

Tecniche di riparazione della valvola mitralica

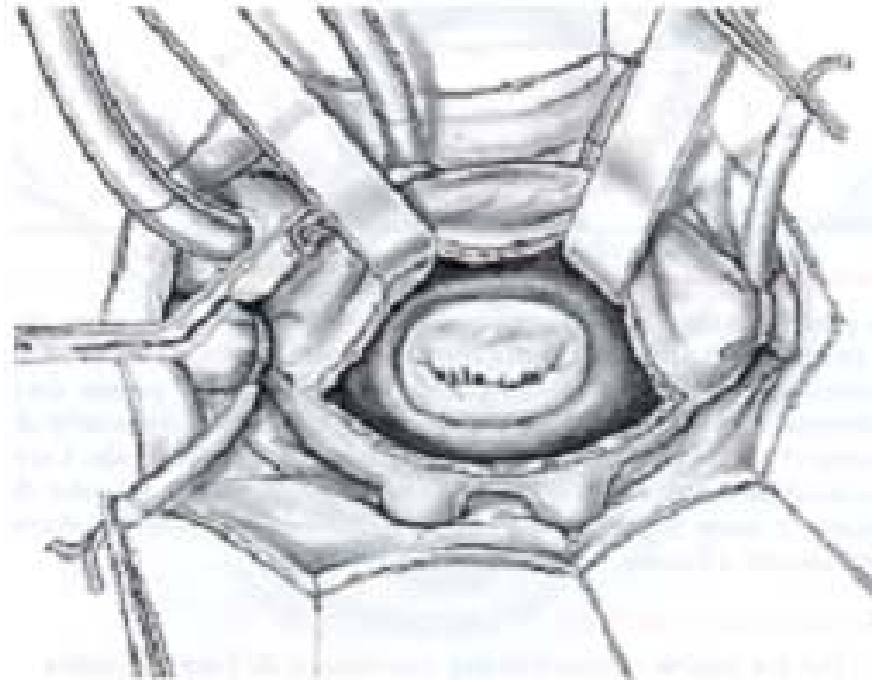
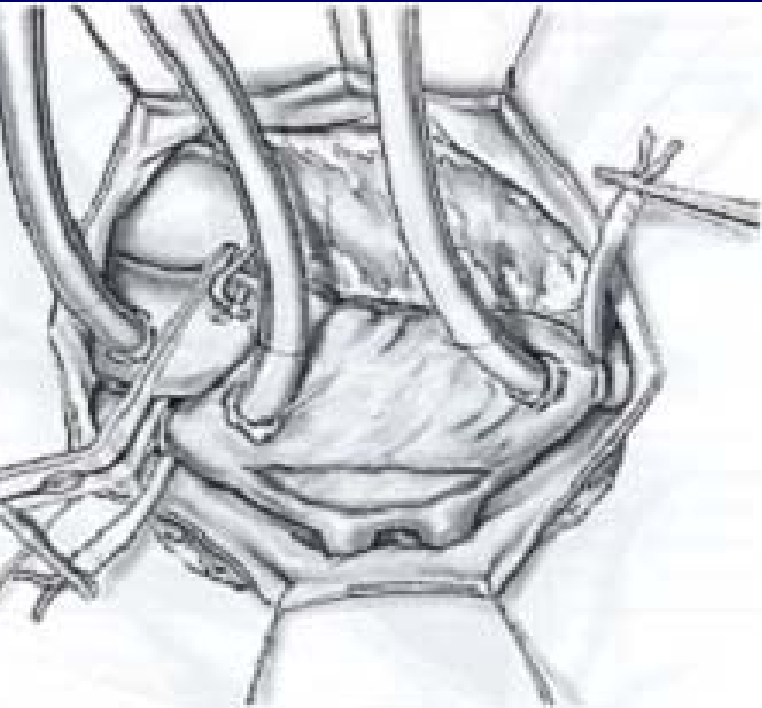
Gaetano Minzioni

1° Convegno Nazionale di Ecocardiochirurgia
Milano 15-17 Ottobre 2007

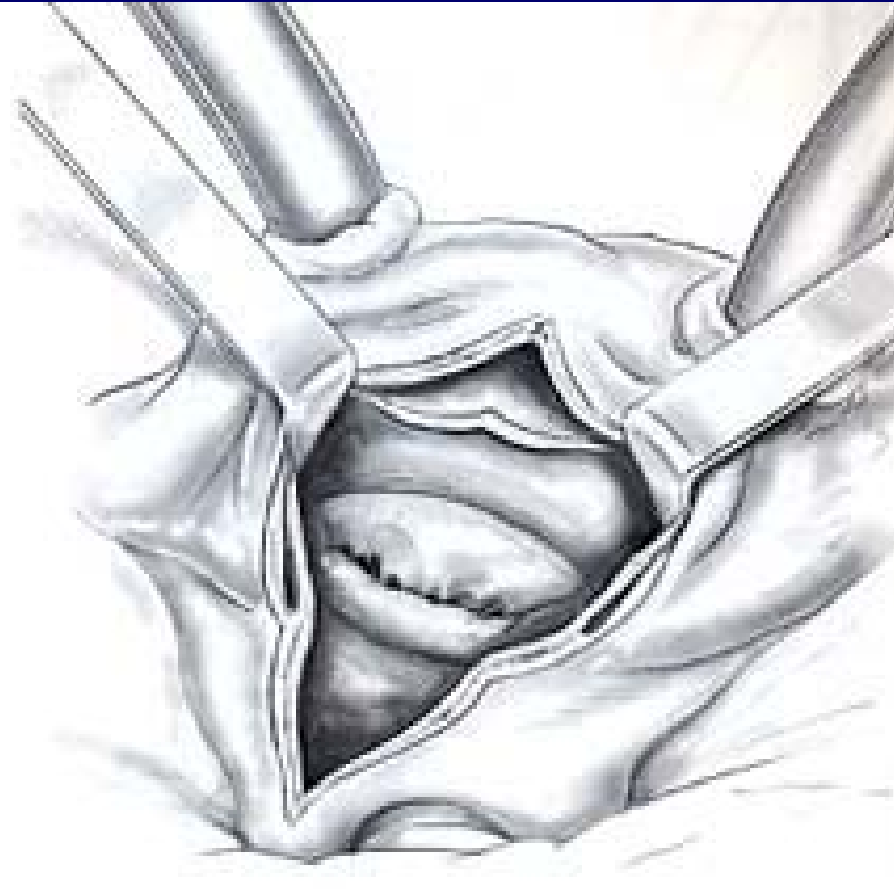
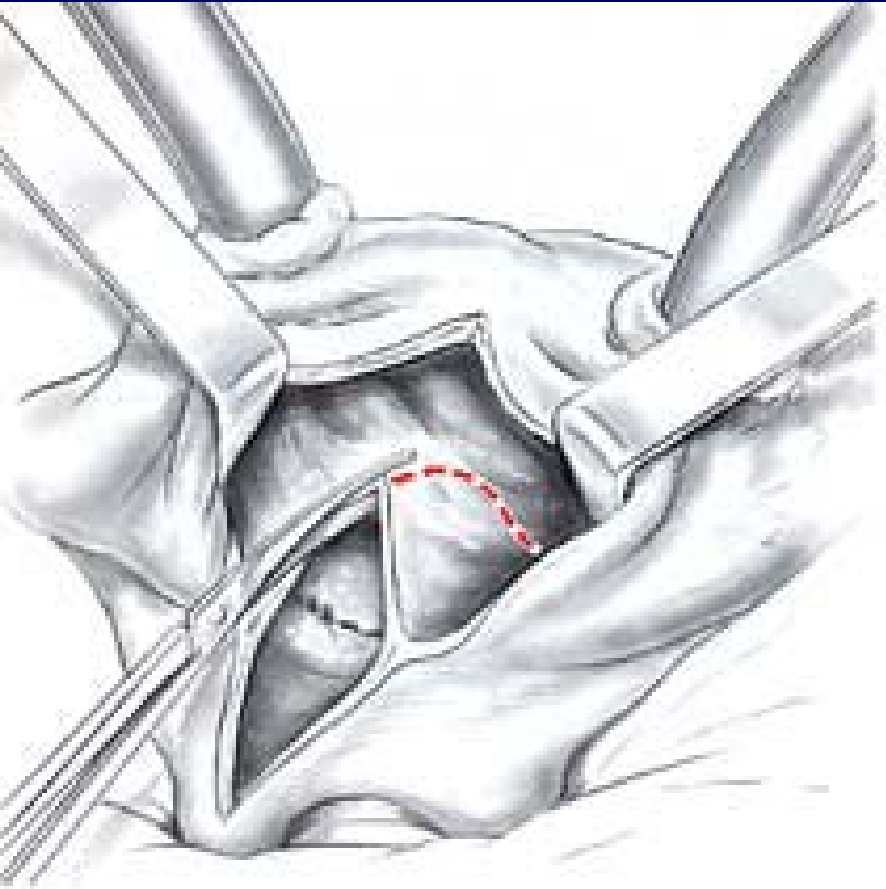
Vie di accesso

- atriotomia sinistra parasettale
- biatriale posteriore sec. Dubost
- biatriale anteriore sec. Guiraudon
- transettale
- atriotomia sinistra per toracotomia sin.
- parasettale sin estesa al tetto (sez. VCS)

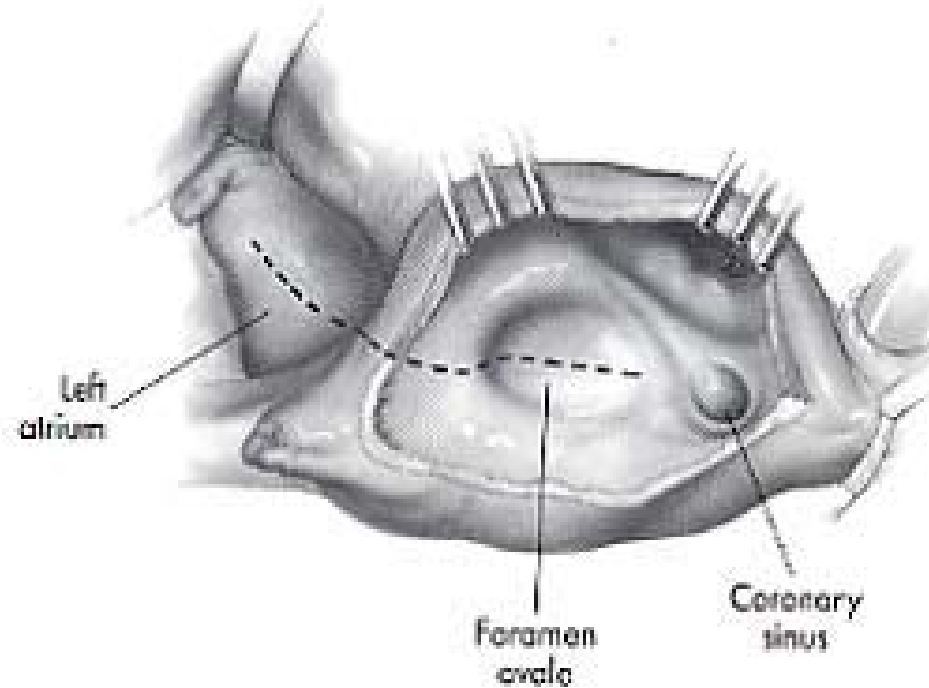
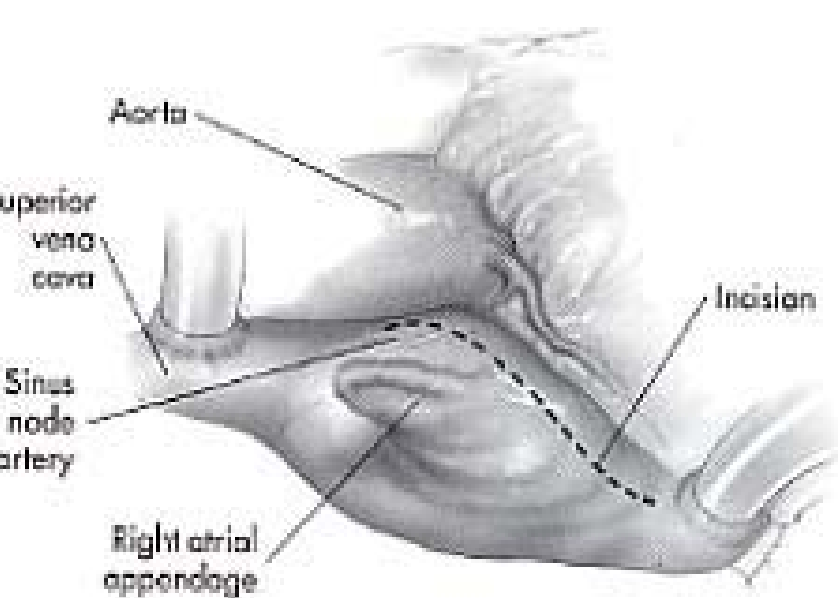
Atriotomia sinistra parasettale



