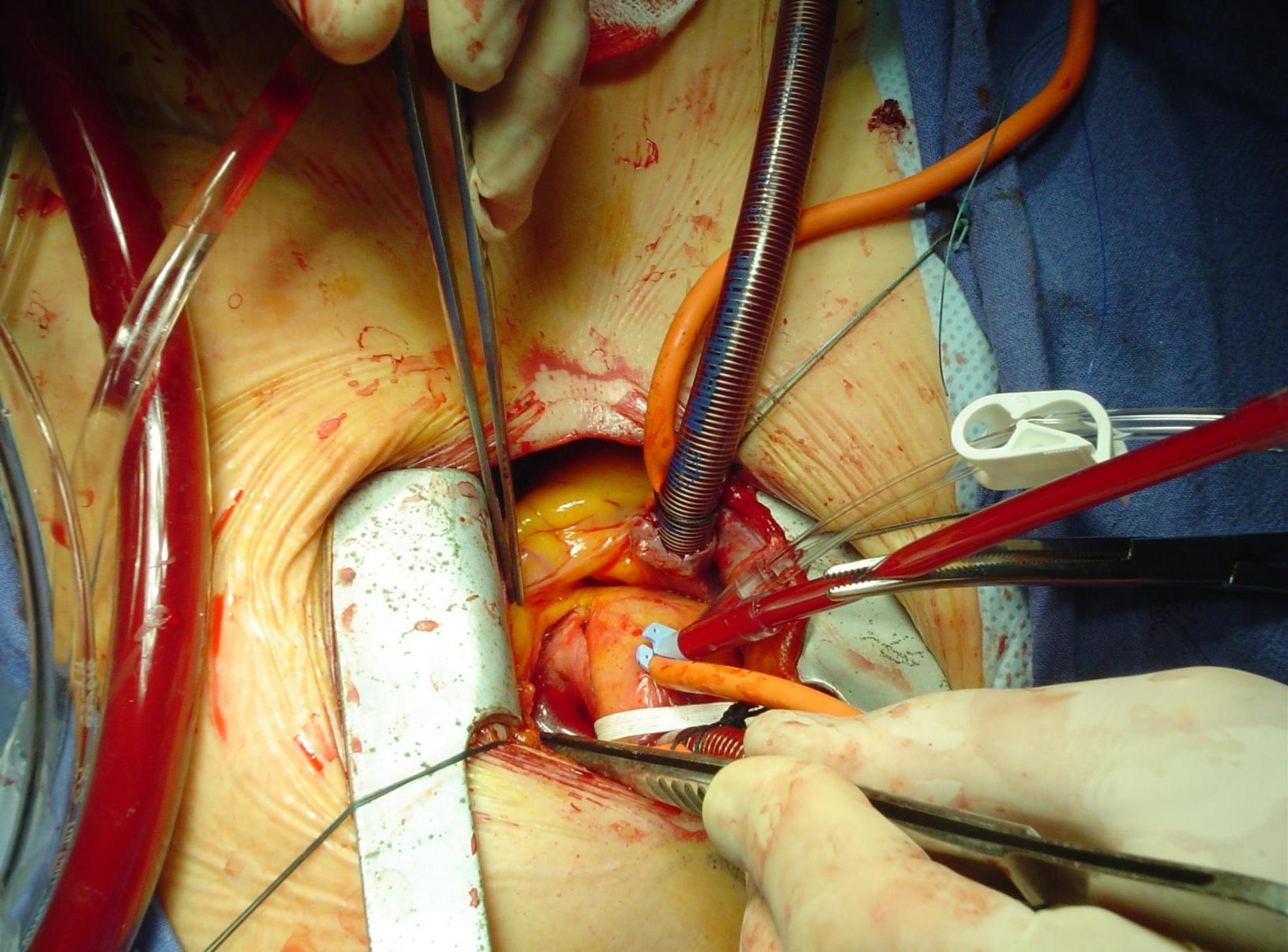
# Stentless Aortic Valve Replacement

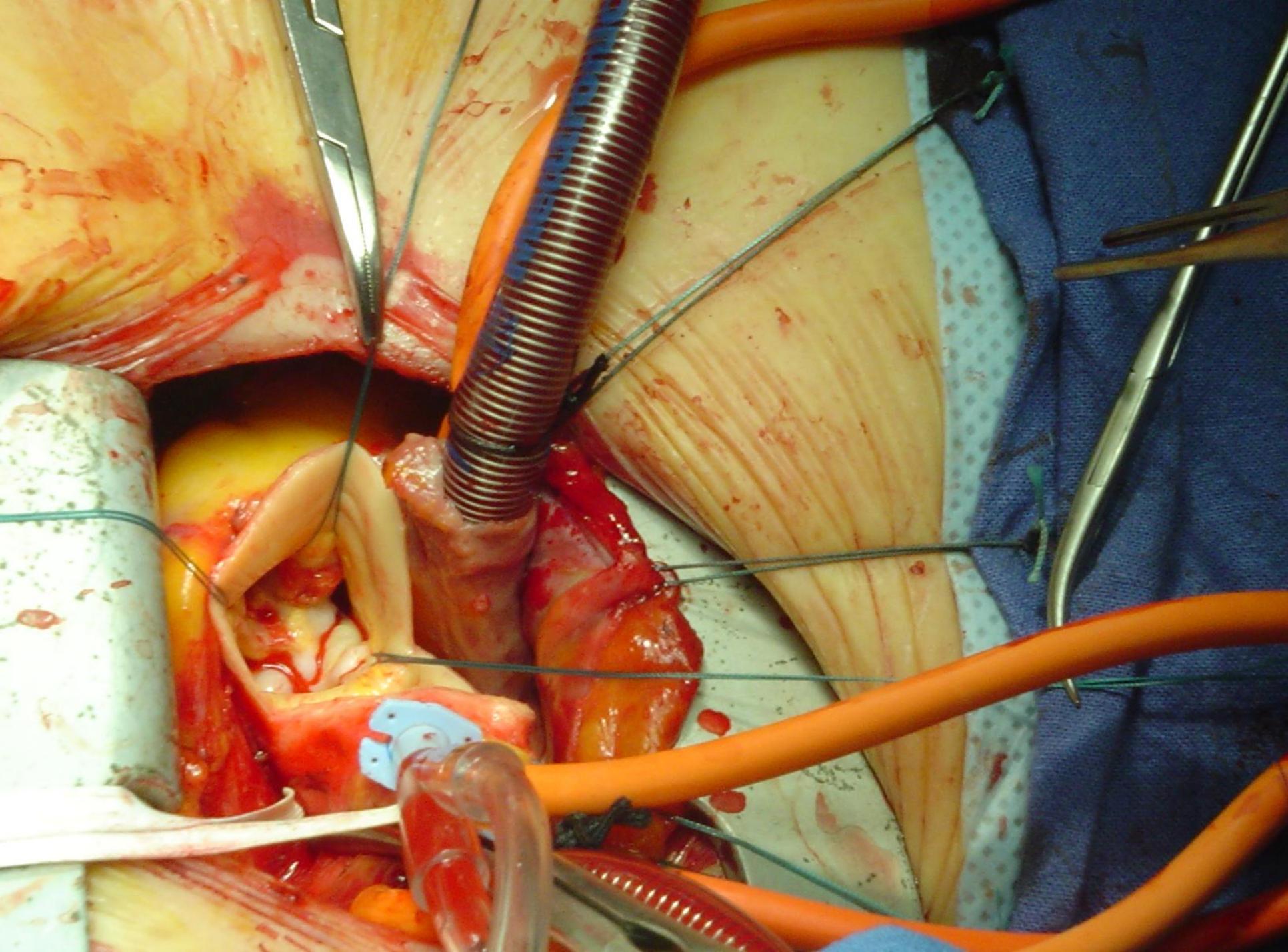
## Technique

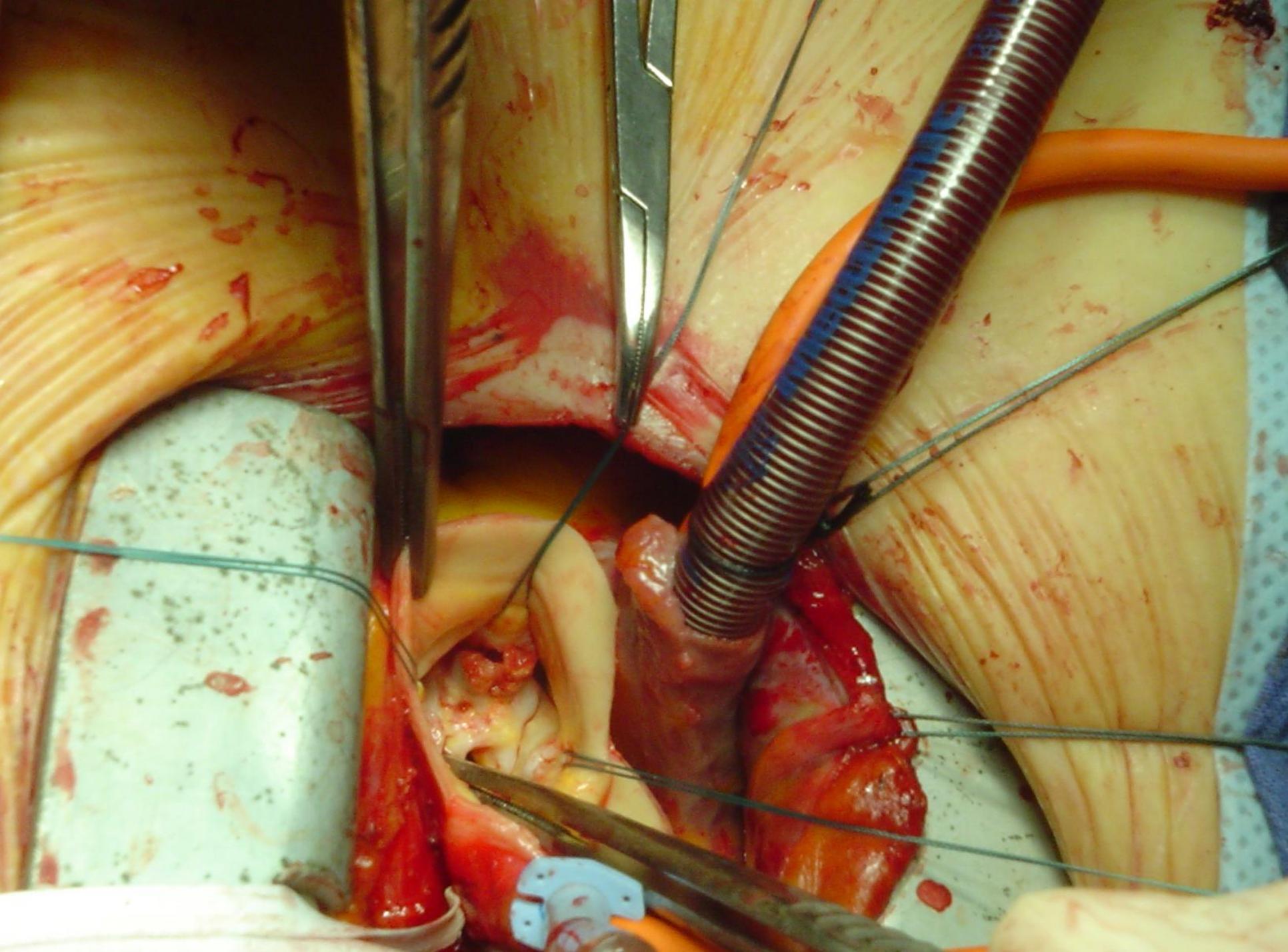
- Full root
  - Aortech Elan Root

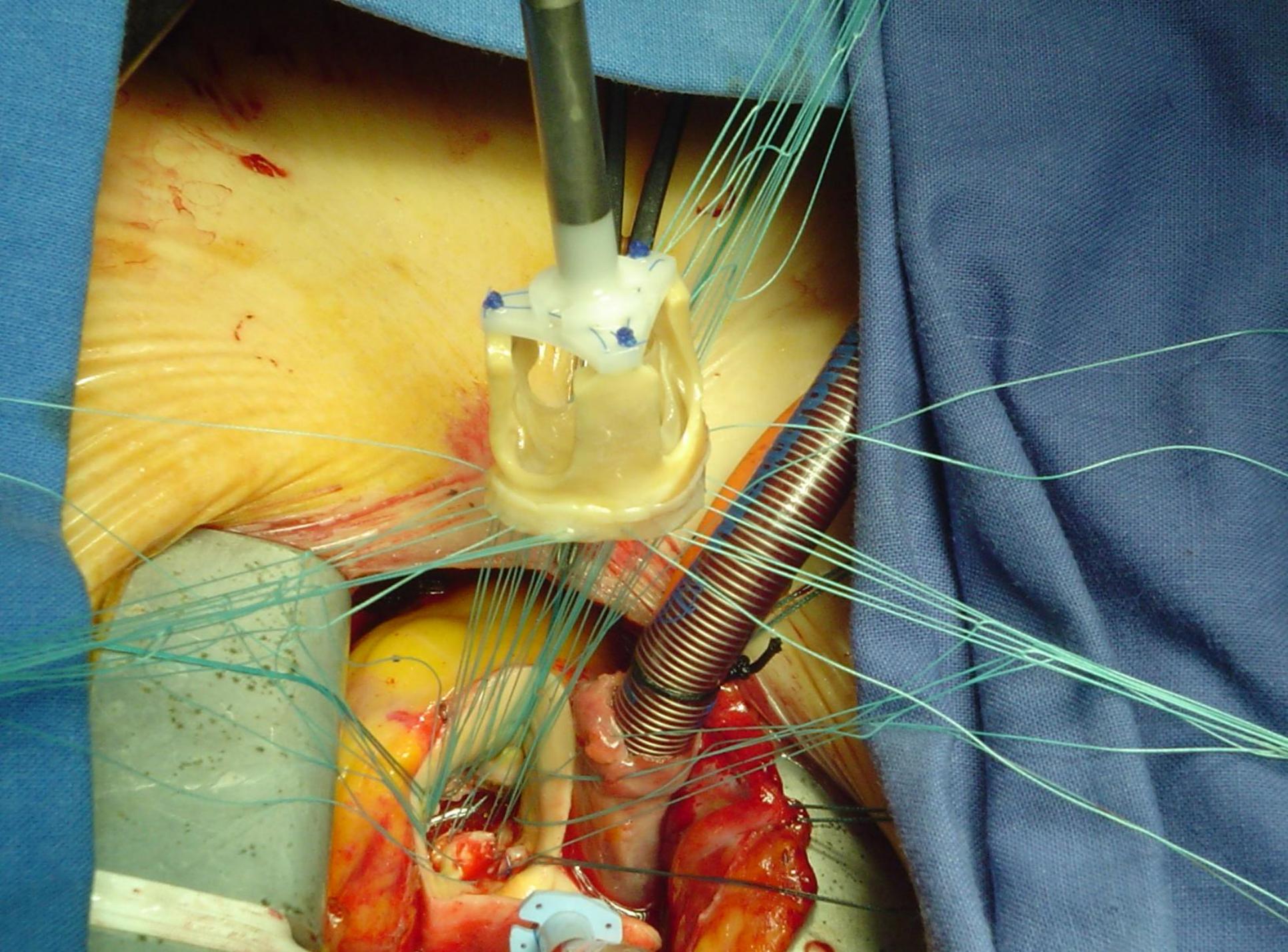


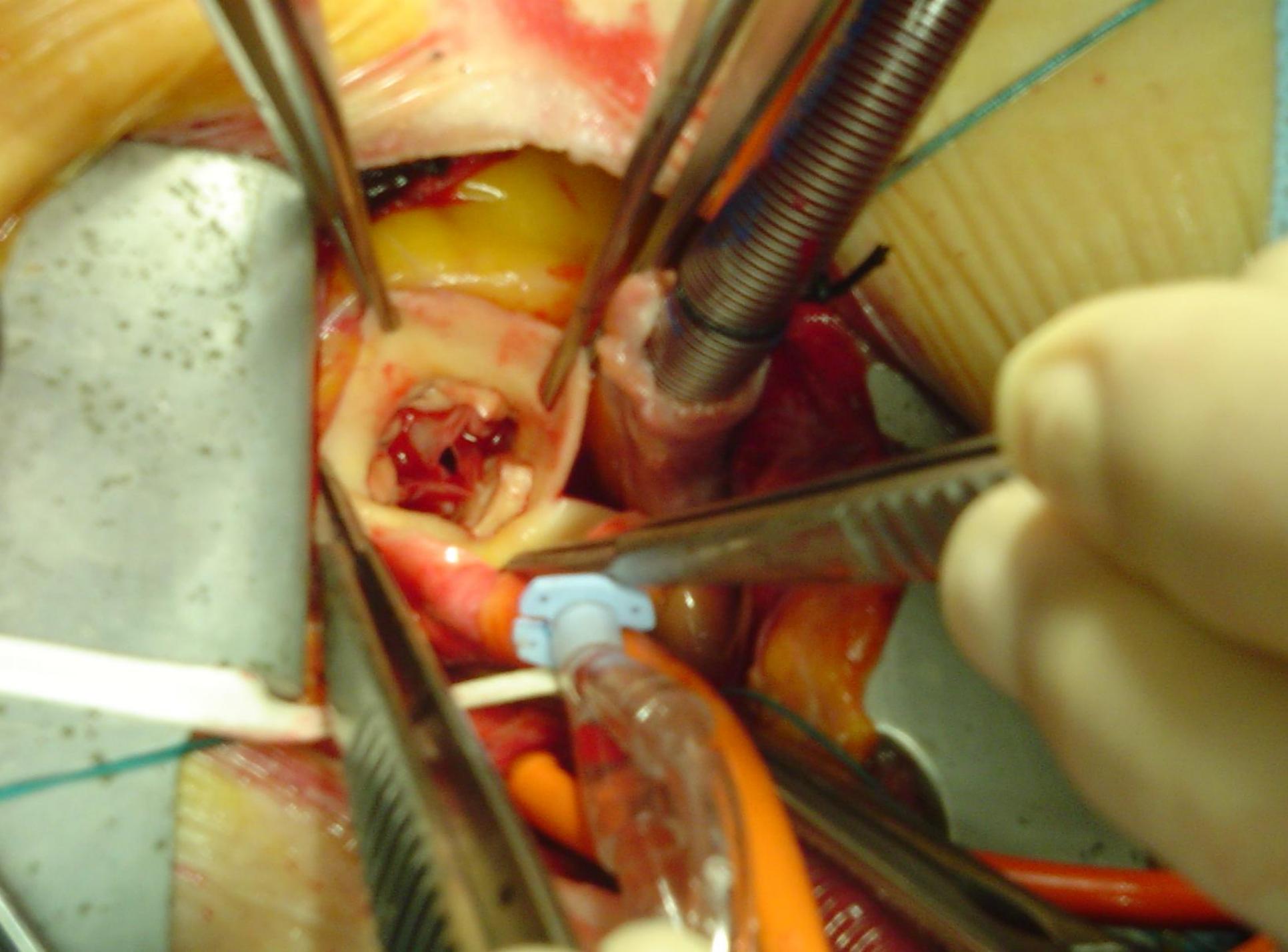








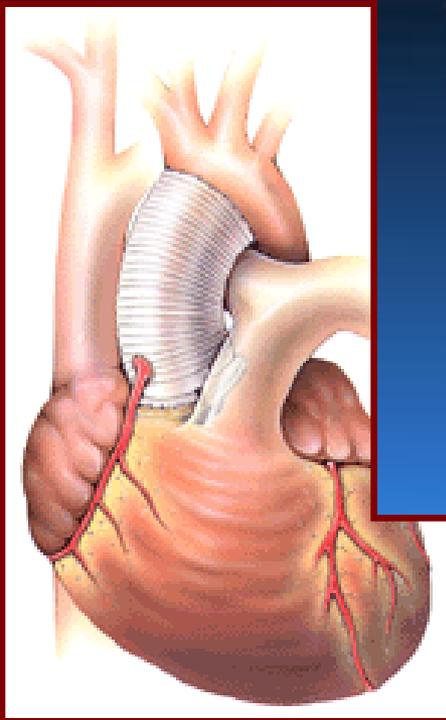








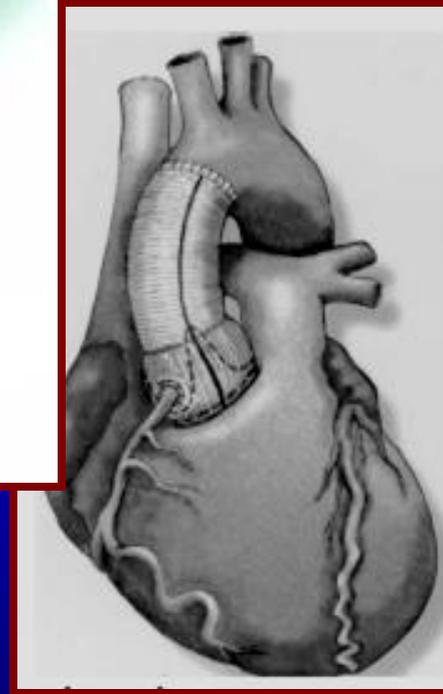
# Terapia Chirurgica sostitutiva

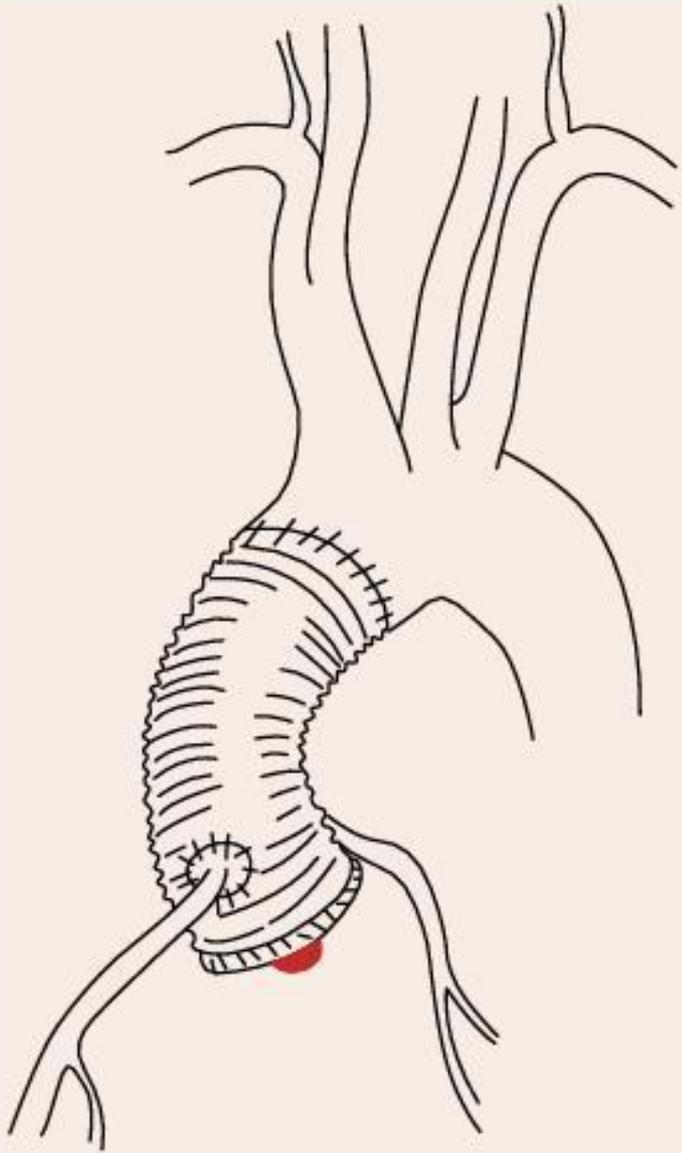


**TUBO VALVOLATO  
MECCANICO**