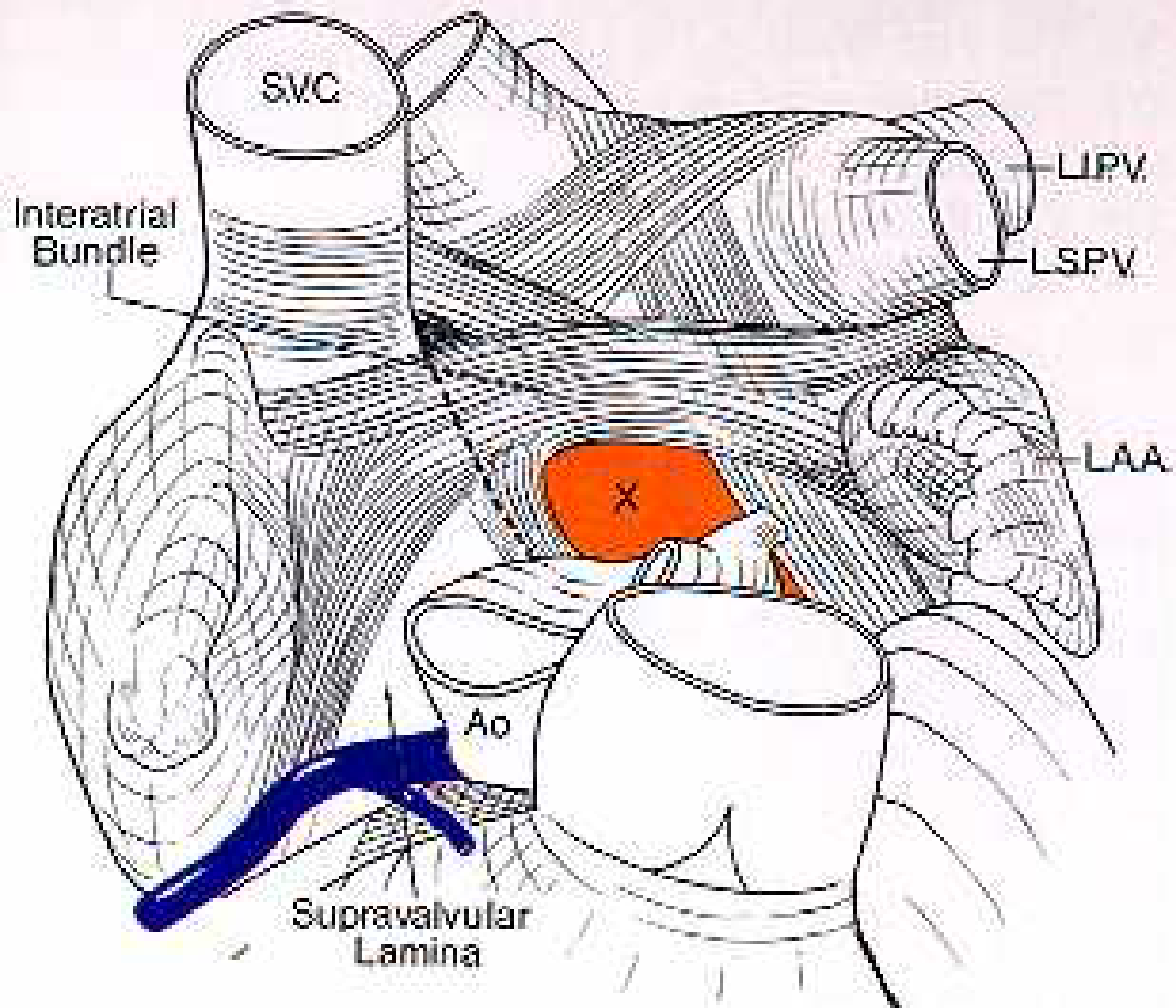
Atriotomia biatriale sec. Dubost

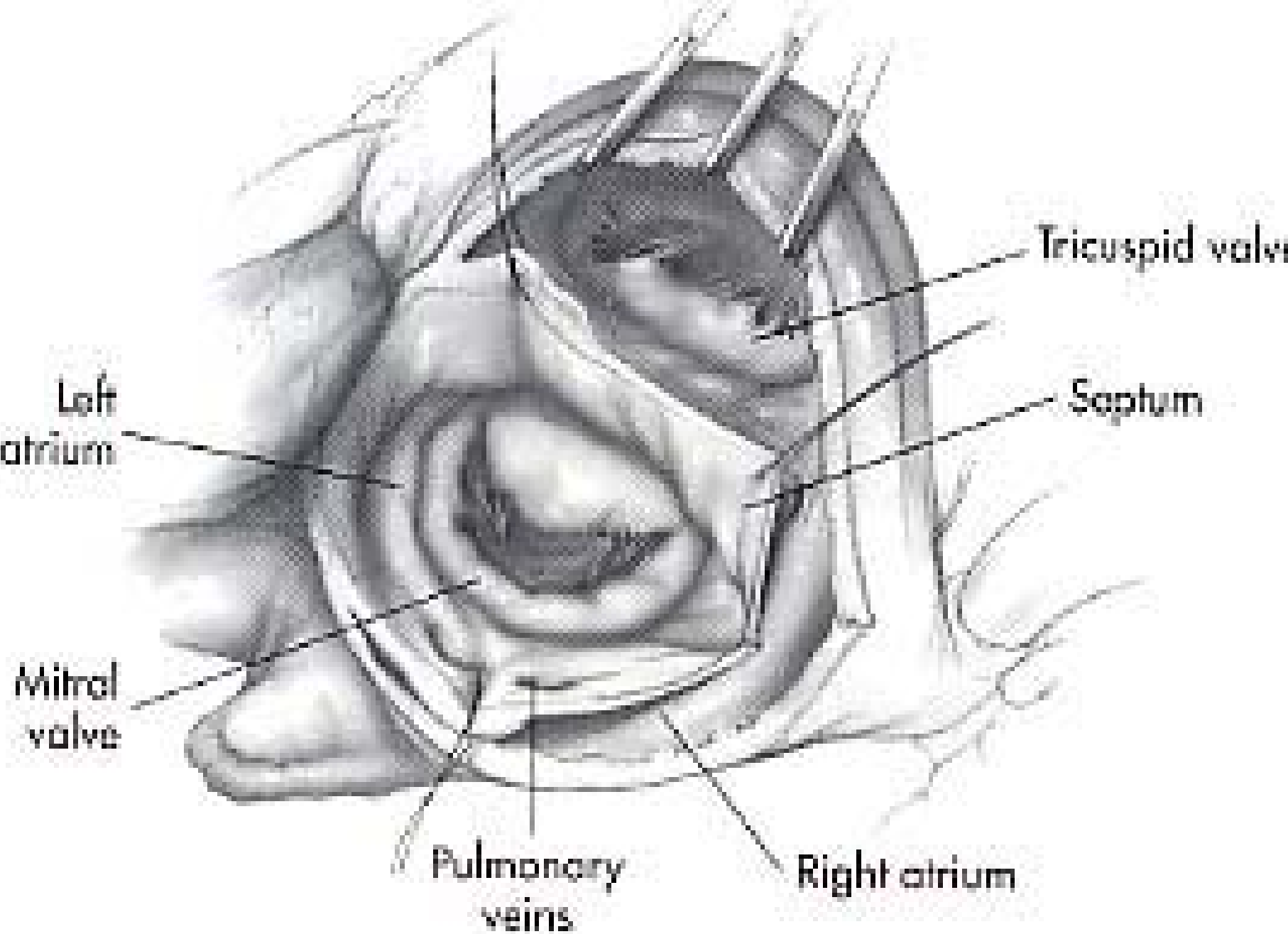


Atriotomy biatriale sec. Guiraudon



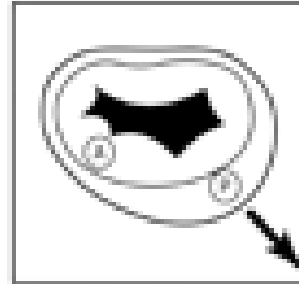
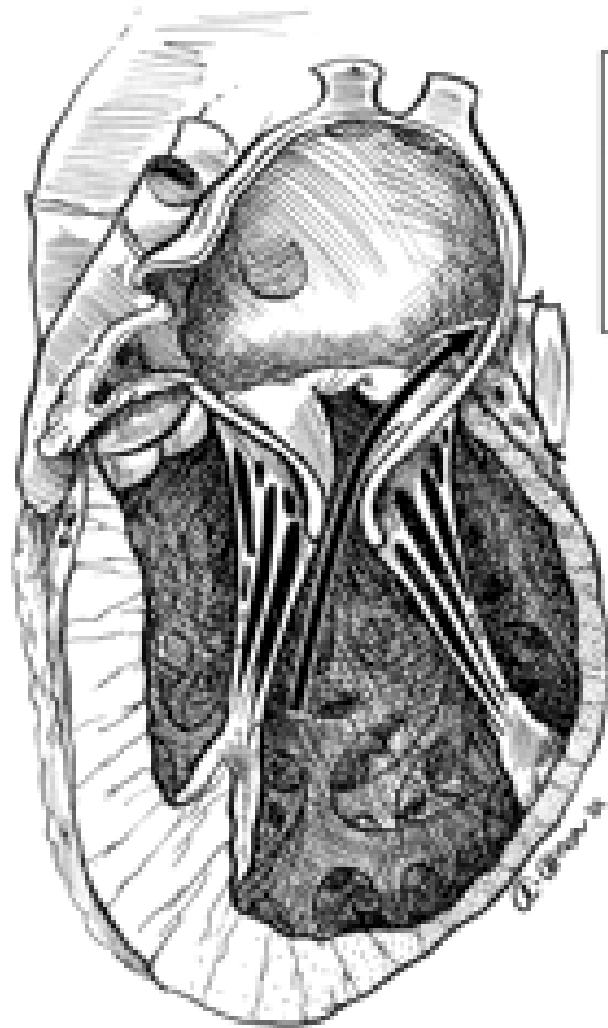
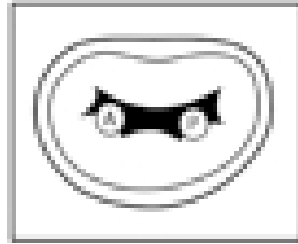
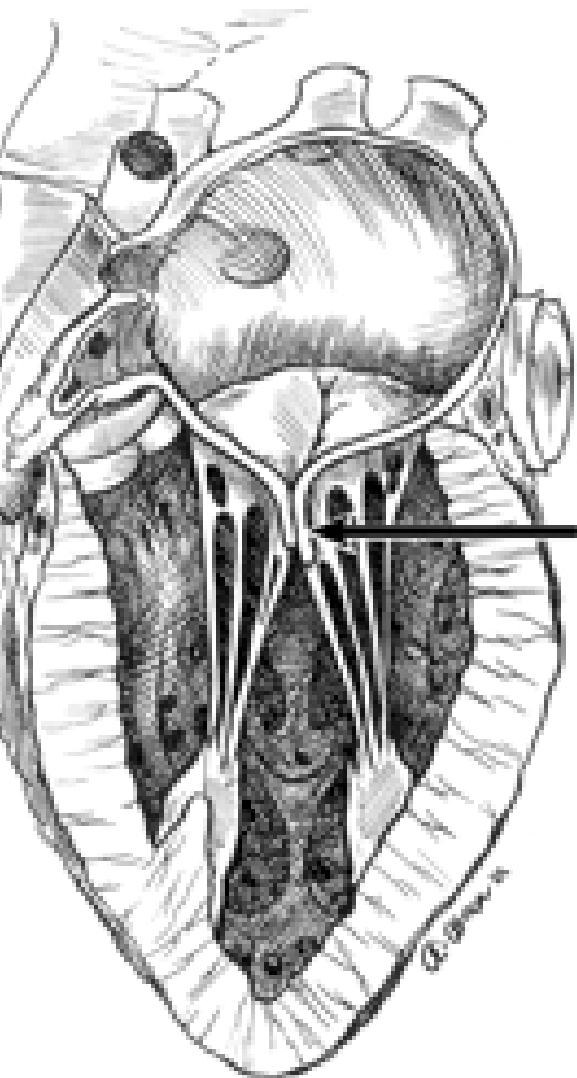


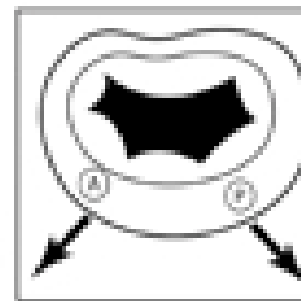
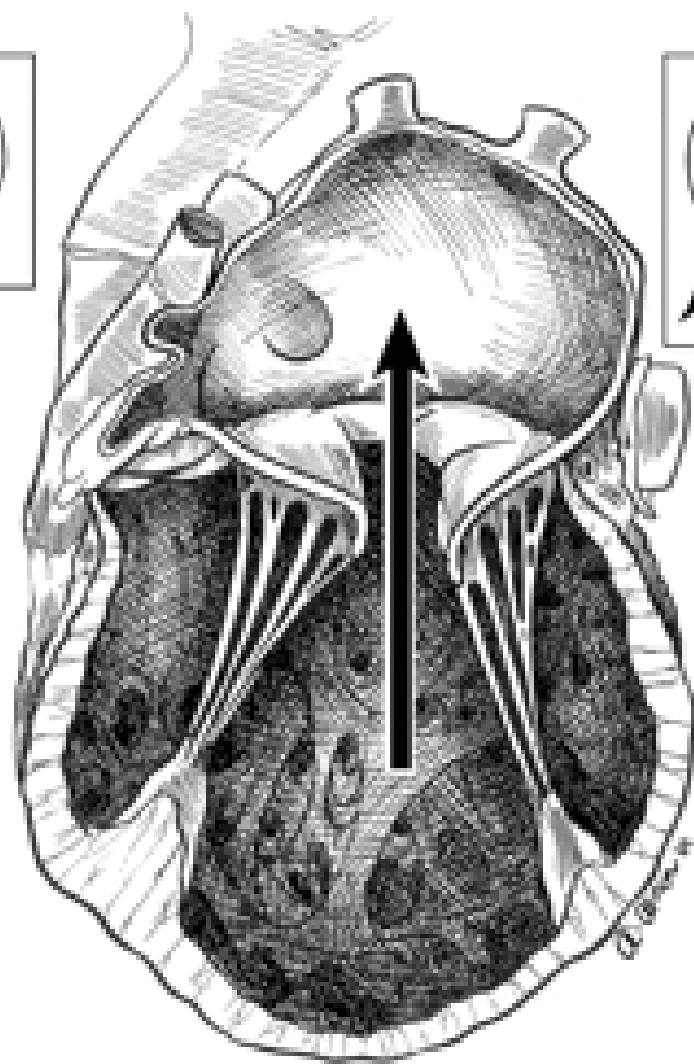
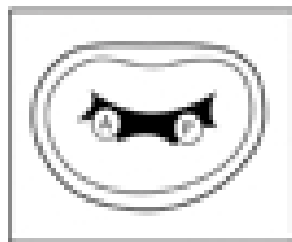
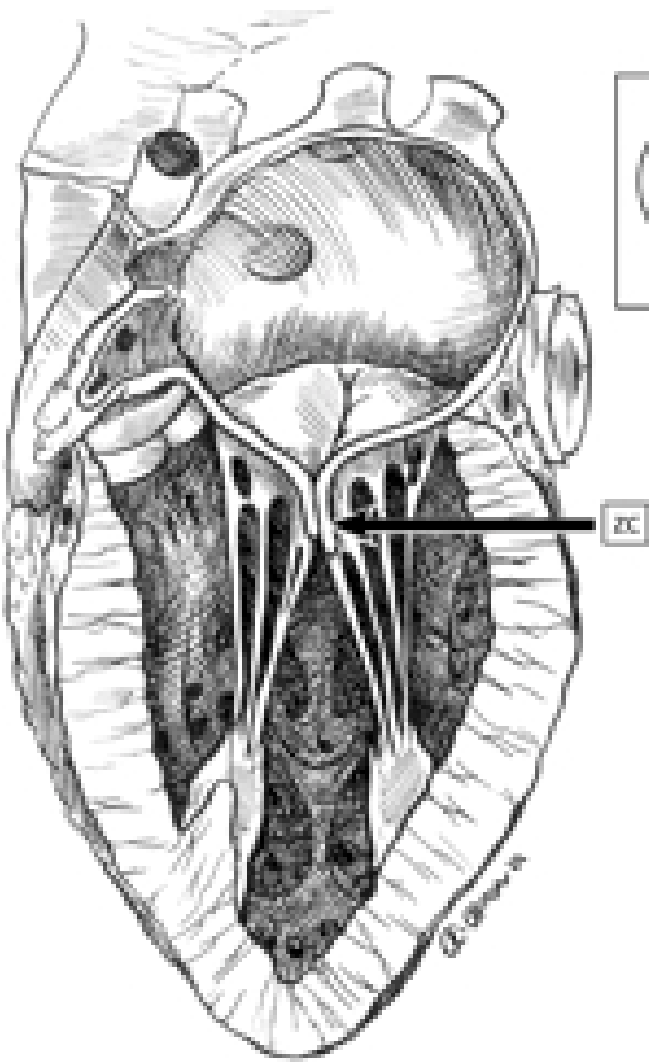




Cause della insufficienza mitralica

- anello
- lembi
- corde
- papillari
- parete ventricolo sinistro





PRE :

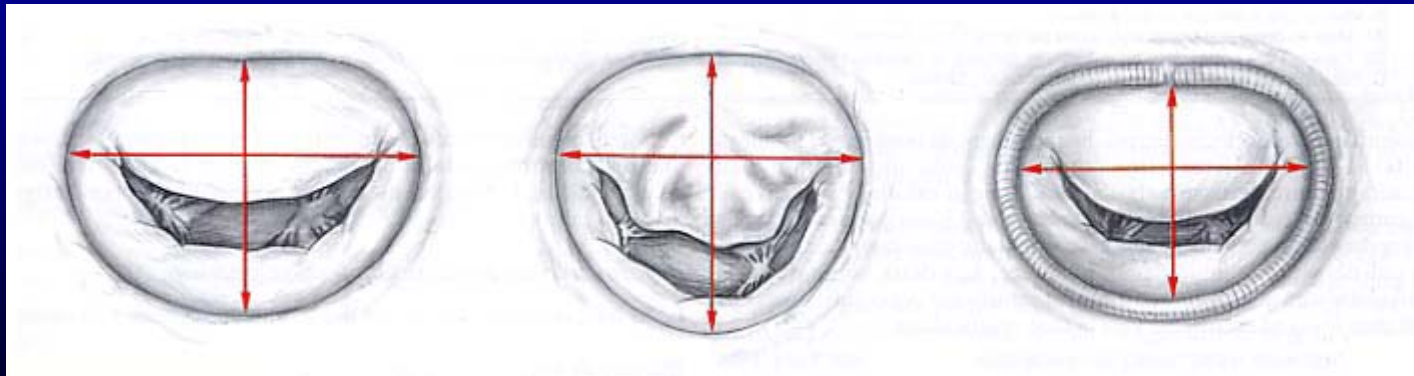
- analisi della valvola
- etiologia
- disfunzione (funzionale e segmentaria)
- lesione
- rischio di SAM

POST :