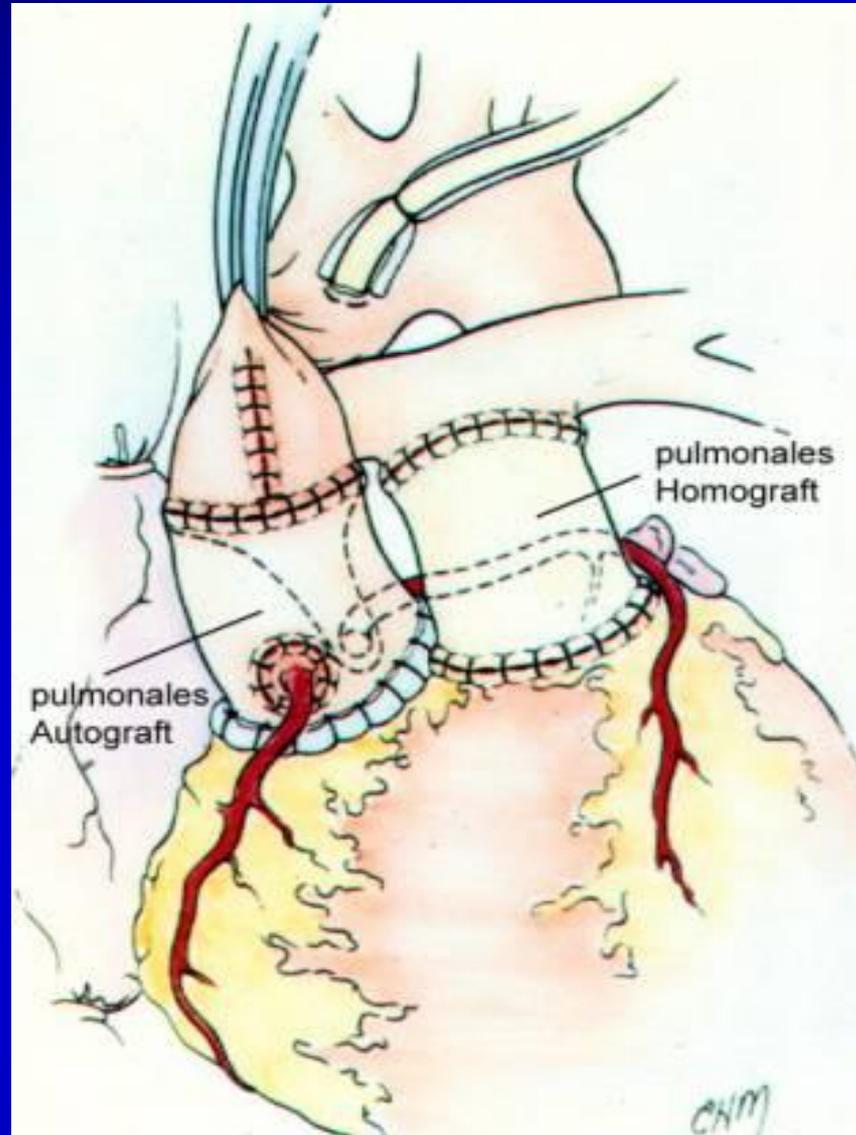


**TUBO VALVOLATO  
BIOLOGICO**





# ROSS OPERATION



# PATOLOGIE DELLA VALVOLA AORTICA

L'insufficienza Ao può risultare da una malattia della valvola, dell'aorta ascendente o di entrambi.

## Etiologia:

• <u>Dilatazione della radice aortica</u>	<b>37%</b>
• Malattia reumatica o postinfiammatoria	27%
• Bicuspidia	24%
• Endocardite infettiva	6%
• <i>DIV del setto membranoso      prolasso lembo cor. dx</i>	
• <i>Trauma</i>	
• <i>Malattie sistemiche: LES, Artrite reumatoide, Spondilite anchilosante, Sifilide, M. di Takayasu o associata a M. di Whipple o di Crohn</i>	

# Riparazione della valvola aortica :

## *Fisiopatologia dell'insufficienza aortica:*

### ▣ *patologia della parete dell'aorta e della radice:*

-  aneurismi del root aortico
-  dissezione della radice aortica
-  dilatazione della giunzione sinotubulare
-  dilatazione anulare

### ▣ *patologia delle cuspidi aortiche:*

-  prolasso
-  perforazione
-  retrazione
-  bicuspidia

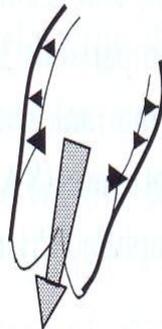
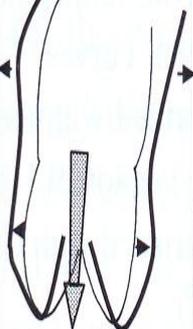
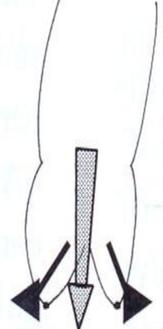
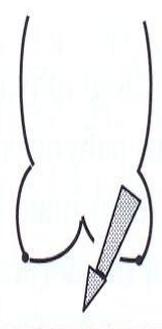
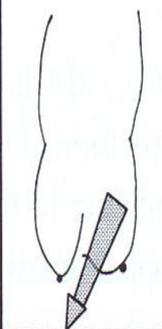
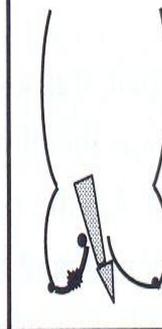
# Riparazione della valvola aortica :

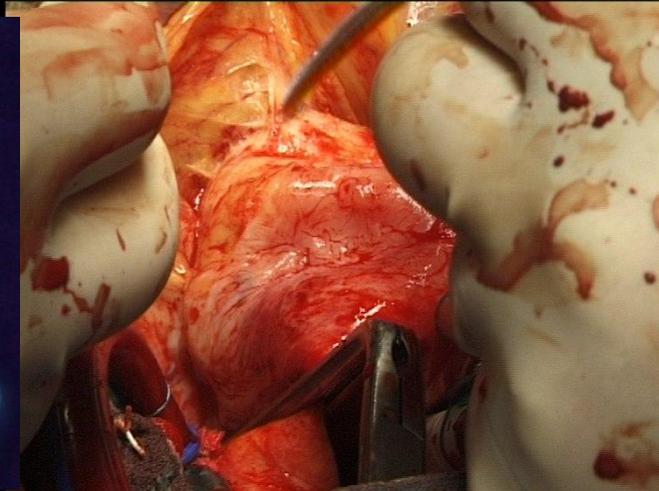
- Basata su una migliore conoscenza di:
  - ✓ Anatomia funzionale della valvola aortica e della radice aortica
  - ✓ Fisiopatologia dell'insufficienza aortica

# Classificazione funzionale ( *TEE + Ispezione visiva* )

## Riparazione della valvola aortica :

<b>Tipo 1</b> : normal cusp motion	1a : dilatazione della giunzione sinotubulare (GST) 1b : dilatazione GST + seni 1c : dilatazione anulare 1d : difetti delle cuspidi
<b>Tipo 2</b> : cusp prolapse	Eccessivo tessuto delle cuspidi Distorsione o flail commissurale
<b>Tipo 3</b> : restricted cusp motion	Ispessimento fibroso Calcificazioni

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



Disfunzione

Lesione

Chirurgia

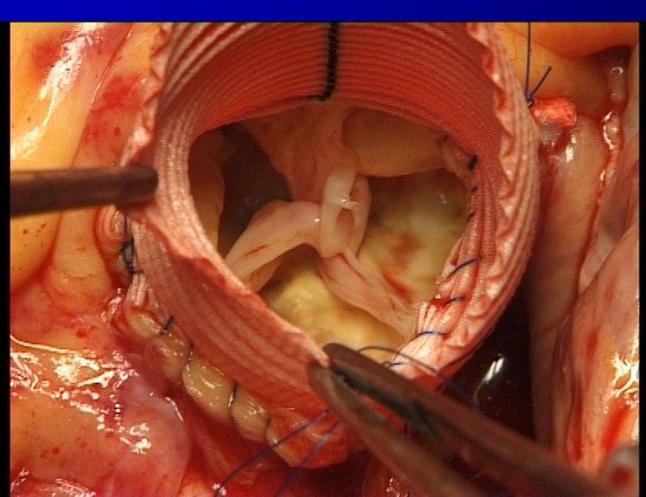
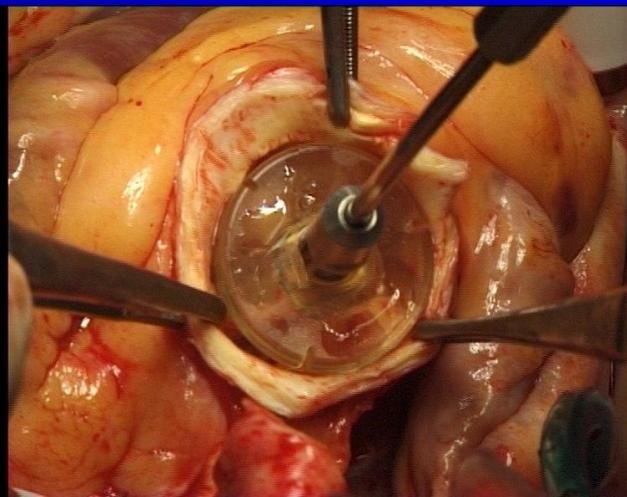
**I a**

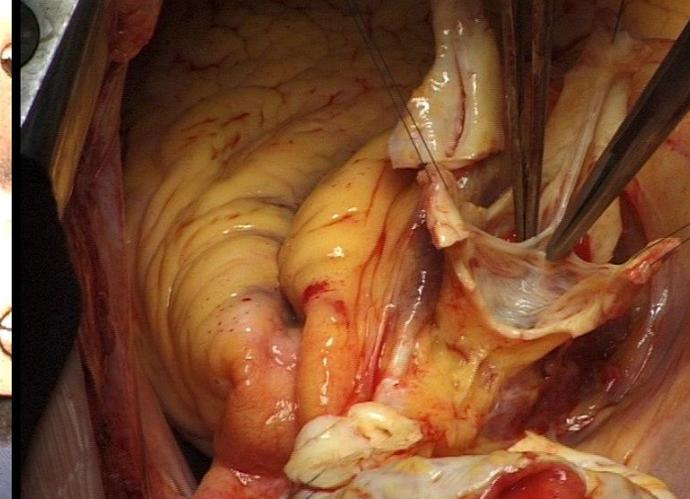
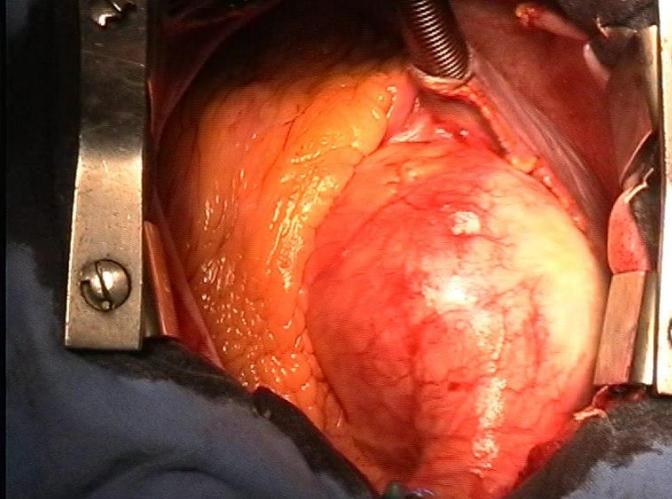
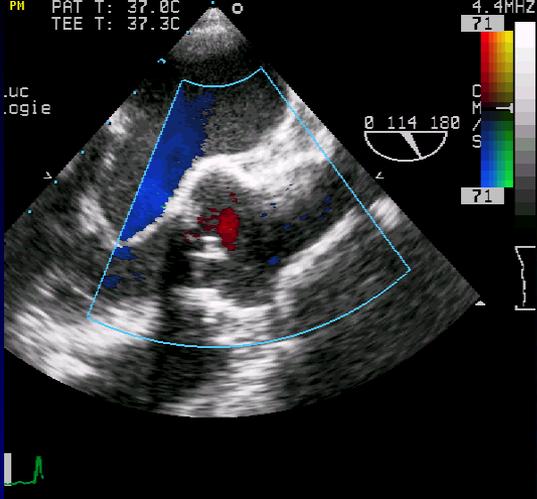


**dilatazione tubulare**



**rimodellamento  
GST**





Disfunzione

**I b**

**I c (-)**

Lesione

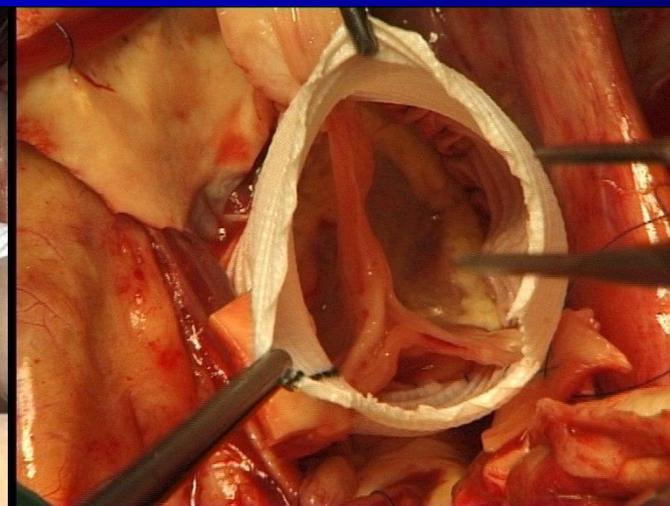
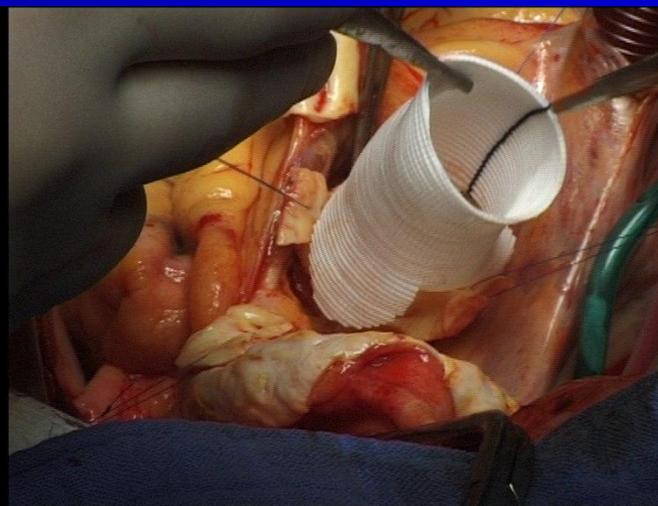
Aneurisma dei Seni