- IM residua (origine, entità)
- SAM
- disfunzione VS
- lunghezza della coaptazione

Anello protesico

- riduzione negli anelli dilatati
- rimodellamento (diametro AP e LL)
- consolidamento della riparazione
- affrontamento dei lembi nel tethering
(tenting area, coaptation depth)



Anelli

- completi e incompleti
- mitral bands
- rigidi
- semirigidi
- semiflessibili
- flessibili
- metallici
- dacron
- pericardio

1970s



Carpentier-Edwards Classic™
Annuloplasty Ring

1980s



Carpentier-Edwards Classic™
Tricuspid Ring



Cosgrove-Edwards™
Annuloplasty System

1990s



Carpentier-Edwards Physio™
Annuloplasty Ring

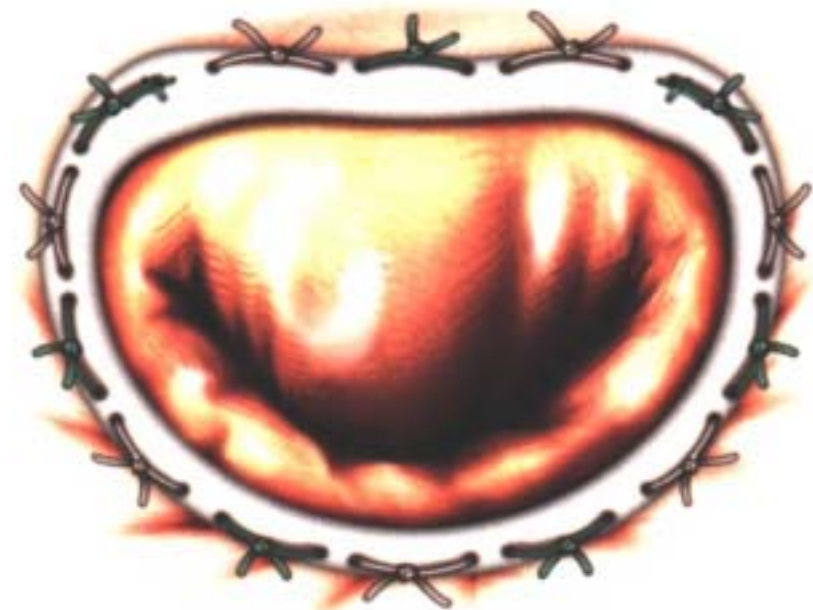


Edwards MC²™
Tricuspid Annuloplasty System

2000s



Carpentier-McCarthy-Adams IMR ETlogix™
Annuloplasty Ring



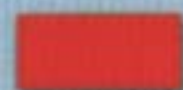
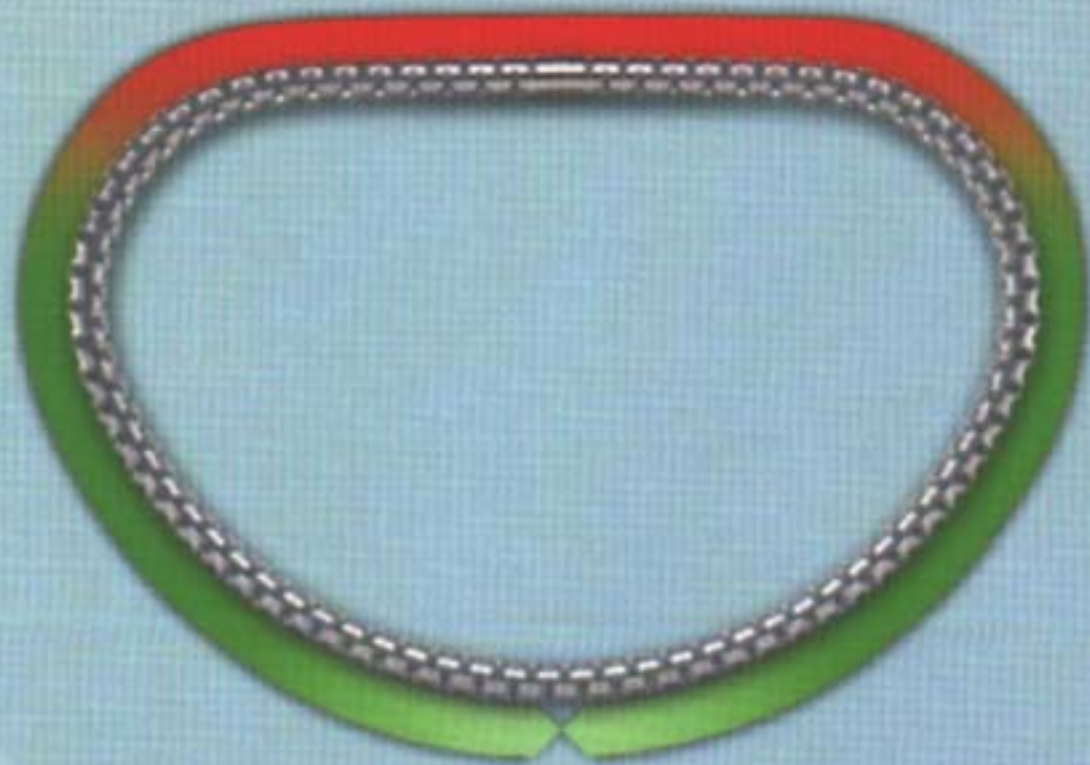
3:4

In cardiac systole,



4:4

In cardiac diastole,



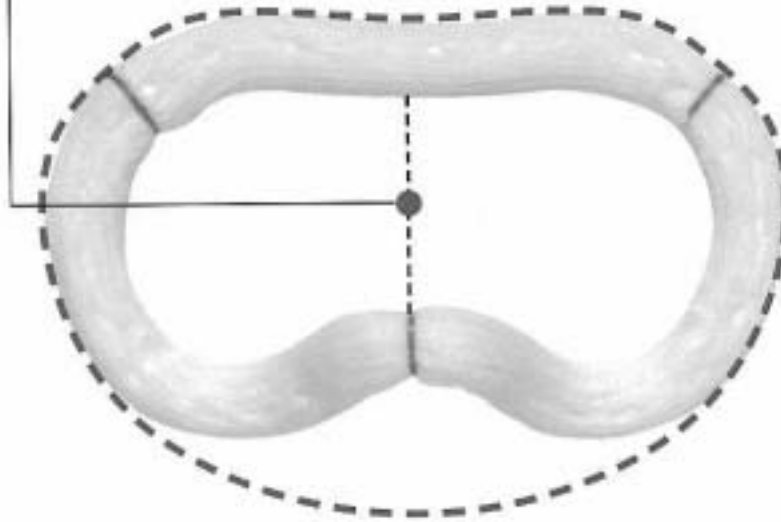
Rigid



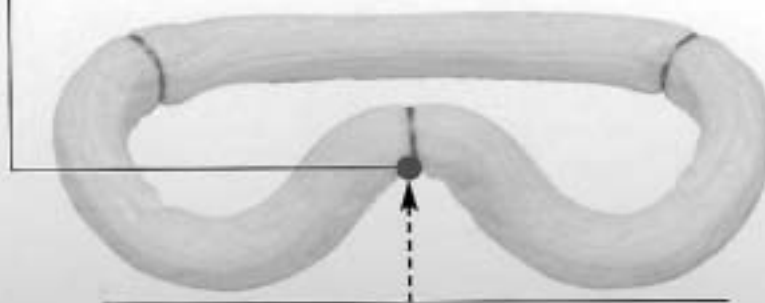
Flexible

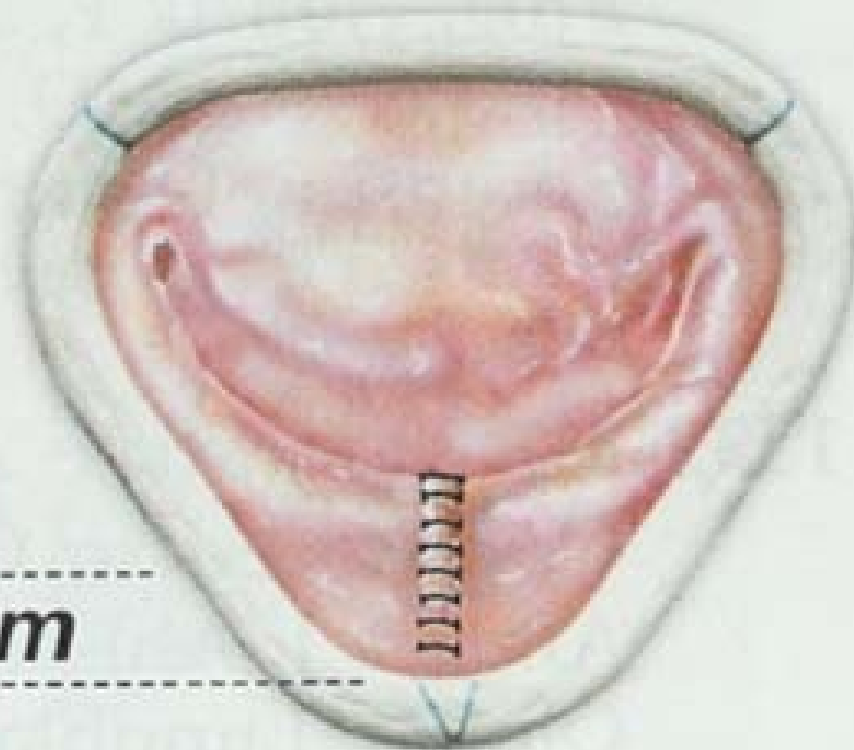
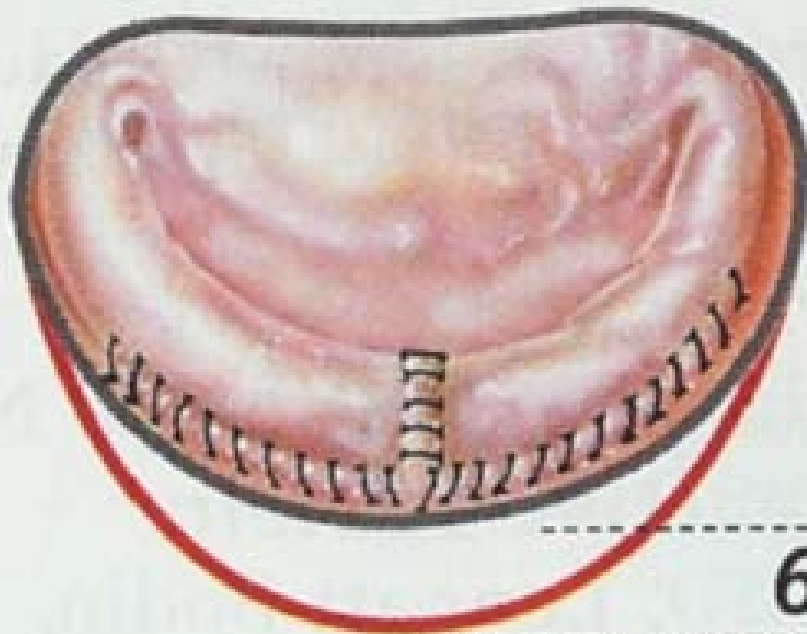


Reduced anteroposterior (AP) distance
(41% reduction)* — brings the annulus inward to counteract the outward pull of the enlarged left ventricle



Elevated P2 (6 mm lift) — raises the mitral valve apparatus to counteract the downward pull of the enlarged left ventricle