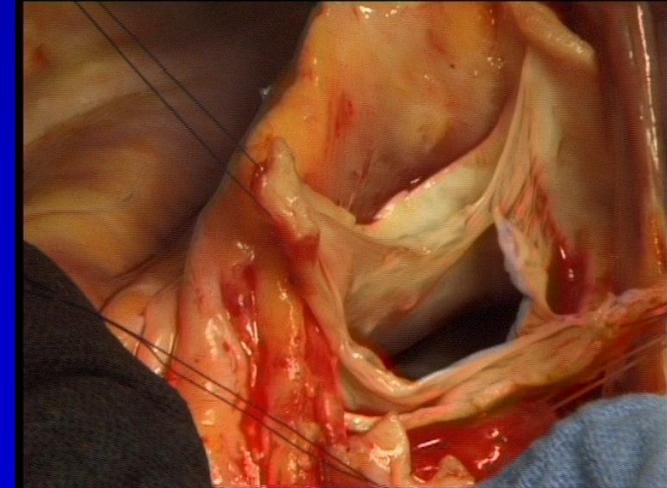
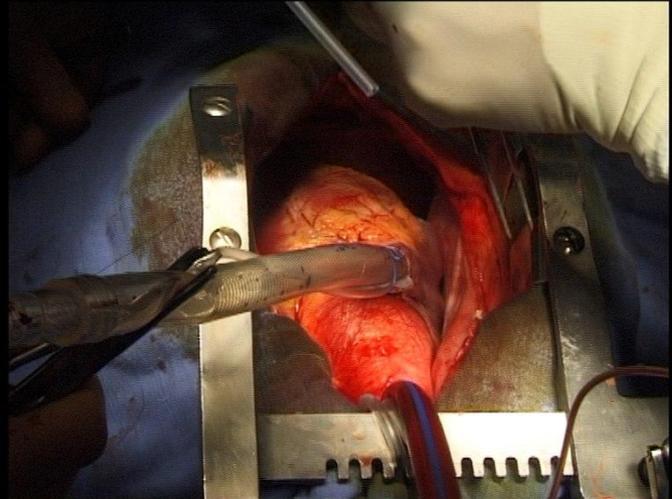
anulus aortico normale



Chirurgia

Aortic root remodeling





Disfunzione

Lesione



Chirurgia

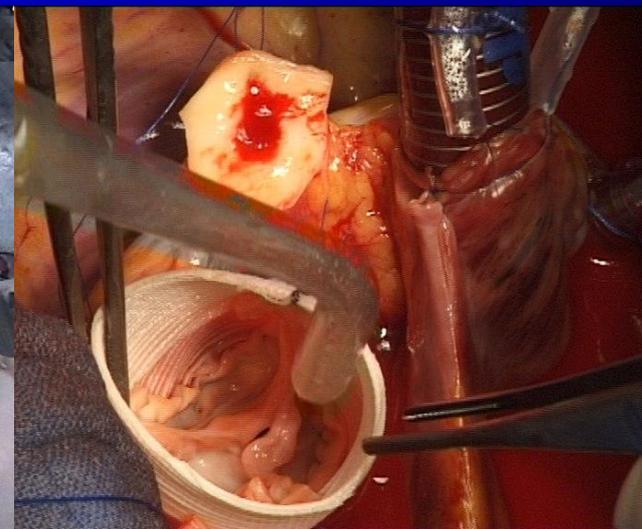
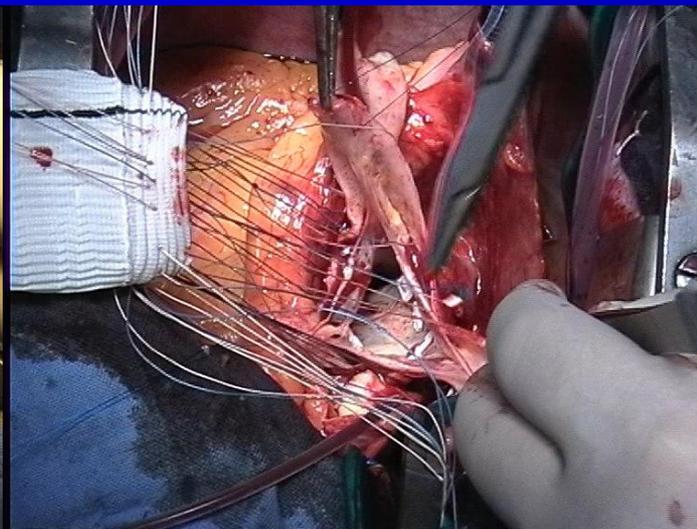
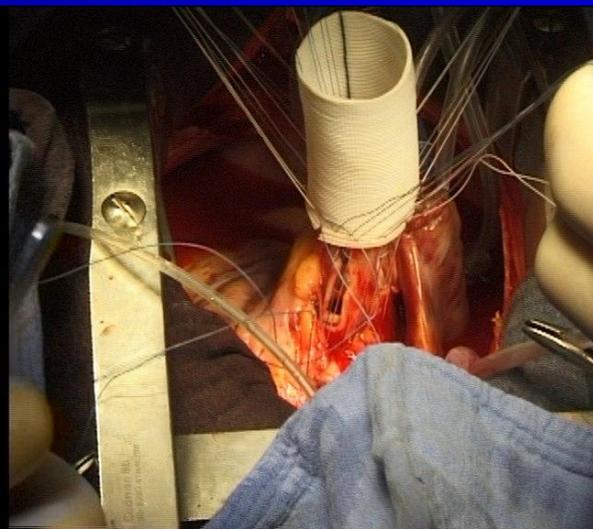
**I b**

Aneurismi seni

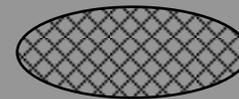
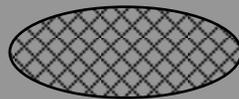
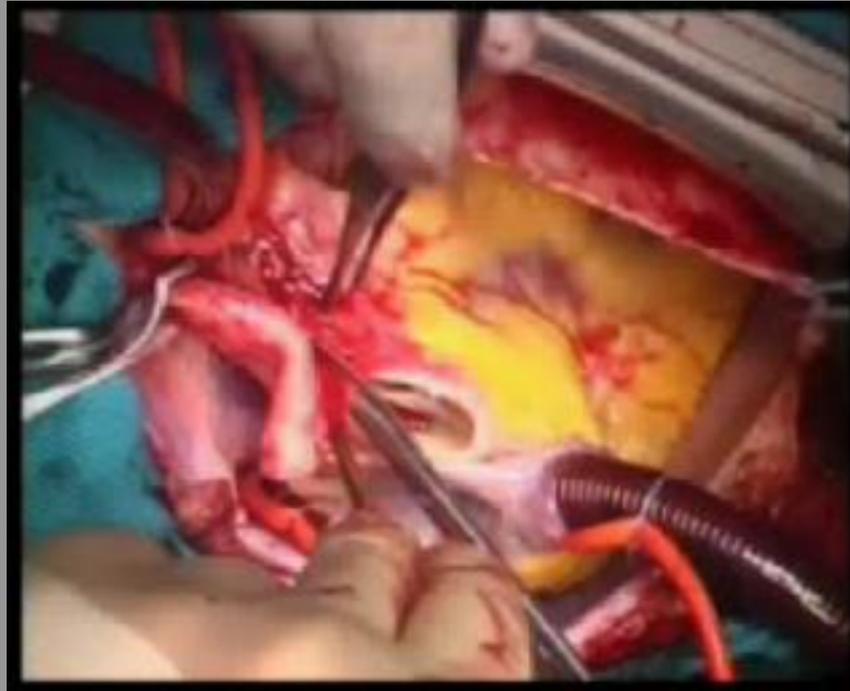
Aortic root reimplantation

**I c** (+)

dilatazione anulus aortico

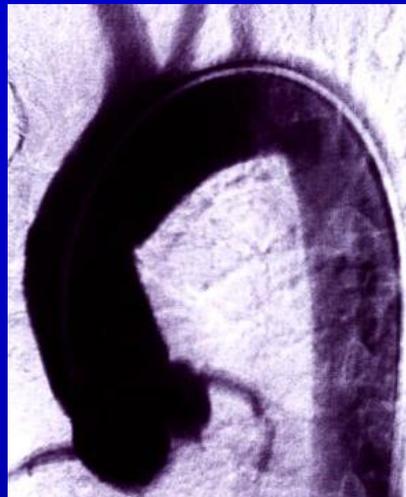
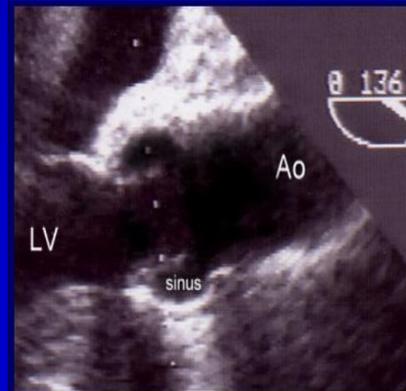
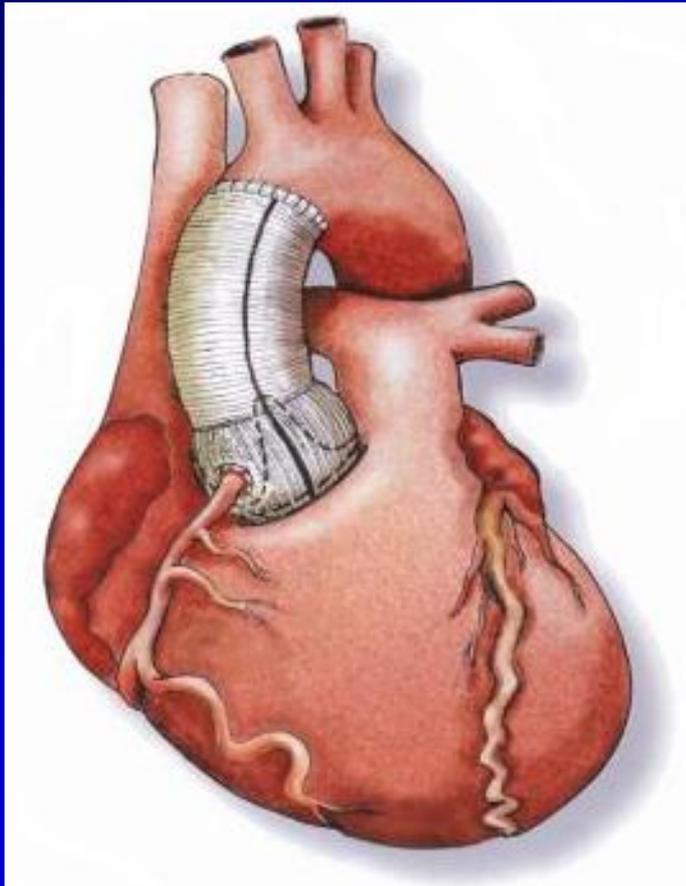


# Implantation Technique



# Gelweave Valsalva <sup>TM</sup>:

## Risultati post-operatori della “David procedure”



Disfunzione

Lesione



Chirurgia

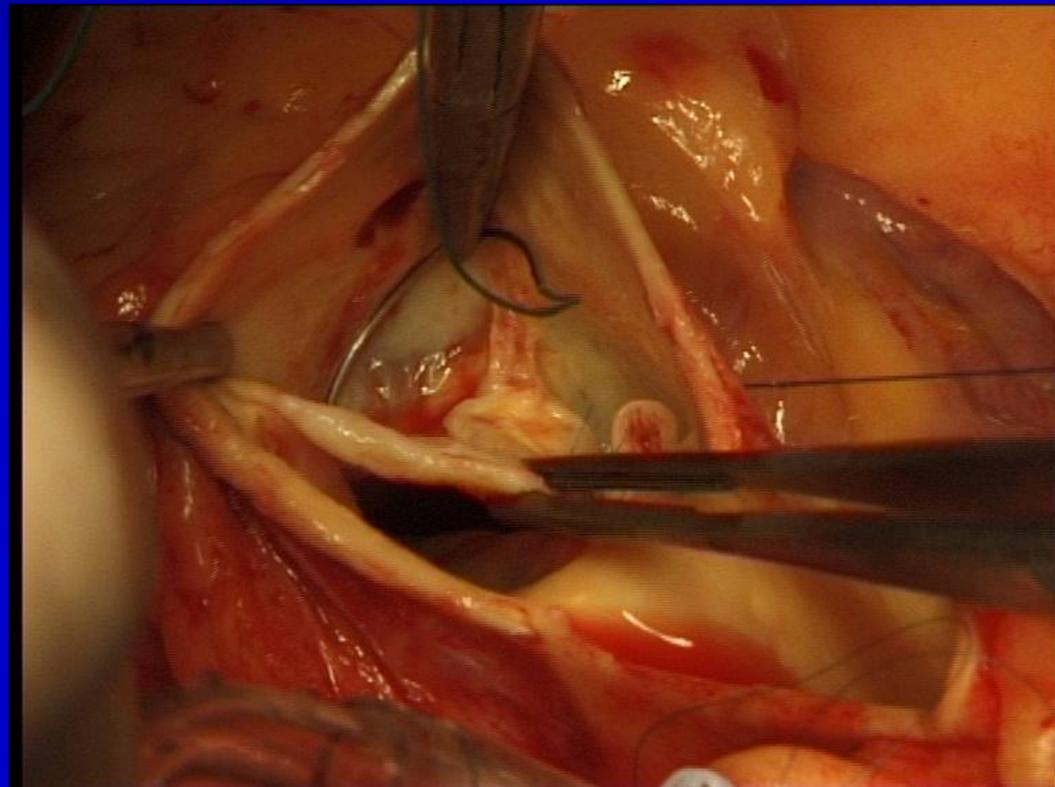
**I c**

dilatazione anulare  
isolata

anuloplastica subcommissurale

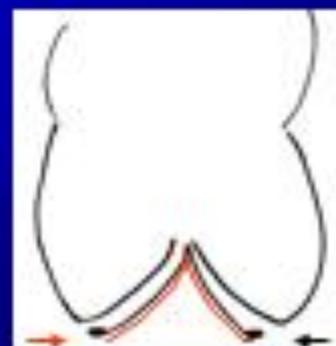
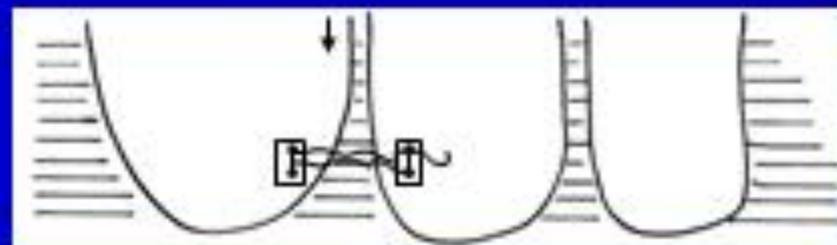
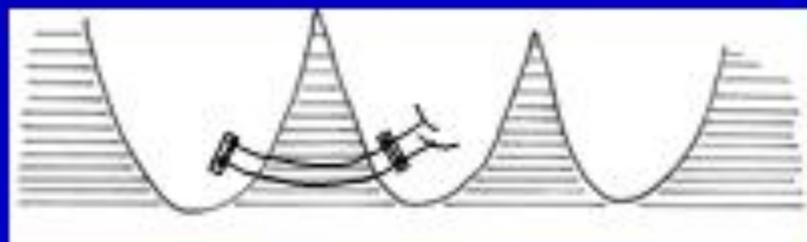
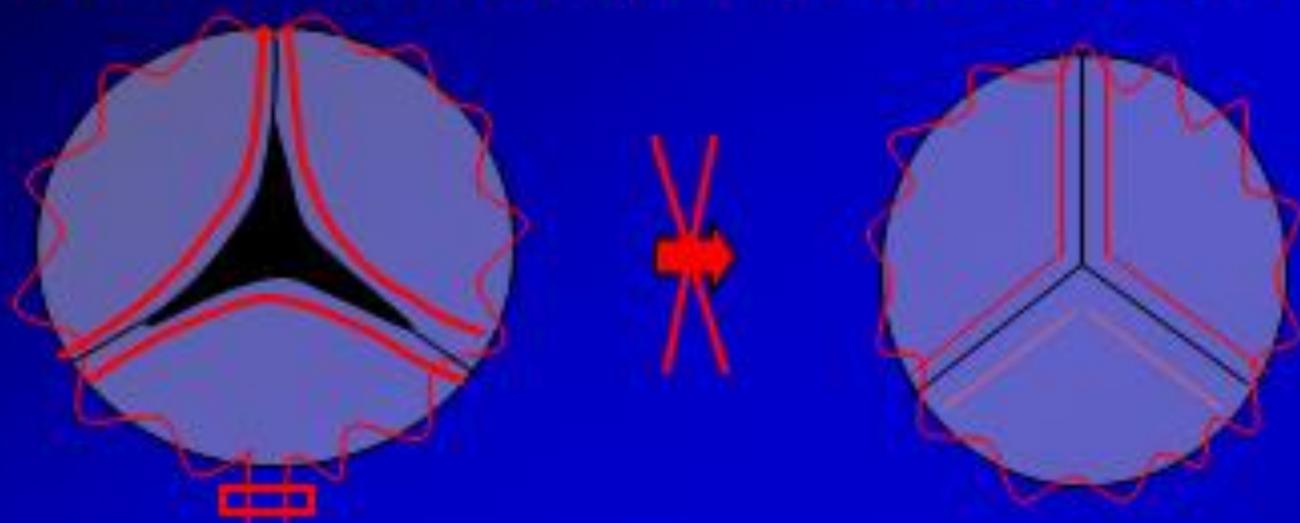
frequentemente associata: reimplantation