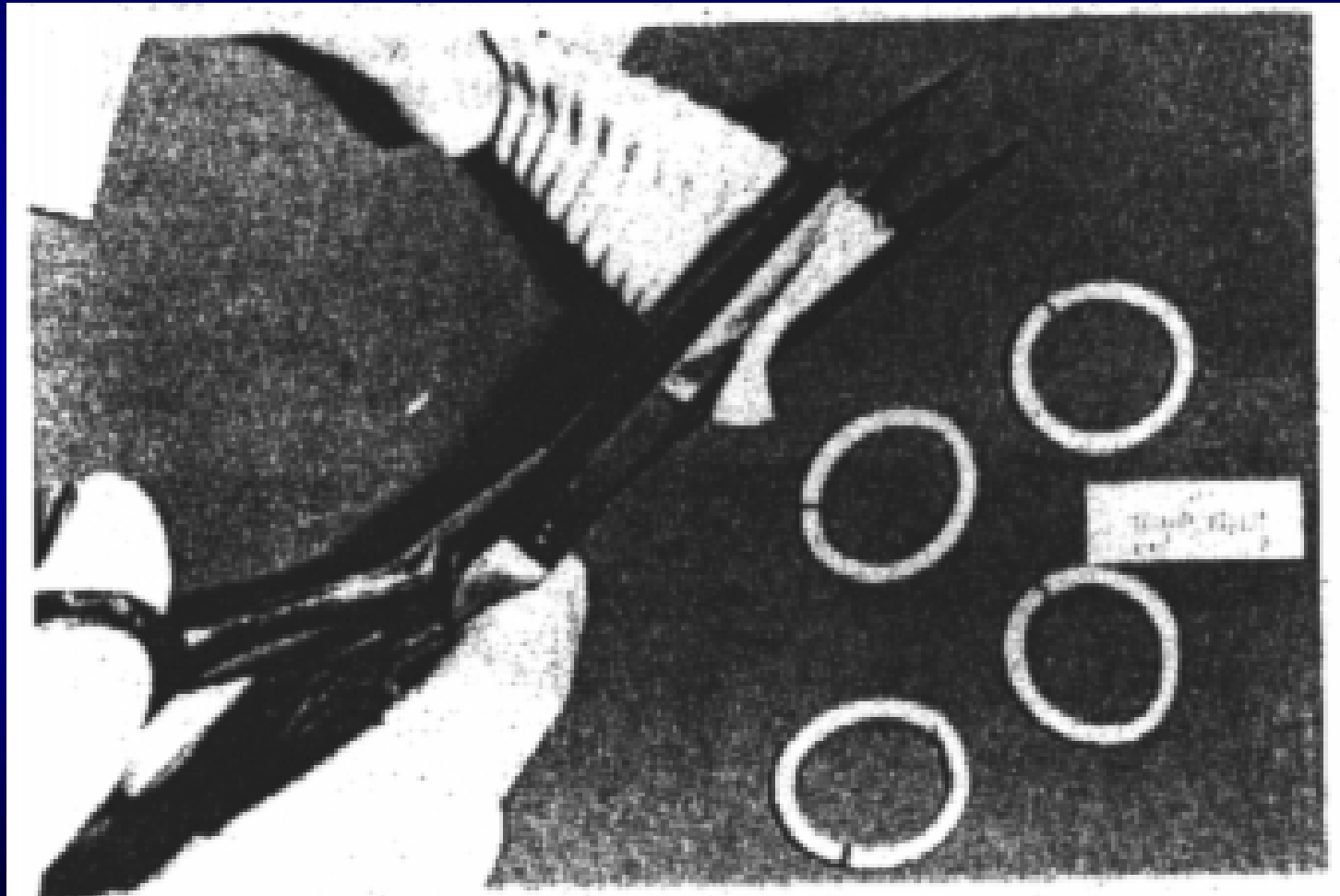


Move instead of remove

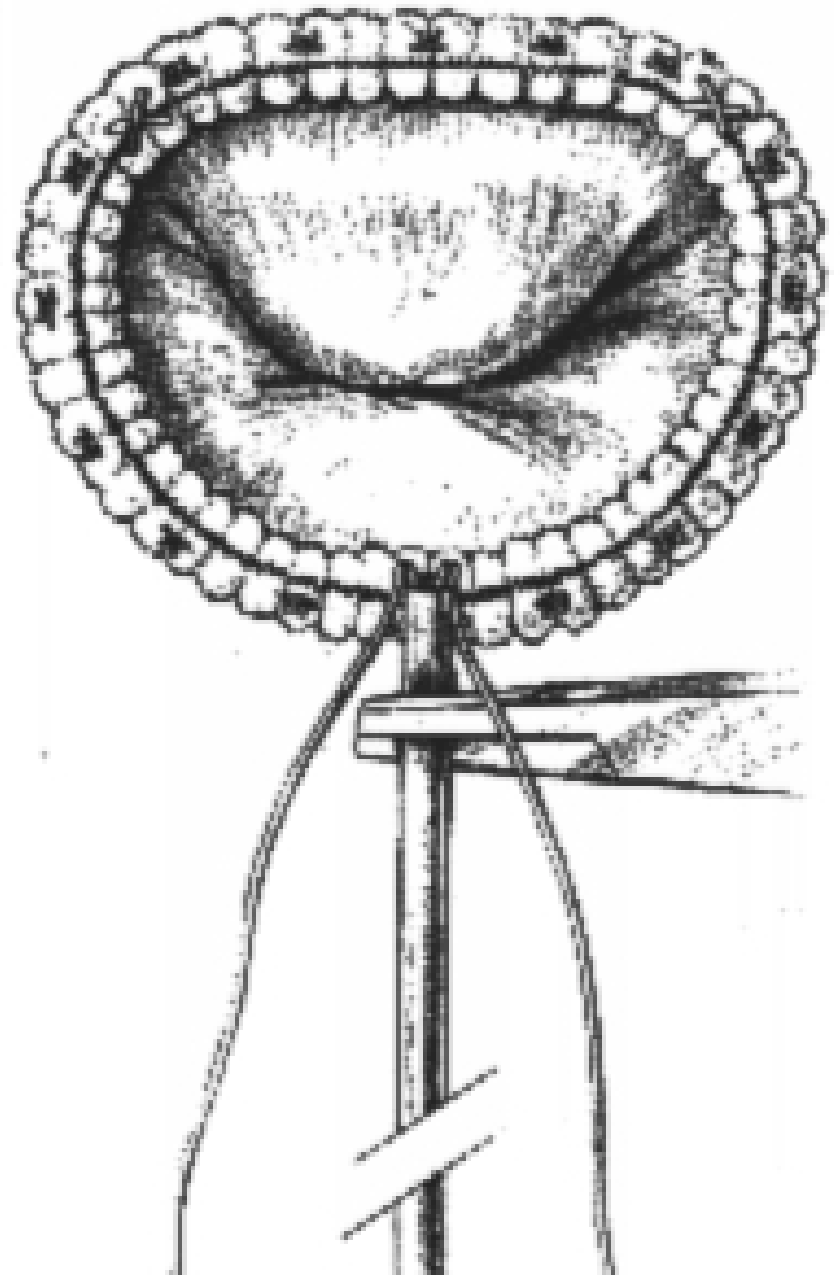
A Cost-Effective Dacron Annuloplasty Ring

Denton A. Cooley, MD, Robert T. Baldwin, MD, and Susan Wilansky, MD

Departments of Cardiovascular Surgery and Cardiology, Texas Heart Institute, Houston, Texas



Anello Biflex



Anello, nelle forme con dilatazione ventricolare

si è detto :

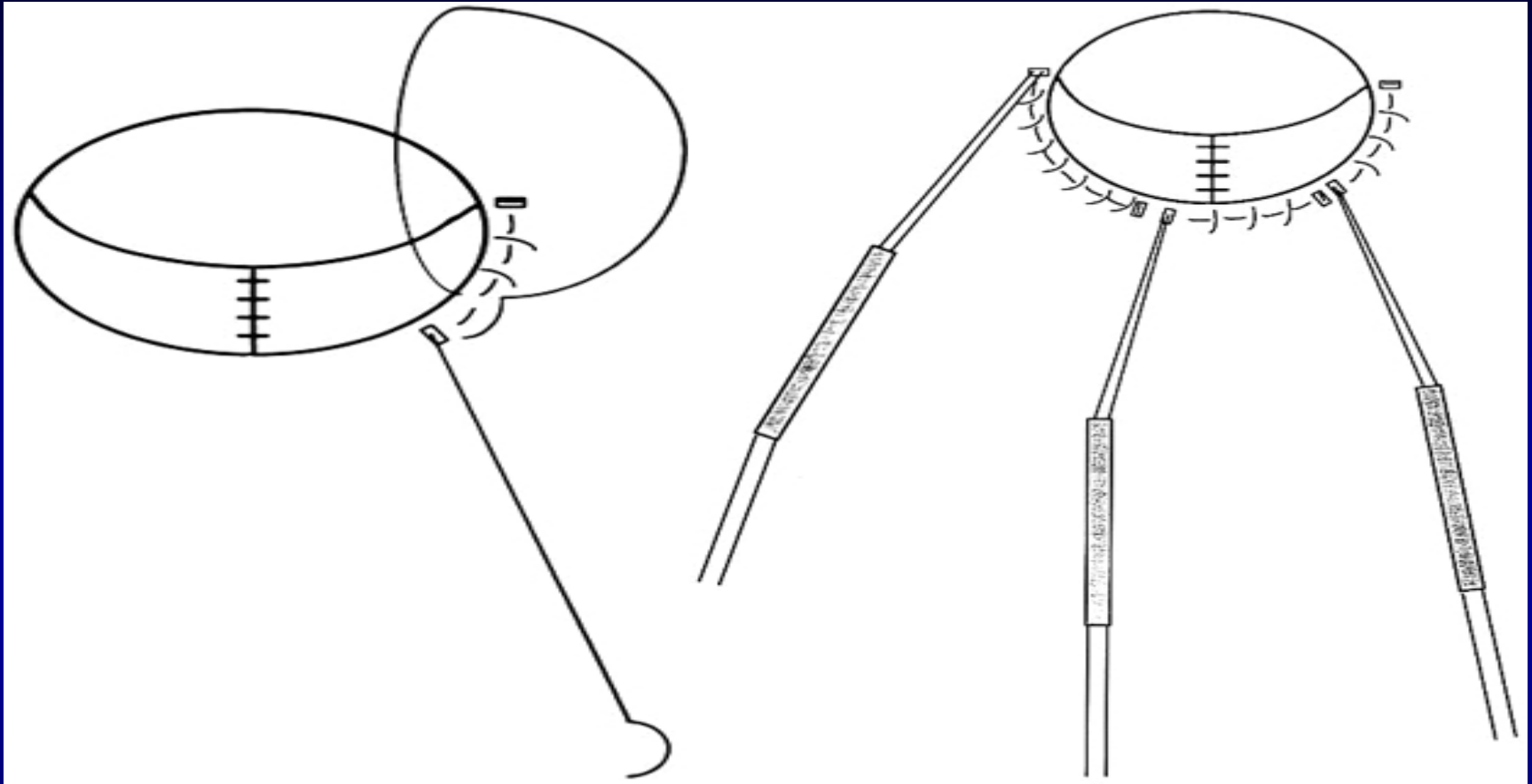
è fondamentale l'uso di un anello flessibile che rispetti la forma “a sella” dell'anello mitralico e non ostacoli la contrazione sistolica dell'anello

sed contra :

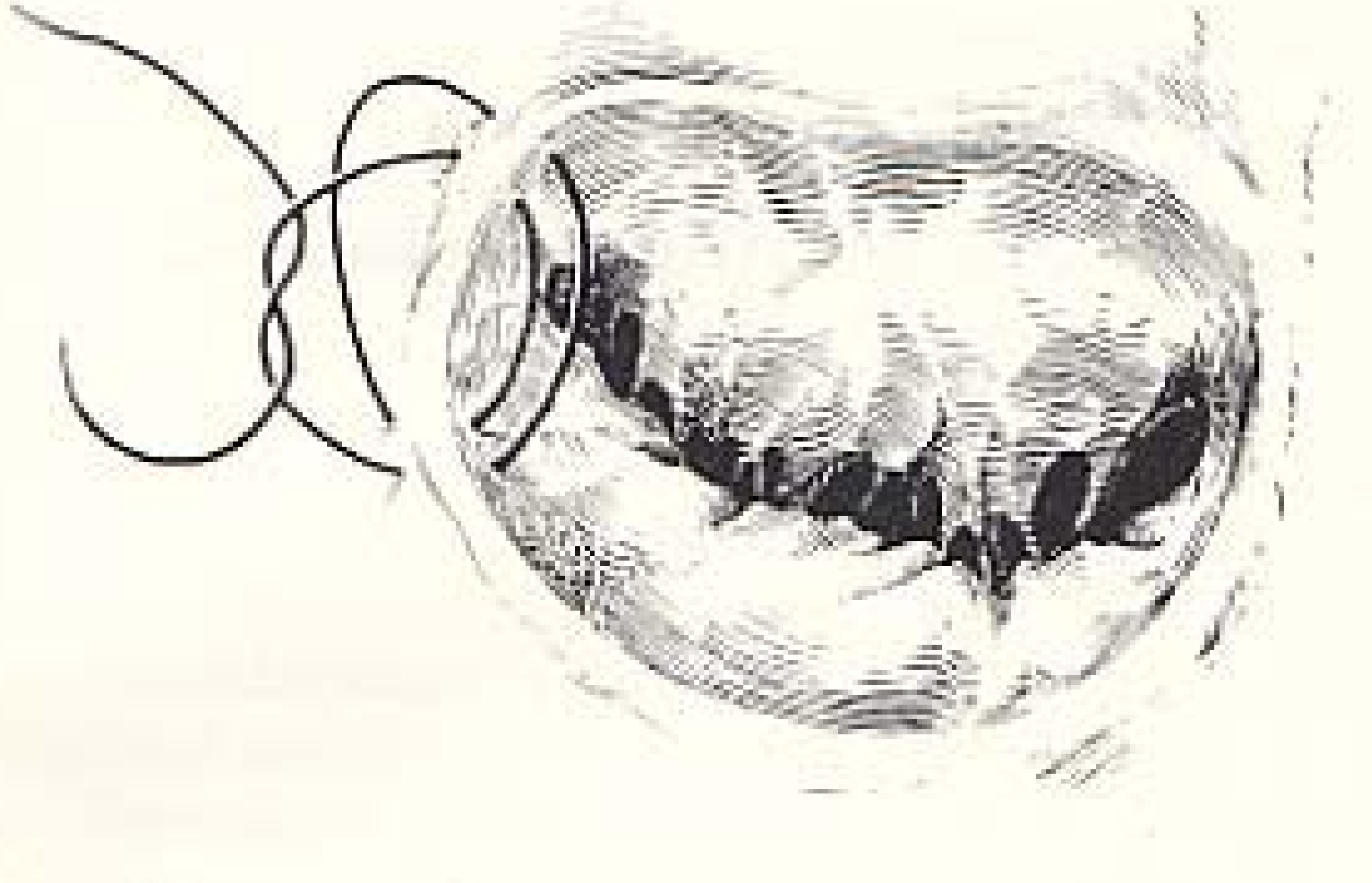
la contrazione dell'anello mitralico è per lo meno dubbia nella CMD e in tutte le forme croniche.

L'anello resta rilasciato in posizione “diastolica”

La sclerosi indotta da qualsiasi anello protesico rende comunque non contrattile l'anello stesso

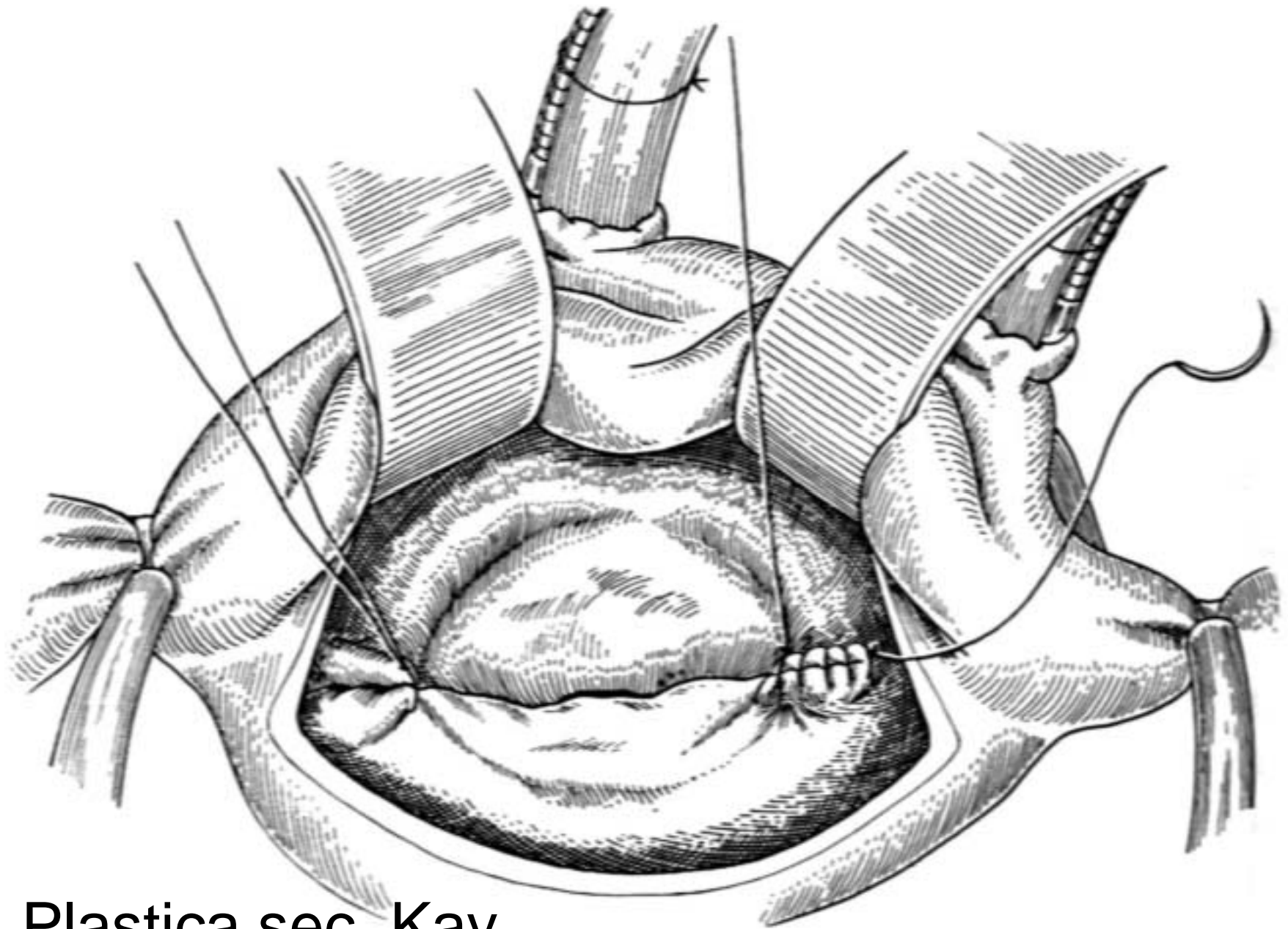


Ricchi: plastica aggiustabile anello posteriore

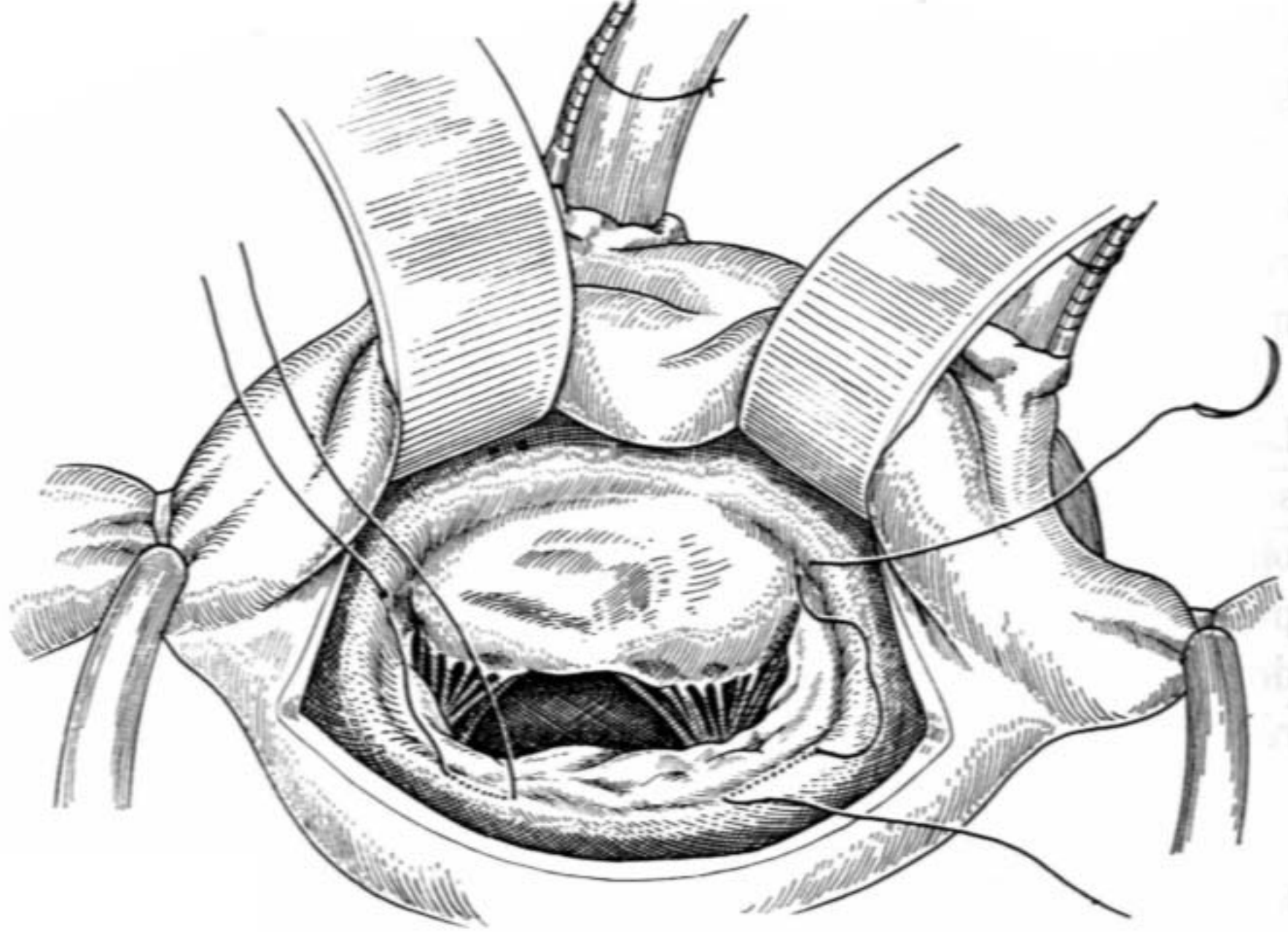


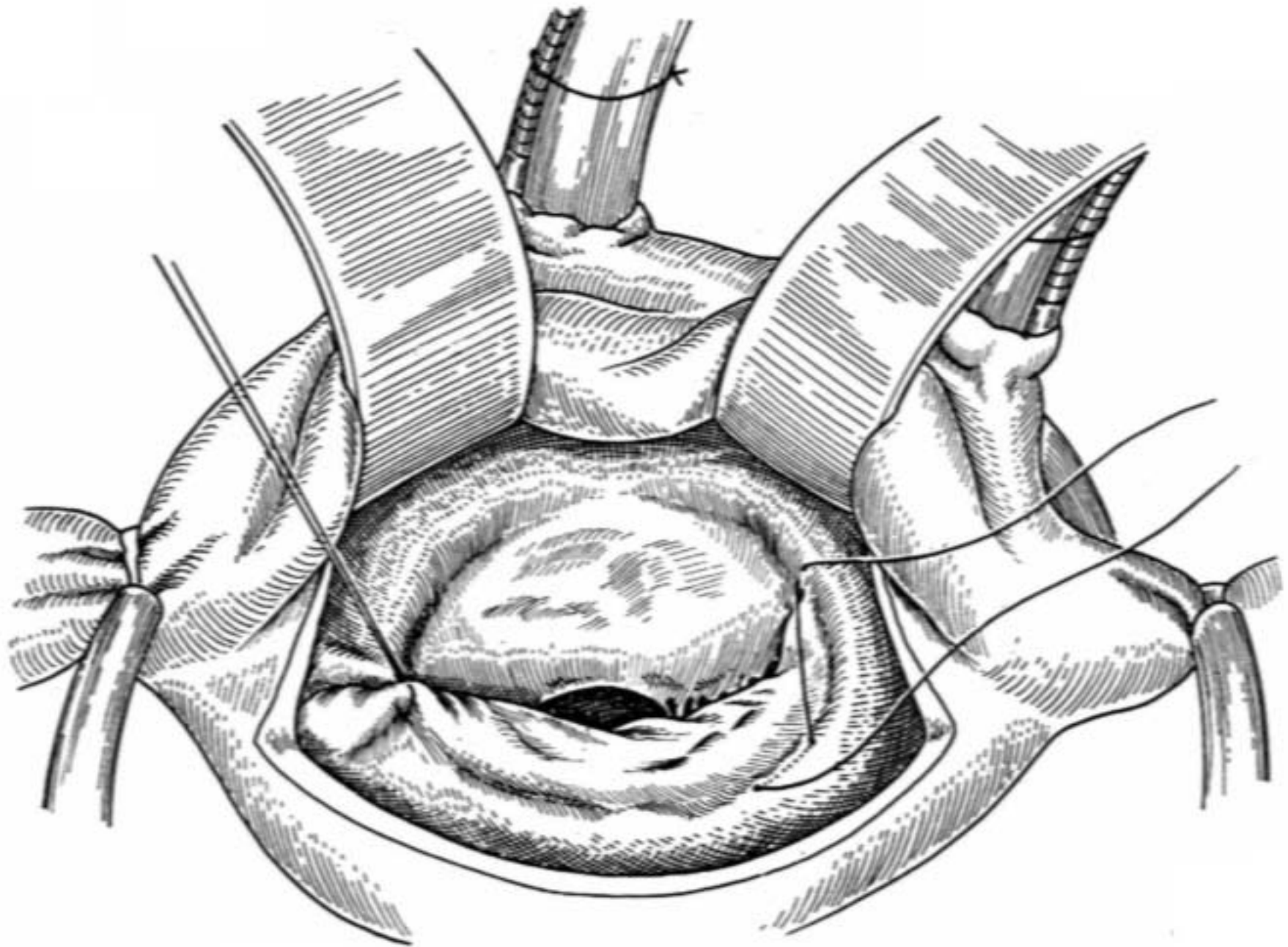
Plastica sec. Kay.

Sutura a figura di otto



Plastica sec. Kay.