I b - II - III



# General Principles - Aortic annuloplasty

Sub Commissural annuloplasty interleaflet Triangle base plication

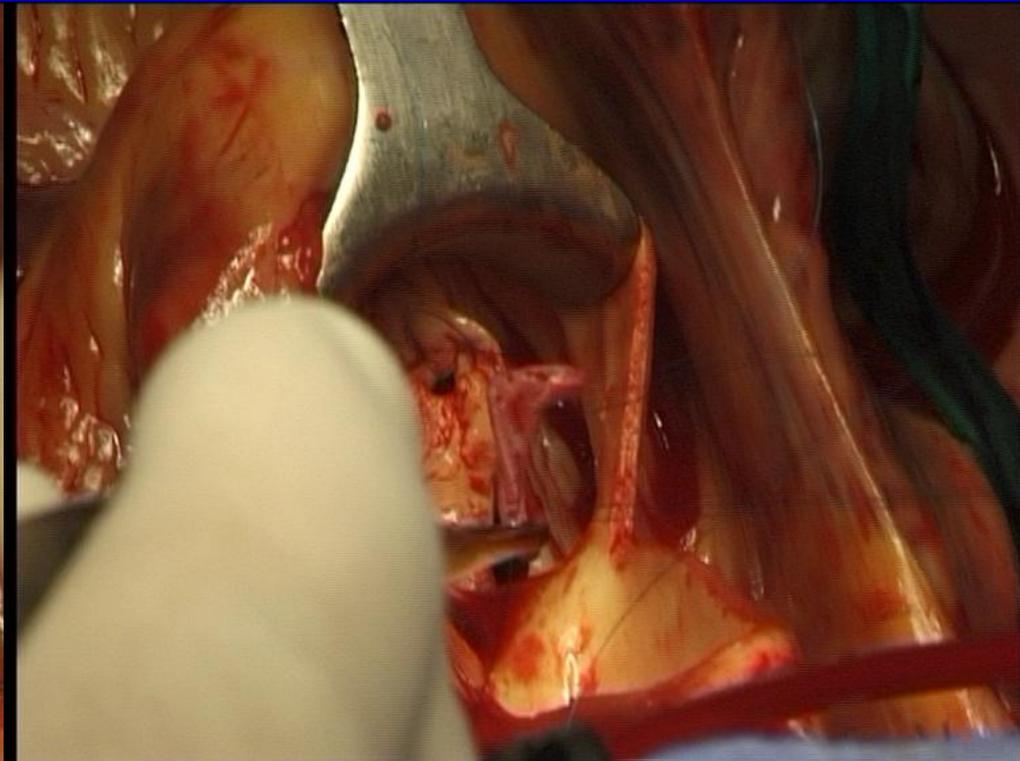
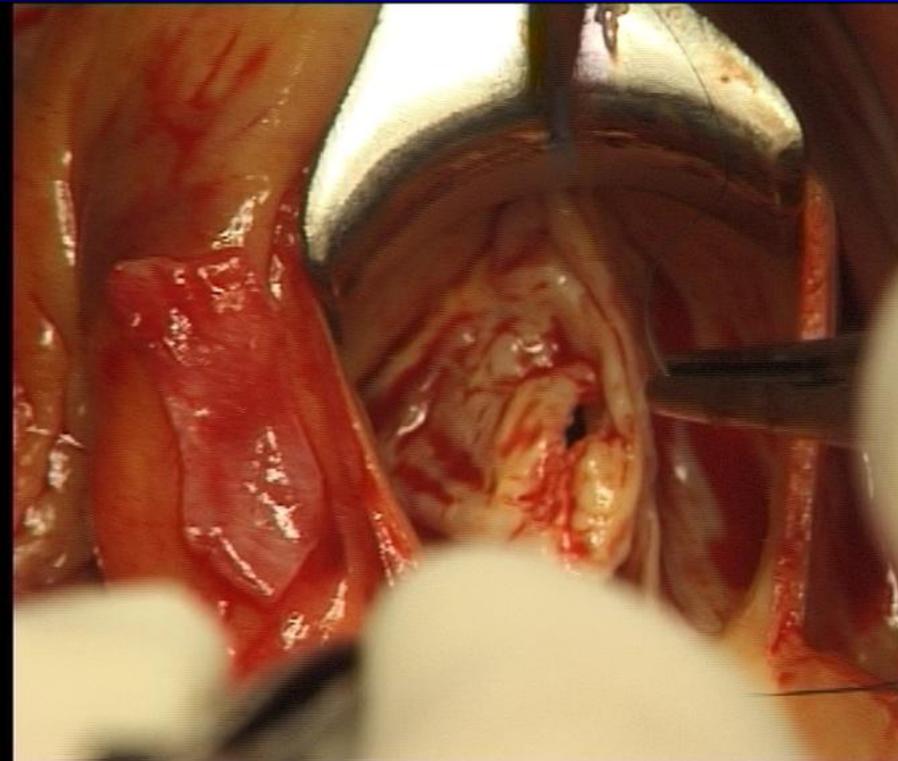


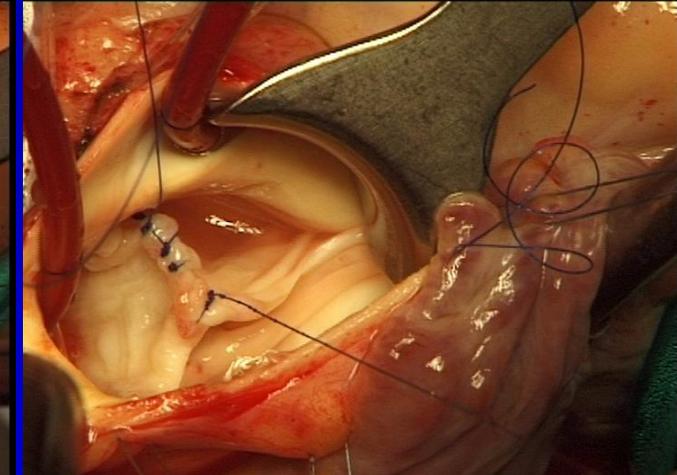
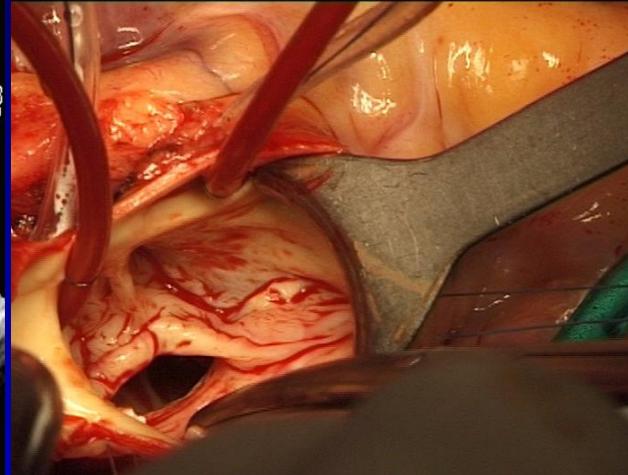
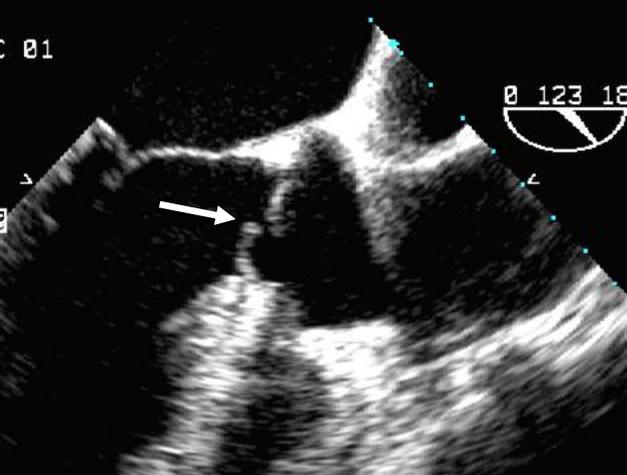
**Disfunzione**

**Lesione**

**Chirurgia**

**I d** perforazione/difetto cuspidi → chiusura con patch





**Disfunzione**

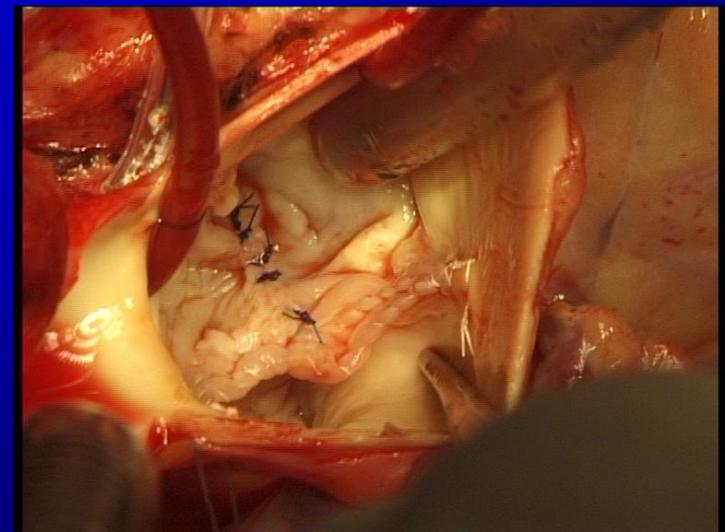
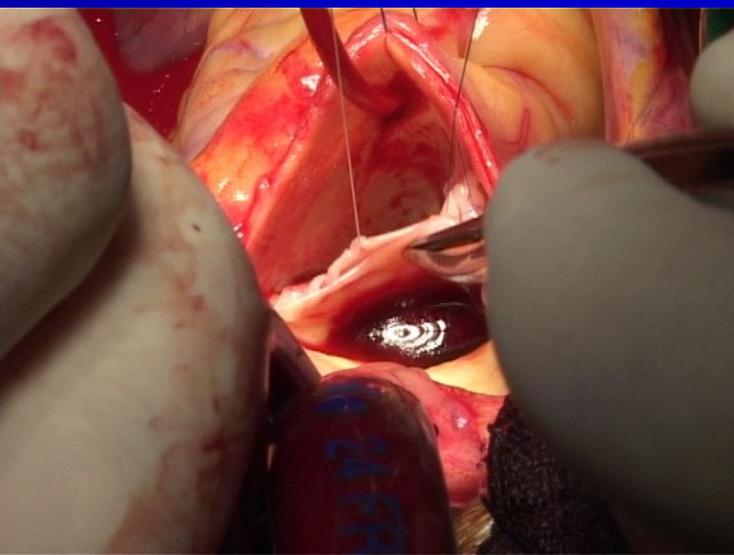
**Lesione**