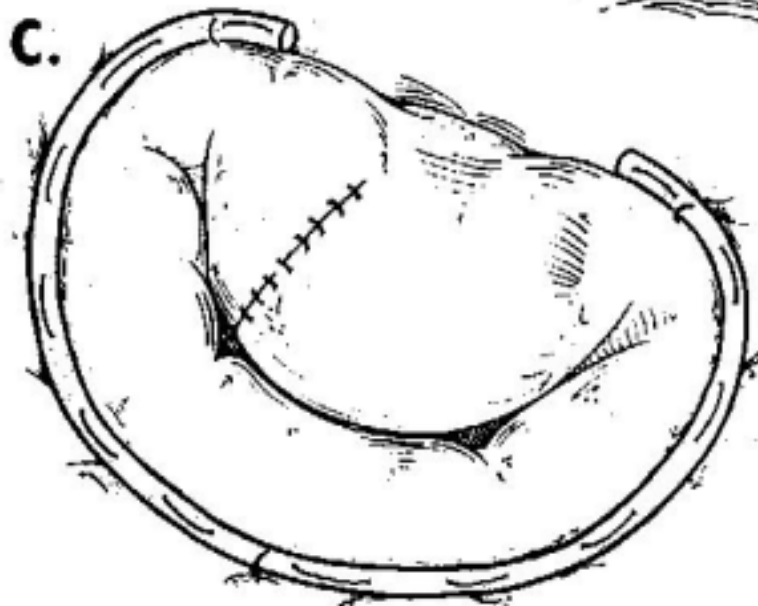


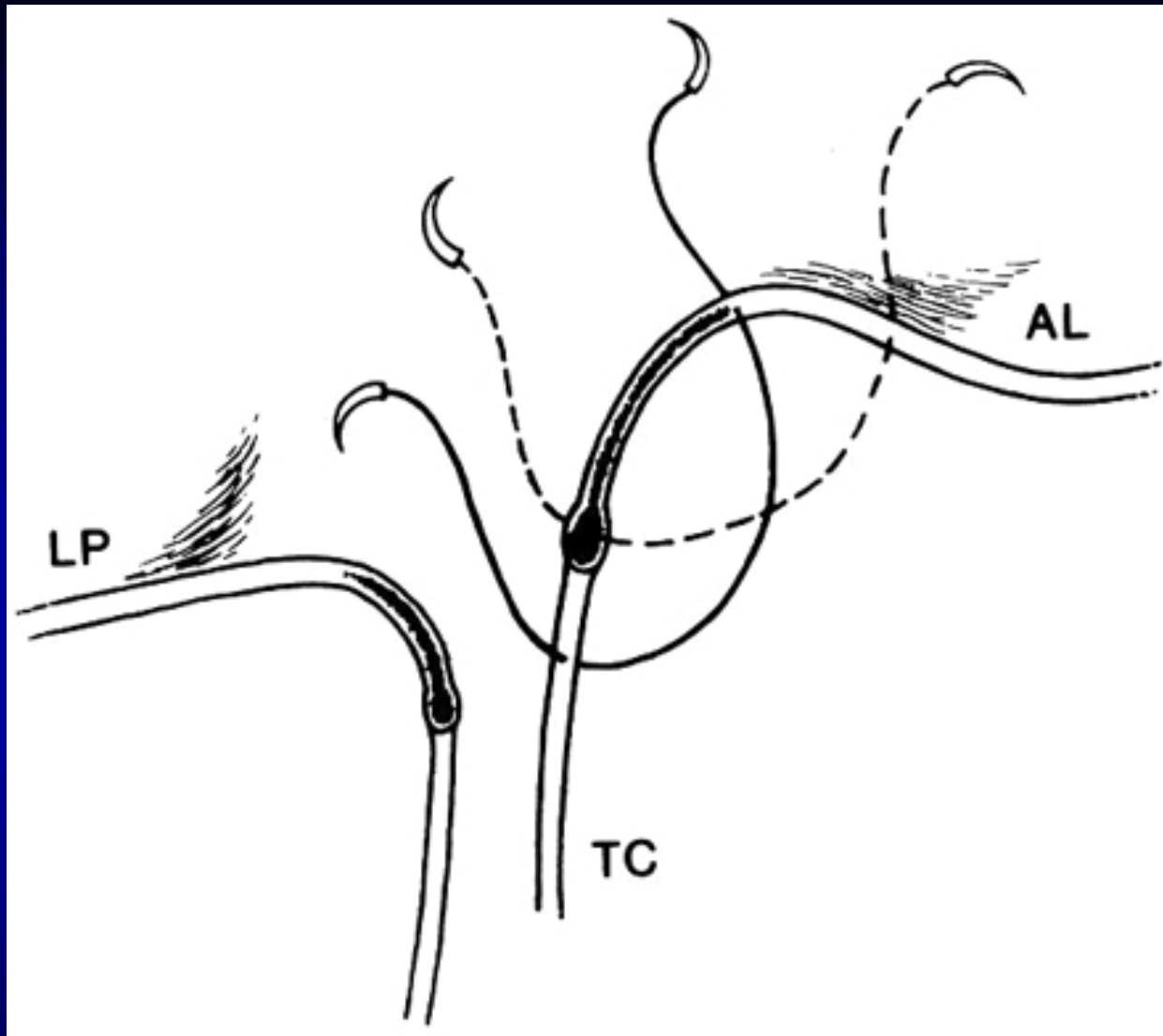
Lembo anteriore

Chordal Rupture - Triangular Resection

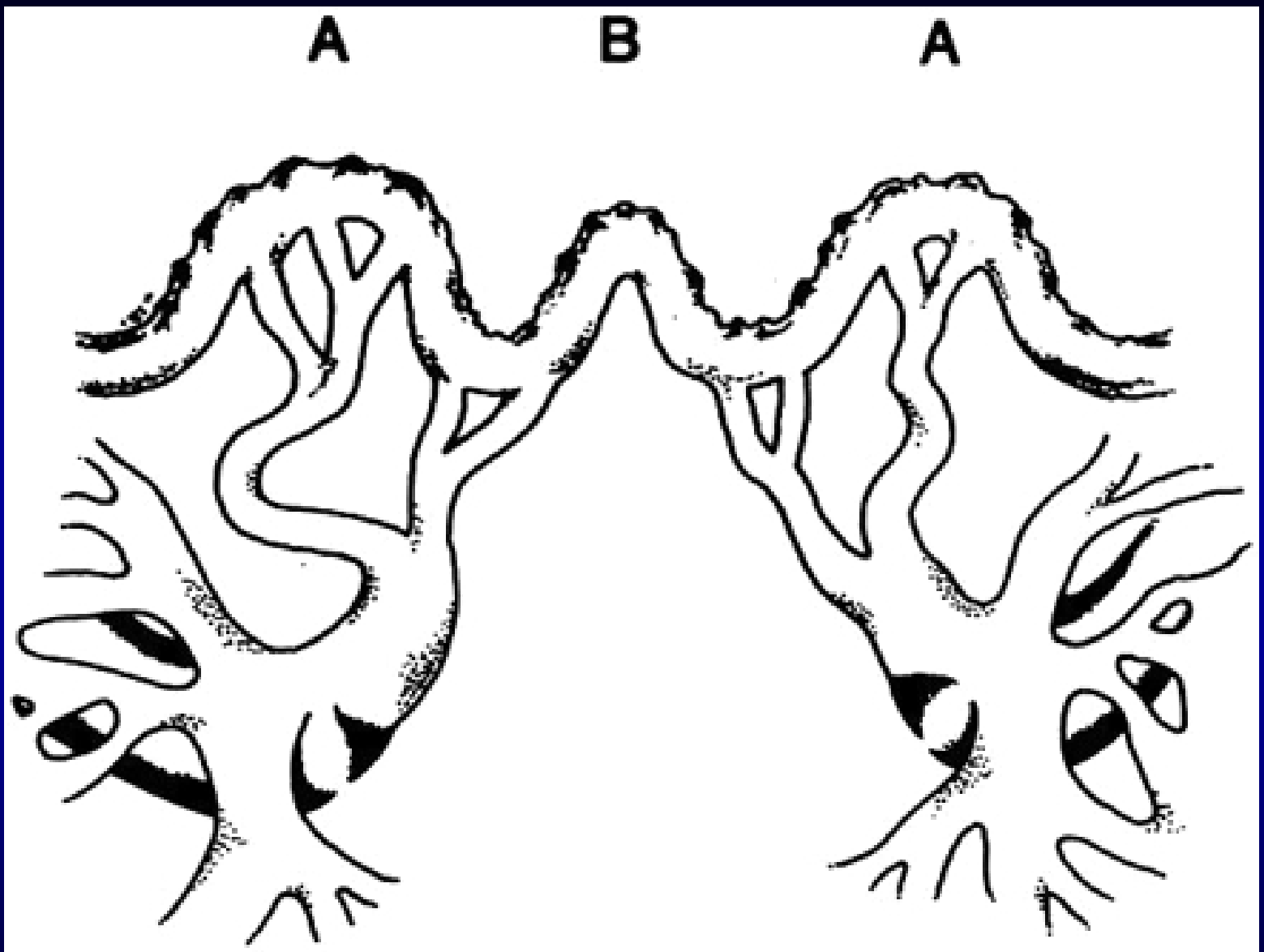


**Prolapsed AML
with elongated
(or ruptured) chords**

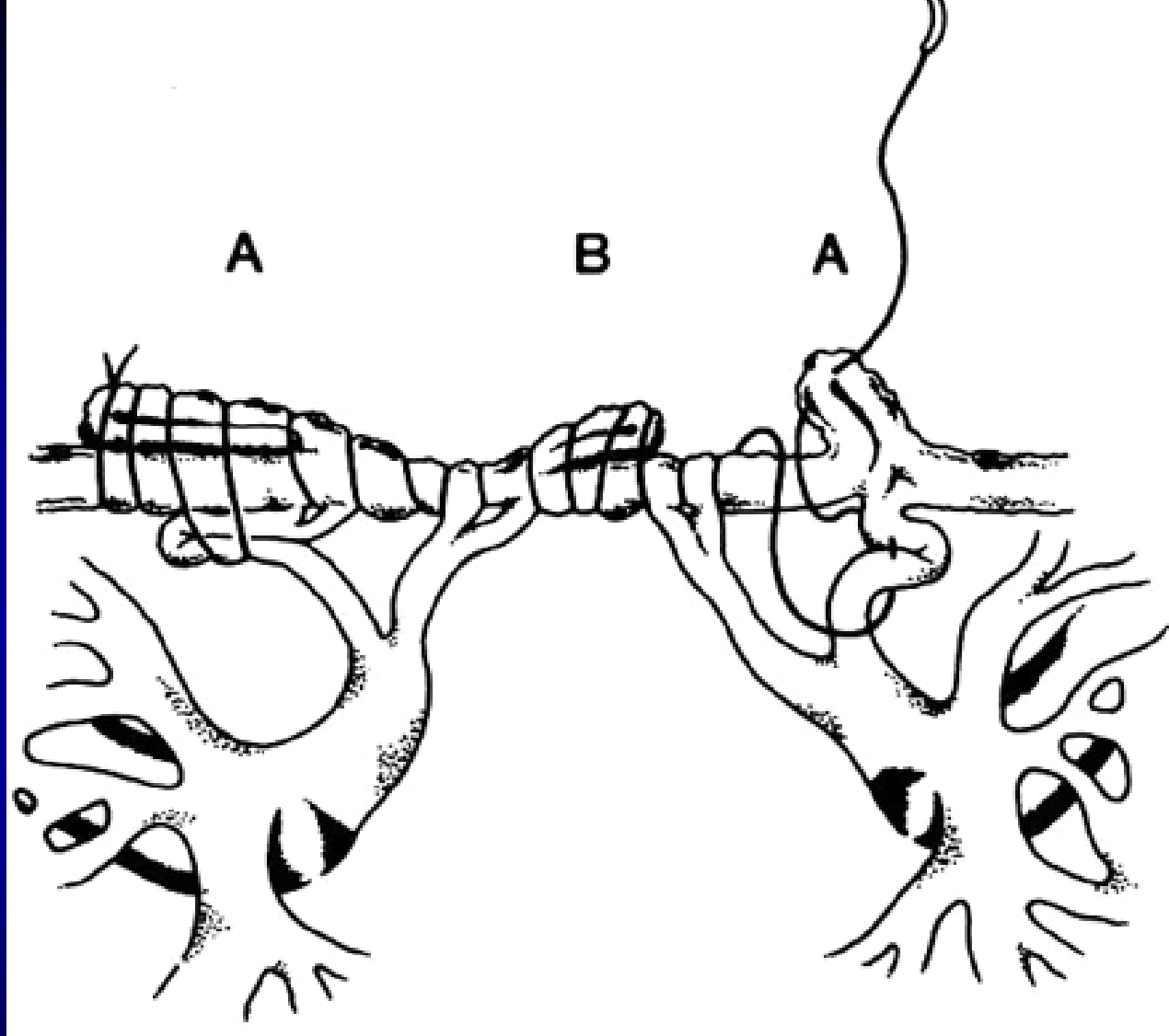




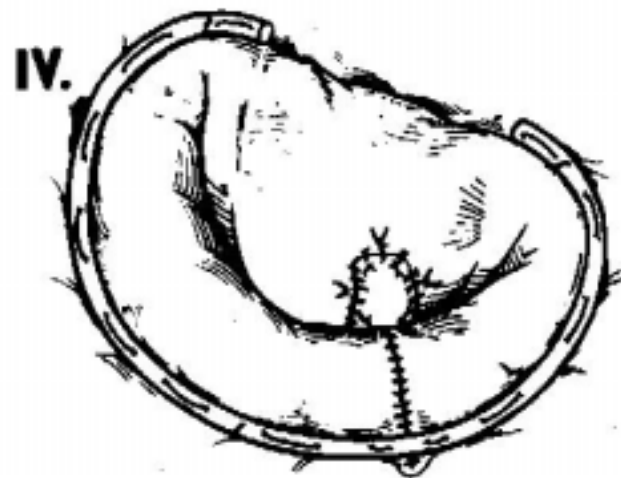
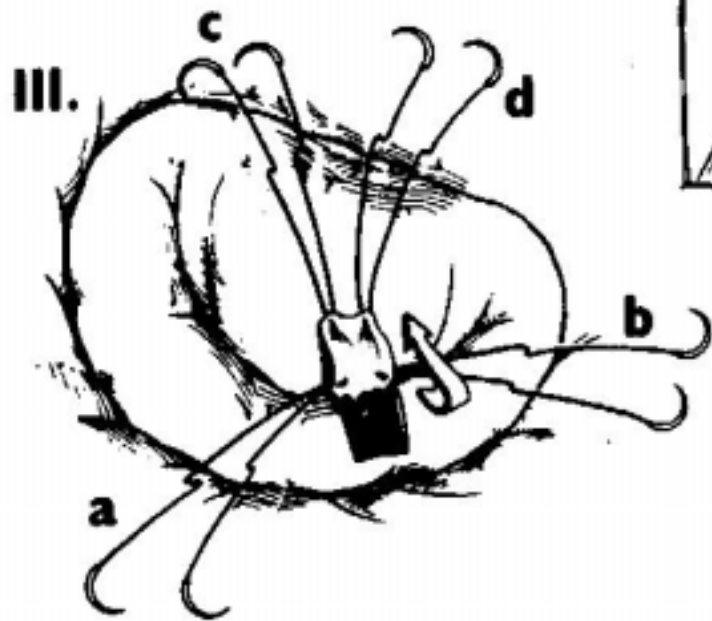
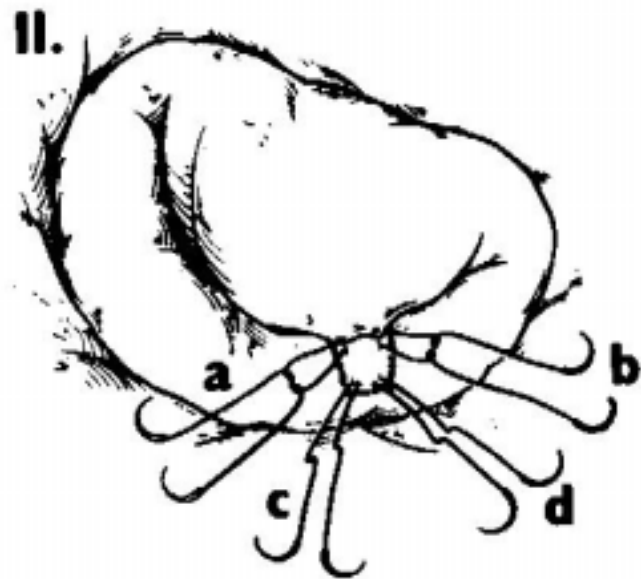
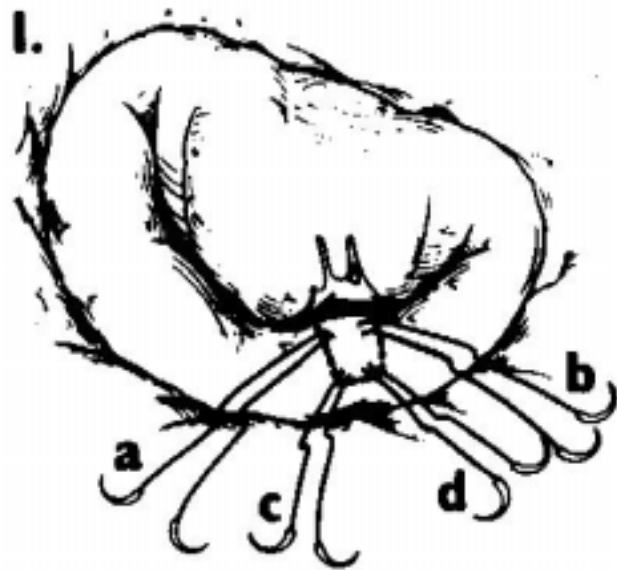
Fundarò: Plicatura della rough zone del LAM



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Fundarò: Plicatura della rough zone del LAM

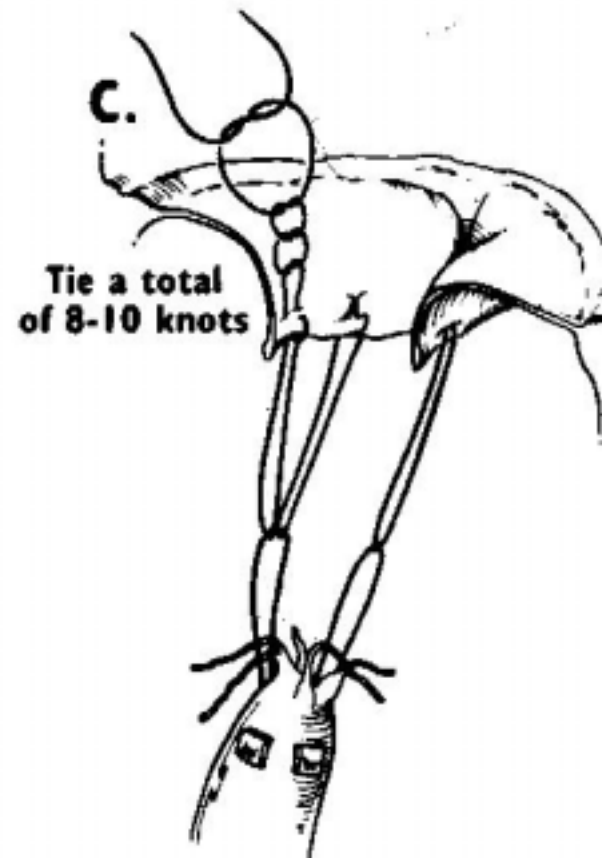
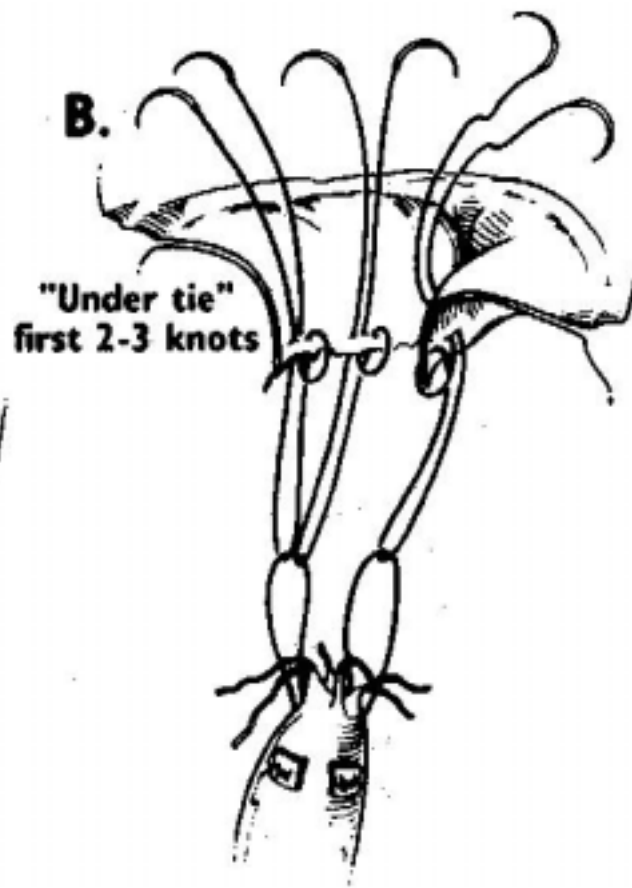


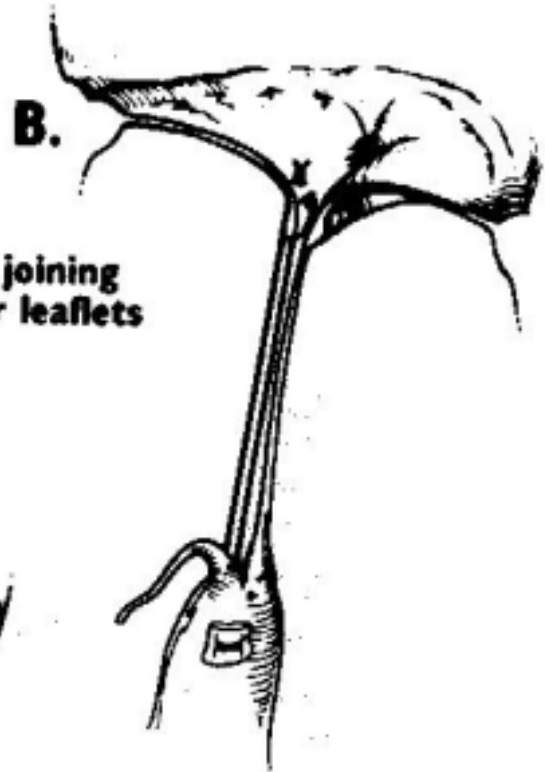
Corde in PTFE

- nel LAM
- Barlow
- esteso prollasso del LPM
- anello mitralico calcifico

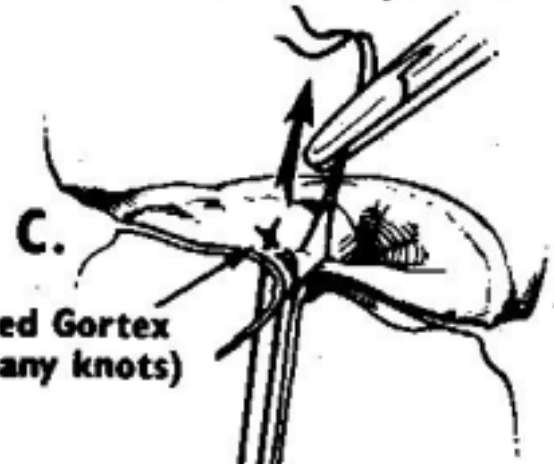
Attenzione all'annodamento

Correzione estesa "profilattica"



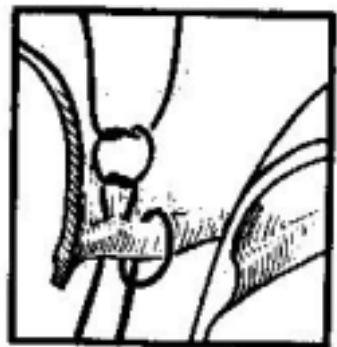


Temporary suture joining anterior & posterior leaflets



Tied Gortex (many knots)

Gortex ← Normal chord



Gortex passed through free edge of leaflet.

In assenza di un preciso riferimento:

Suturare gli scallops presenti sul LPM

Annodare le corde del LPM

Passare senza annodare le corde sul LAM

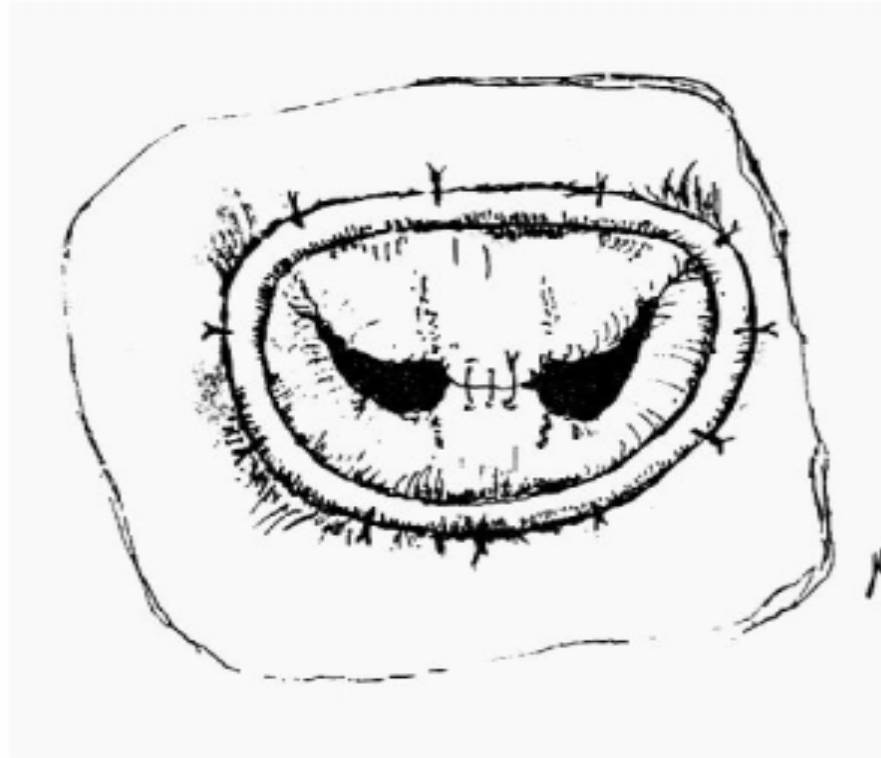
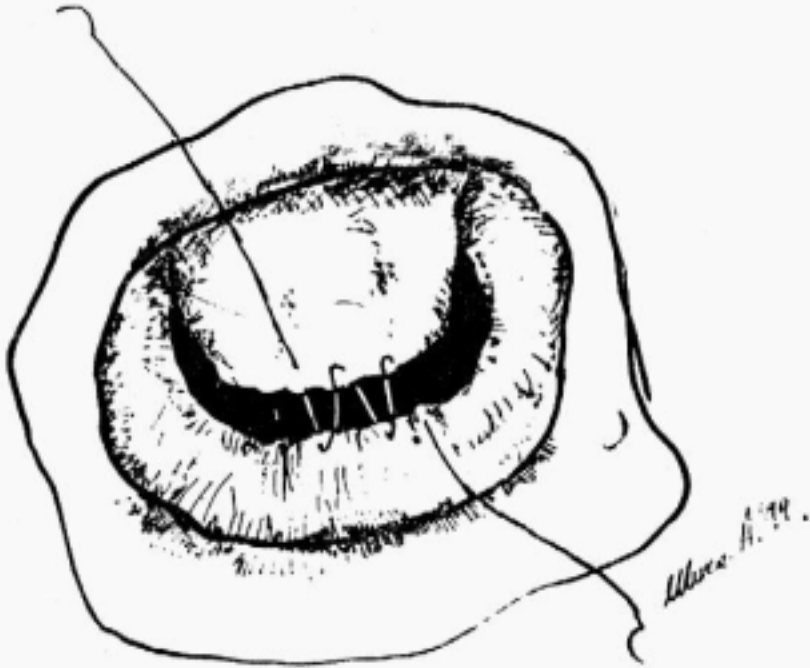
Mettere l'anello in sede

Verificare la lunghezza delle corde del LAM

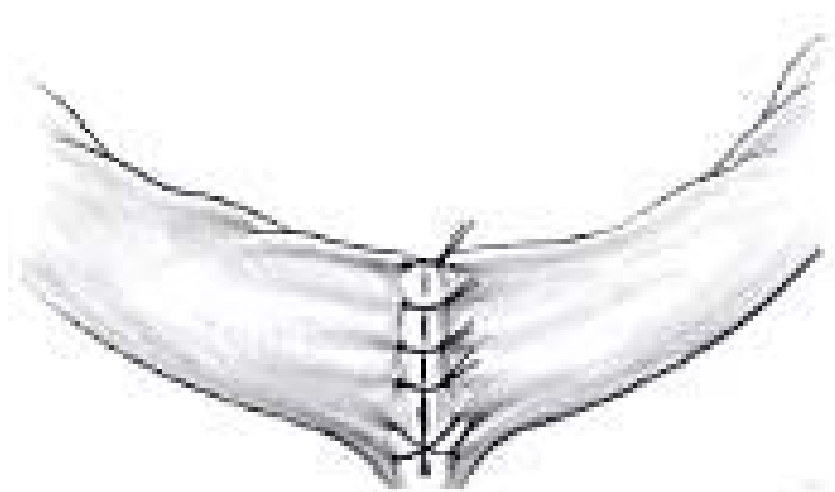
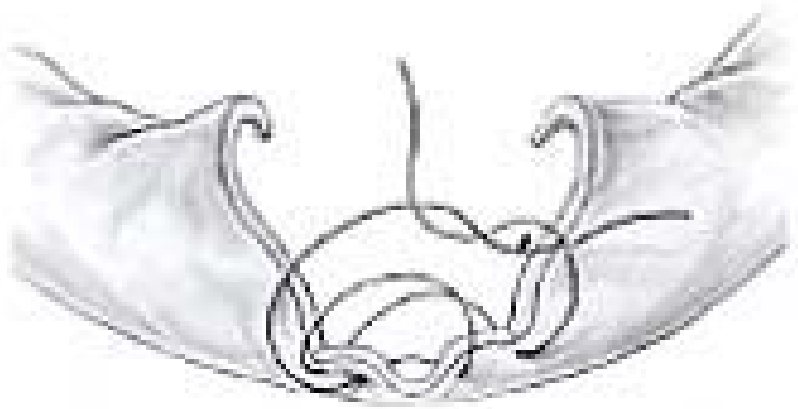
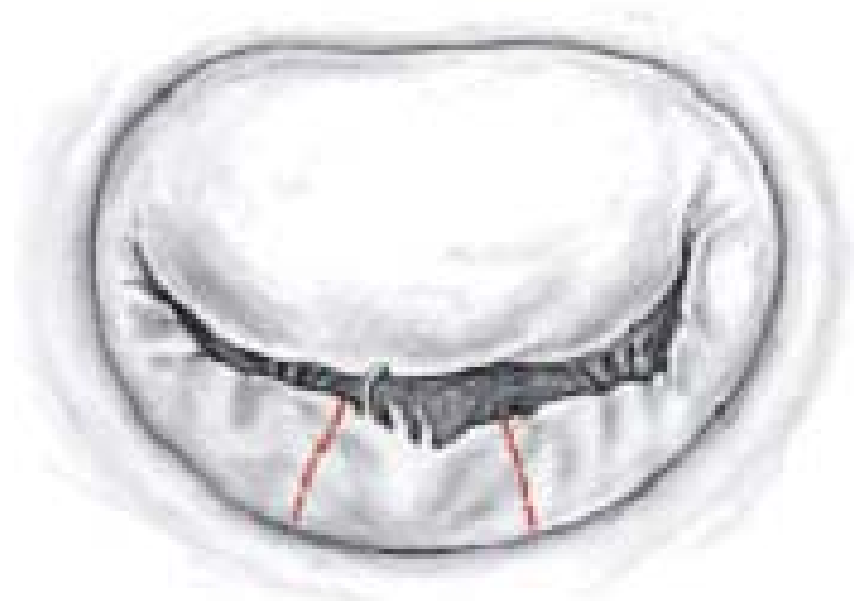
(test idraulico con vent aortico aperto)

Annodare le corde del LAM

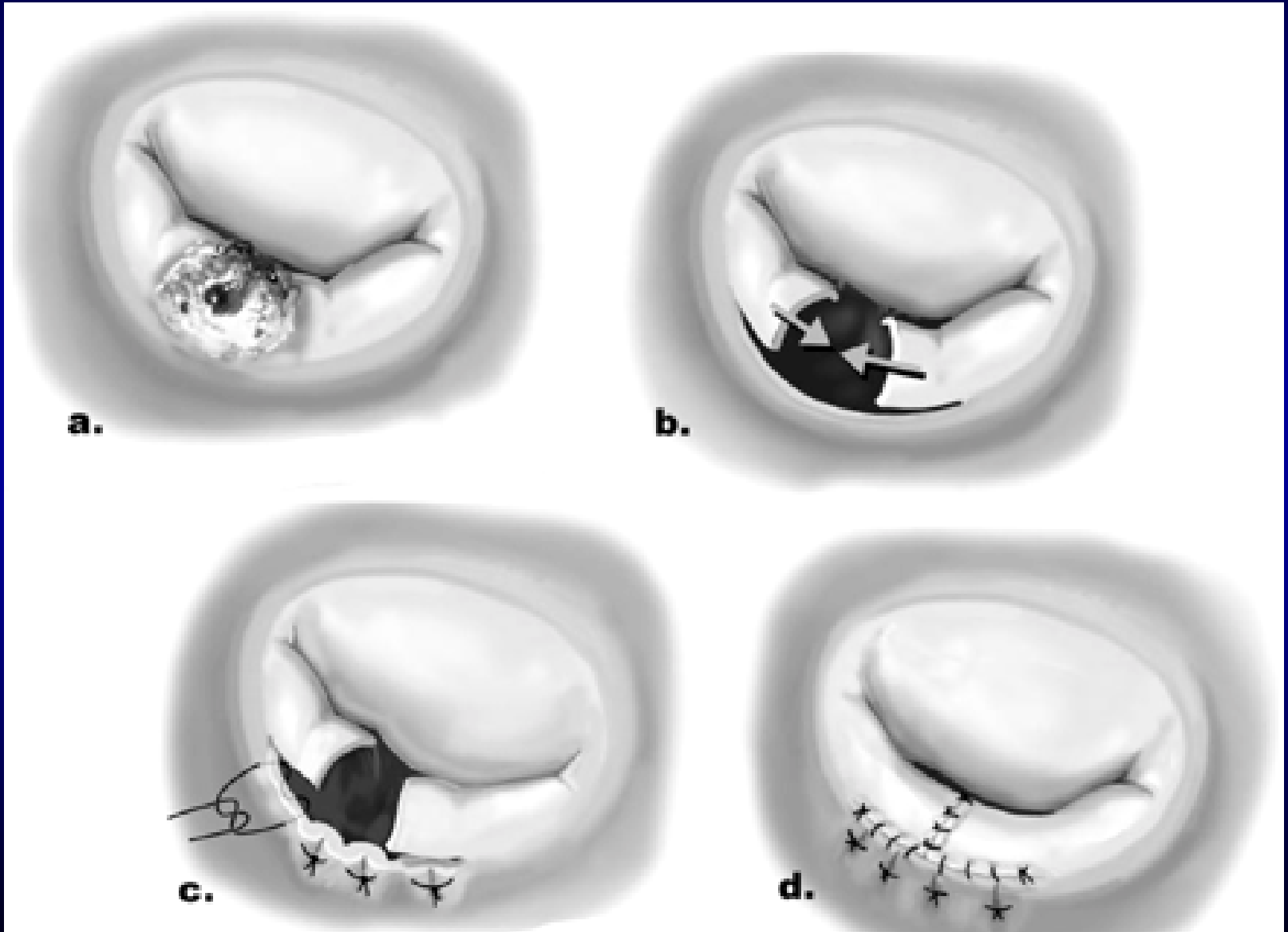
Edge to Edge sec. Alfieri



Lombo posteriore



Compression sutures – “concertina technique”



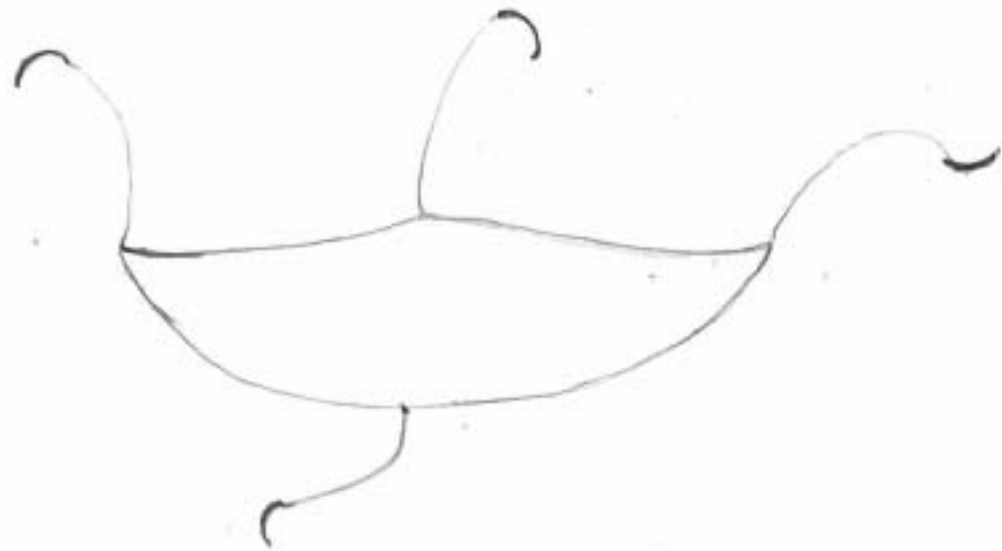
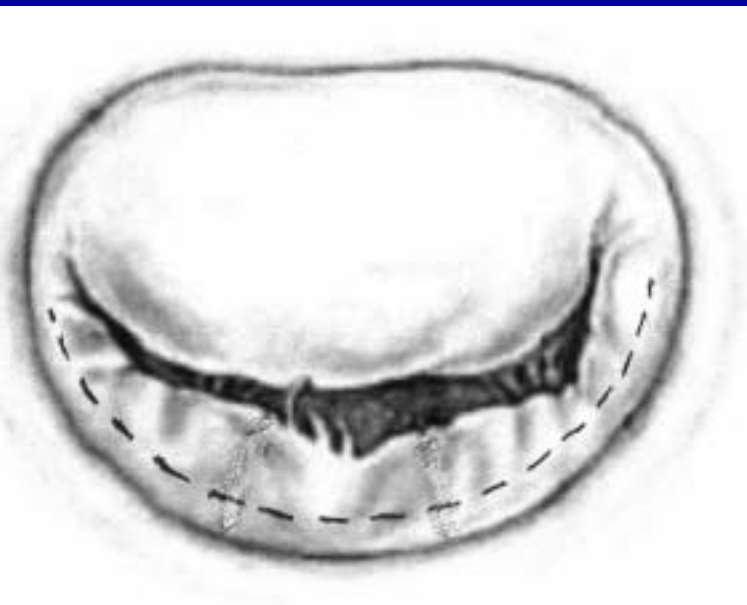
Estensione del LPM con patch pericardico

LPM ridotto

Anello mitralico calcifico

Misurazione della lunghezza della incisione

Sutura in Prolene 5-0 incavigliato



MI: 2:4
T6218

T.PAZ: 27.20
T.TEE: 39.10

0

B. Sel Mb
2.56.27
78/75/53
ARTIOTHRACIC
ANESTHESIA ICU
FF
r. guerracino
rof. minzioni
imreconstructa



5 6 7 8 9 10 11 12
IAT 63
OMP 65

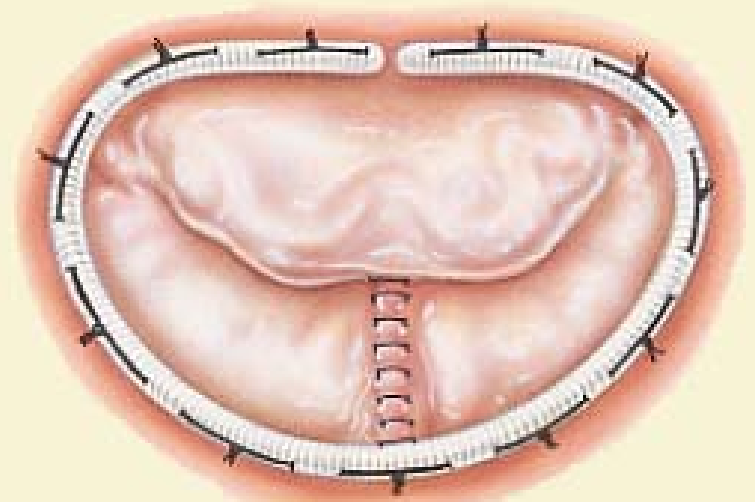
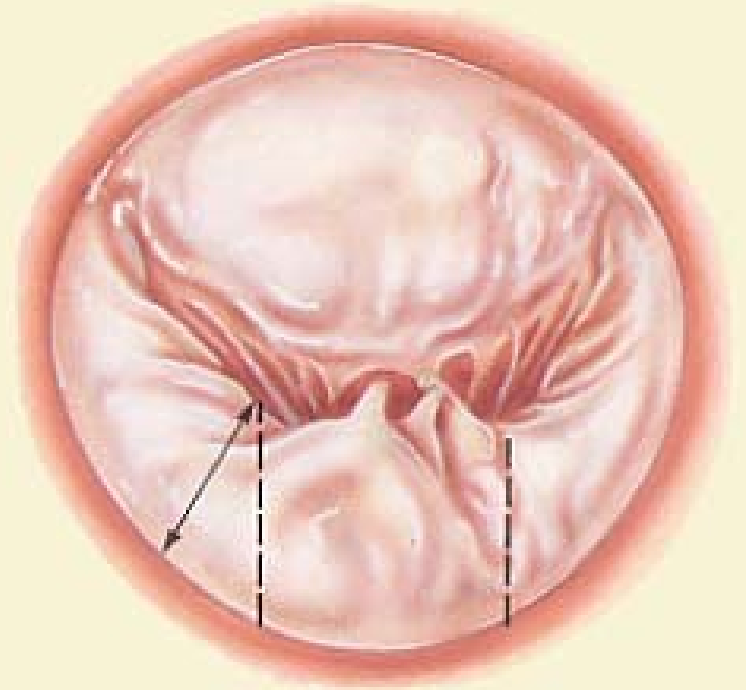
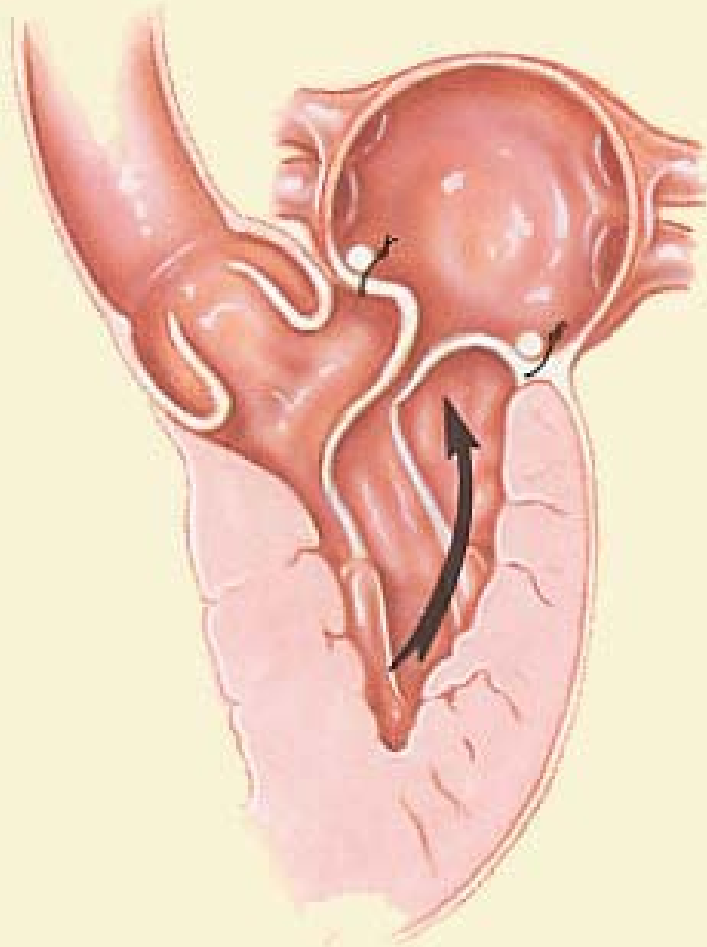
PRF
64HZ

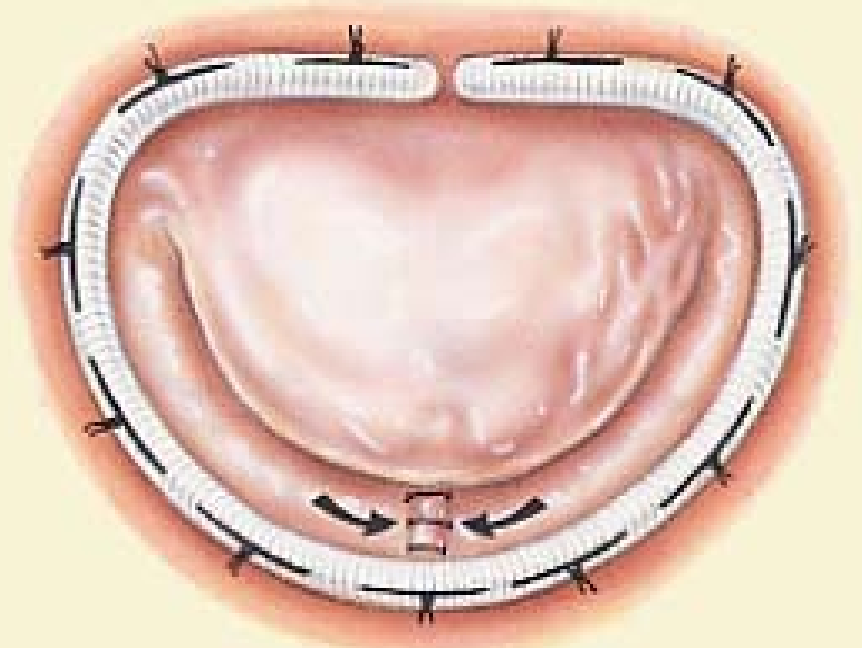
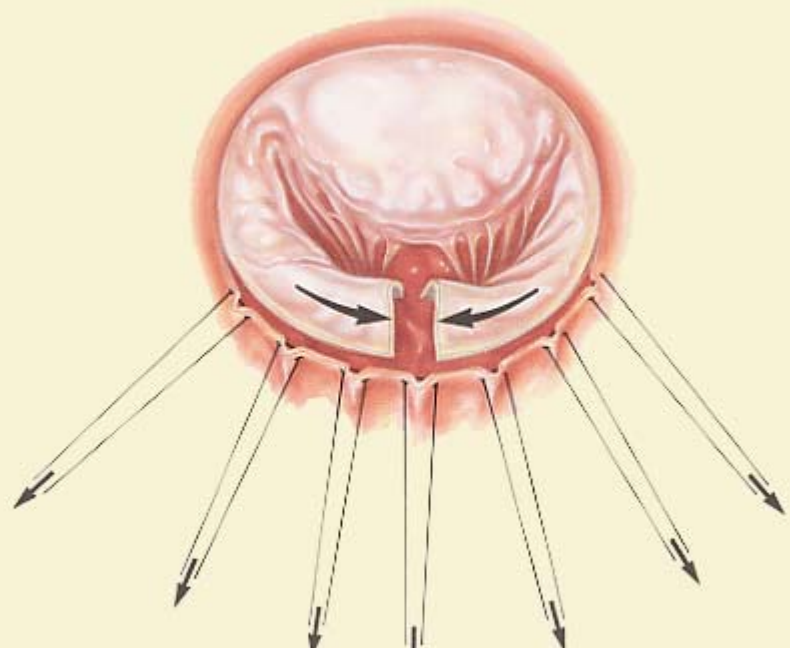
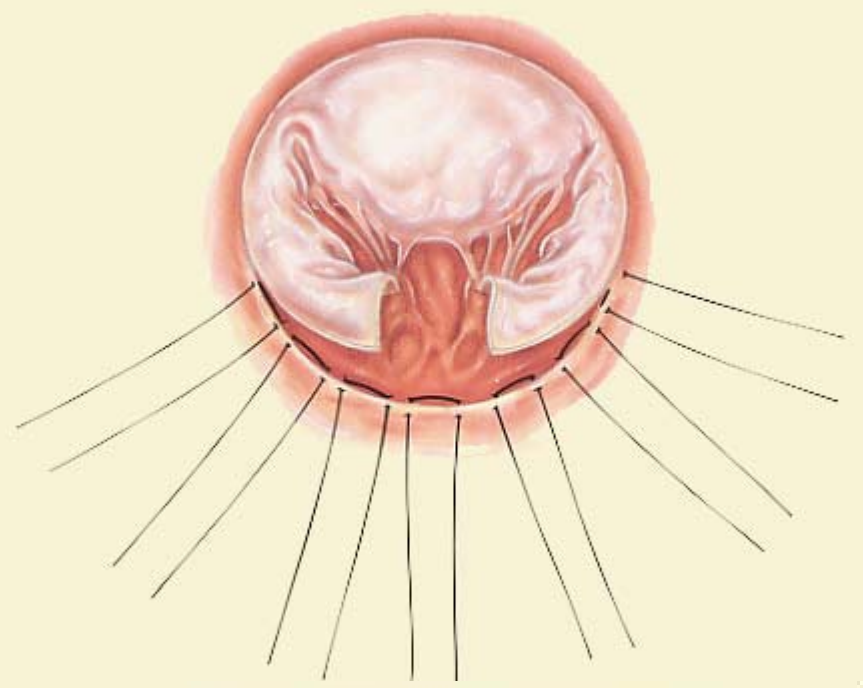
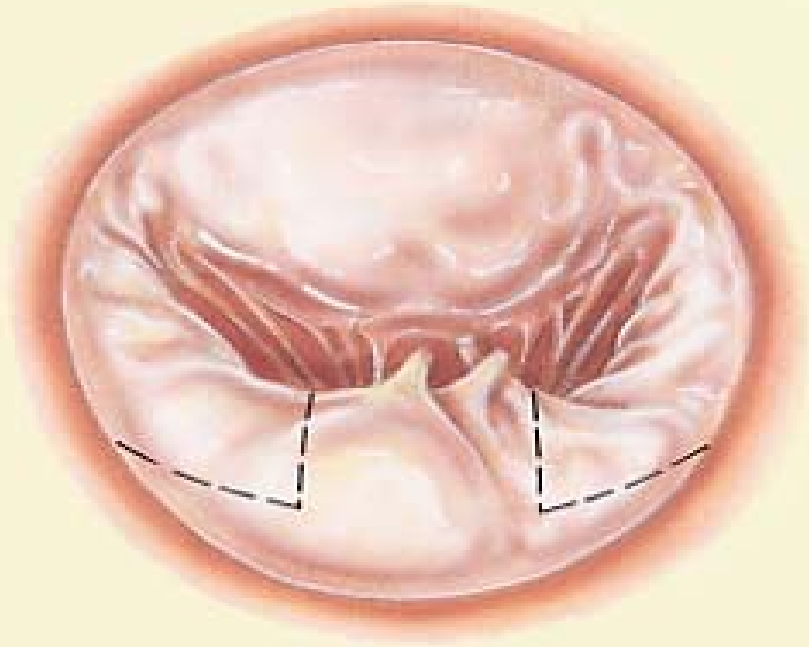


Rischio di SAM

- eccesso di tessuto (LPM)
- VS piccolo
- setto ipertrofico
- angolo mitro-aortico ridotto ($<130^\circ$)

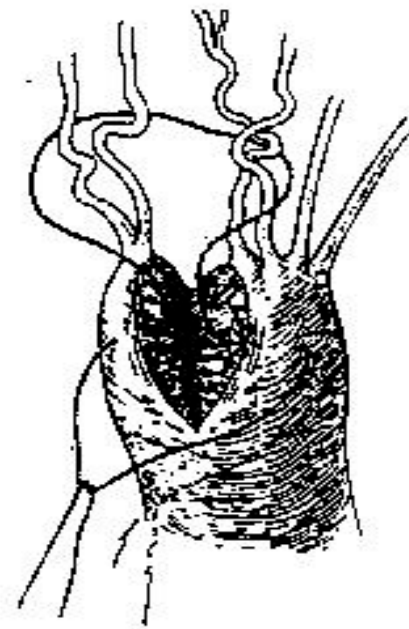
Rischio di SAM



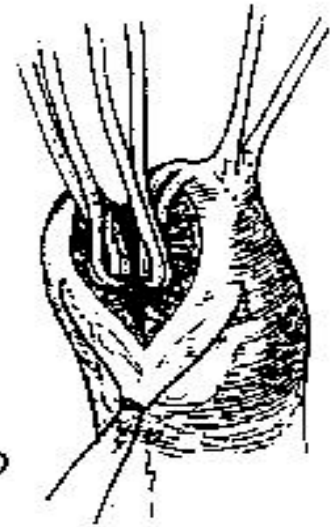


Accorciamento corde
Muscoli papillari

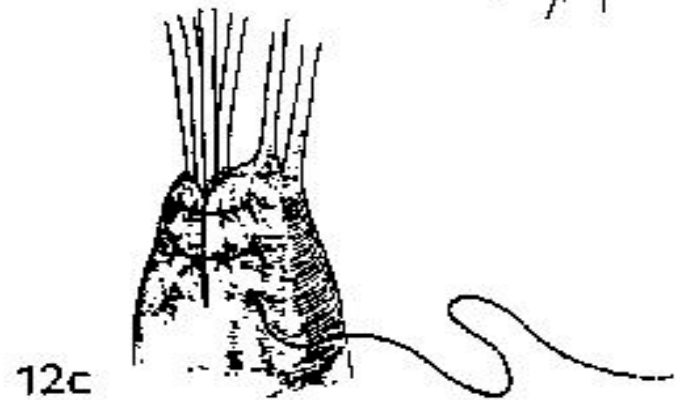
Accorciamento Corde (Carpentier)



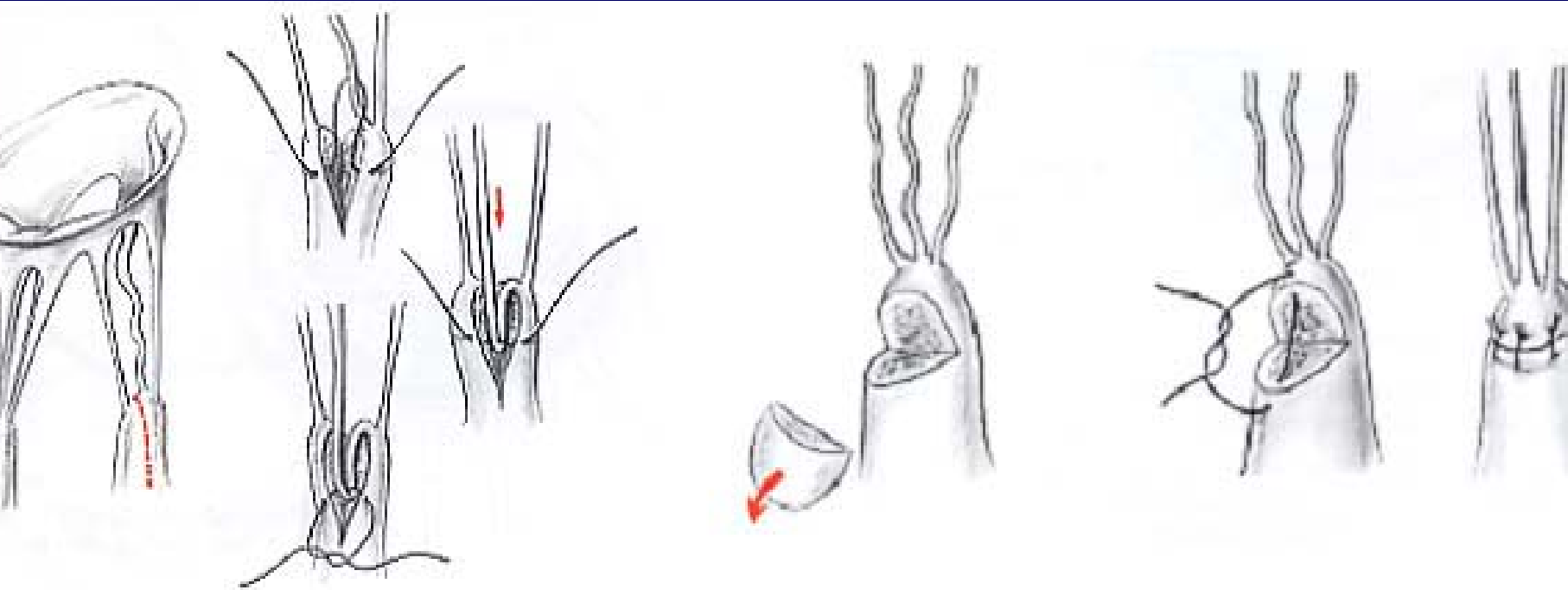
12a