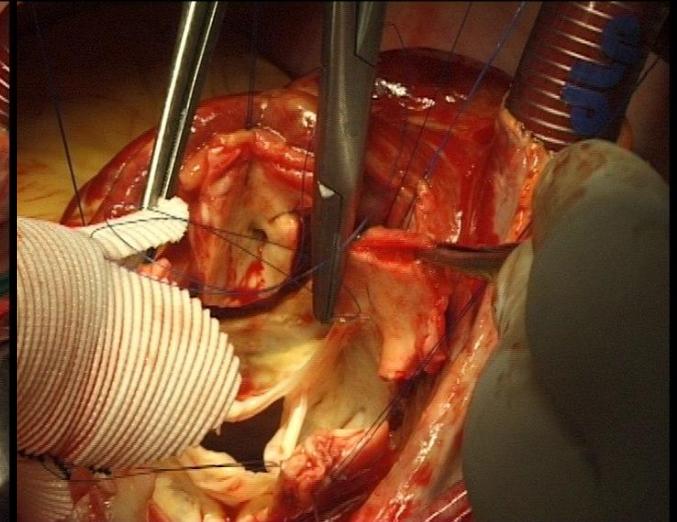
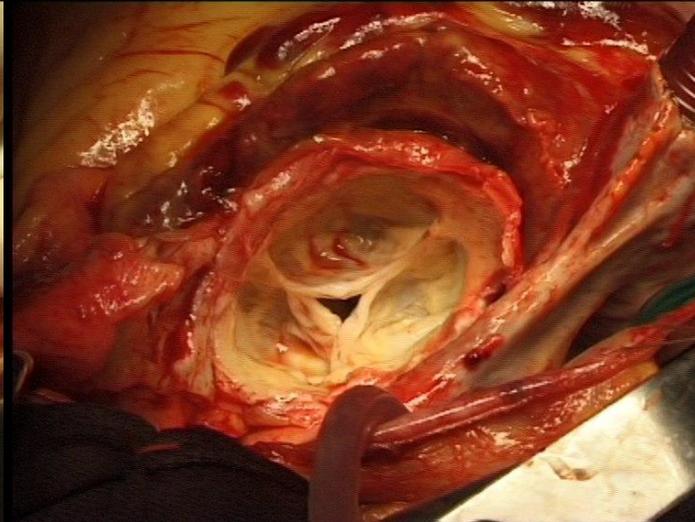
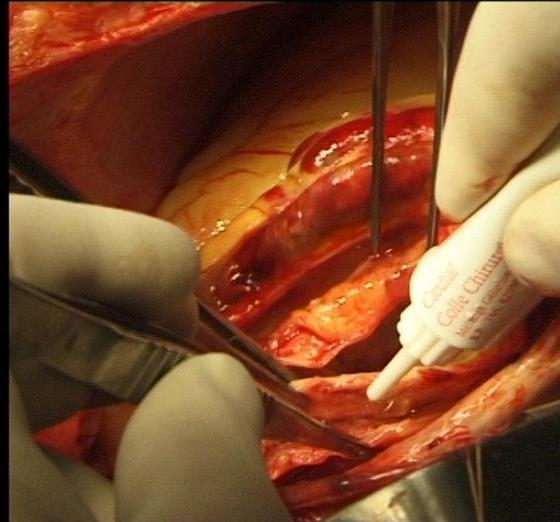
**Chirurgia**

**II**

**Prolasso di cuspidi → Resezione triangolare/plicazione**

**↘ Rinforzo del margine libero**





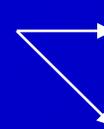
**Disfunzione**

**Lesione**

**Chirurgia**

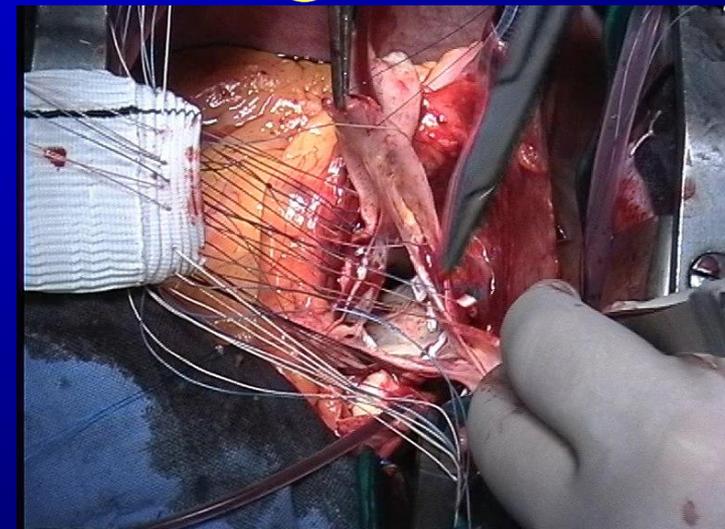
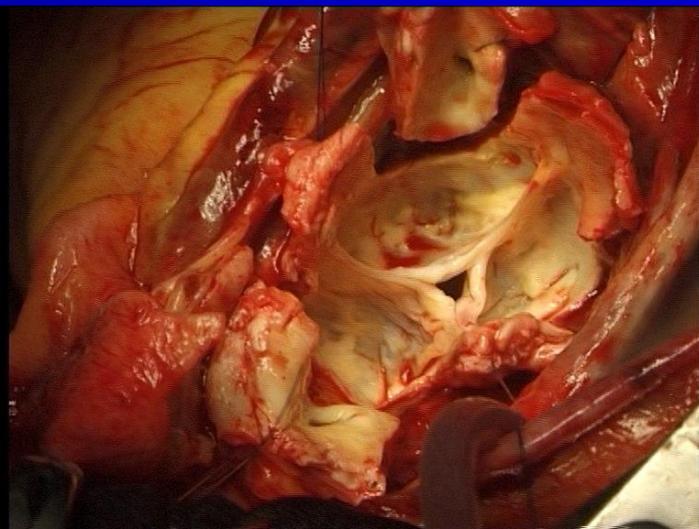
**II**

**Dissezione acuta**



**Aortic root remodeling**

**Aortic root reimplantation**



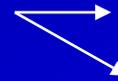
## Disfunzione

## Lesione

## Chirurgia

### III

ispessimento fibroso



shaving

resezione del raphe

calcificazioni

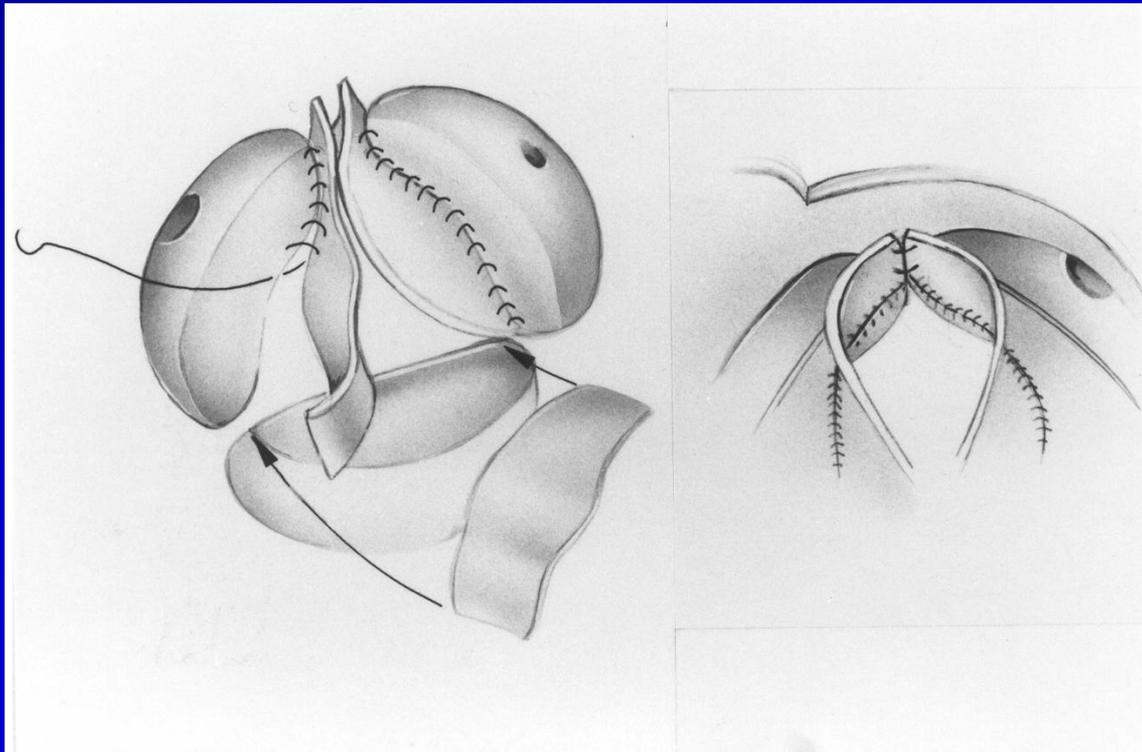


decalcificazione

fusione commissurale



commissurotomia



Estensione delle cuspidi ?

# Tecniche chirurgiche di riparazione dei lembi valvolari:

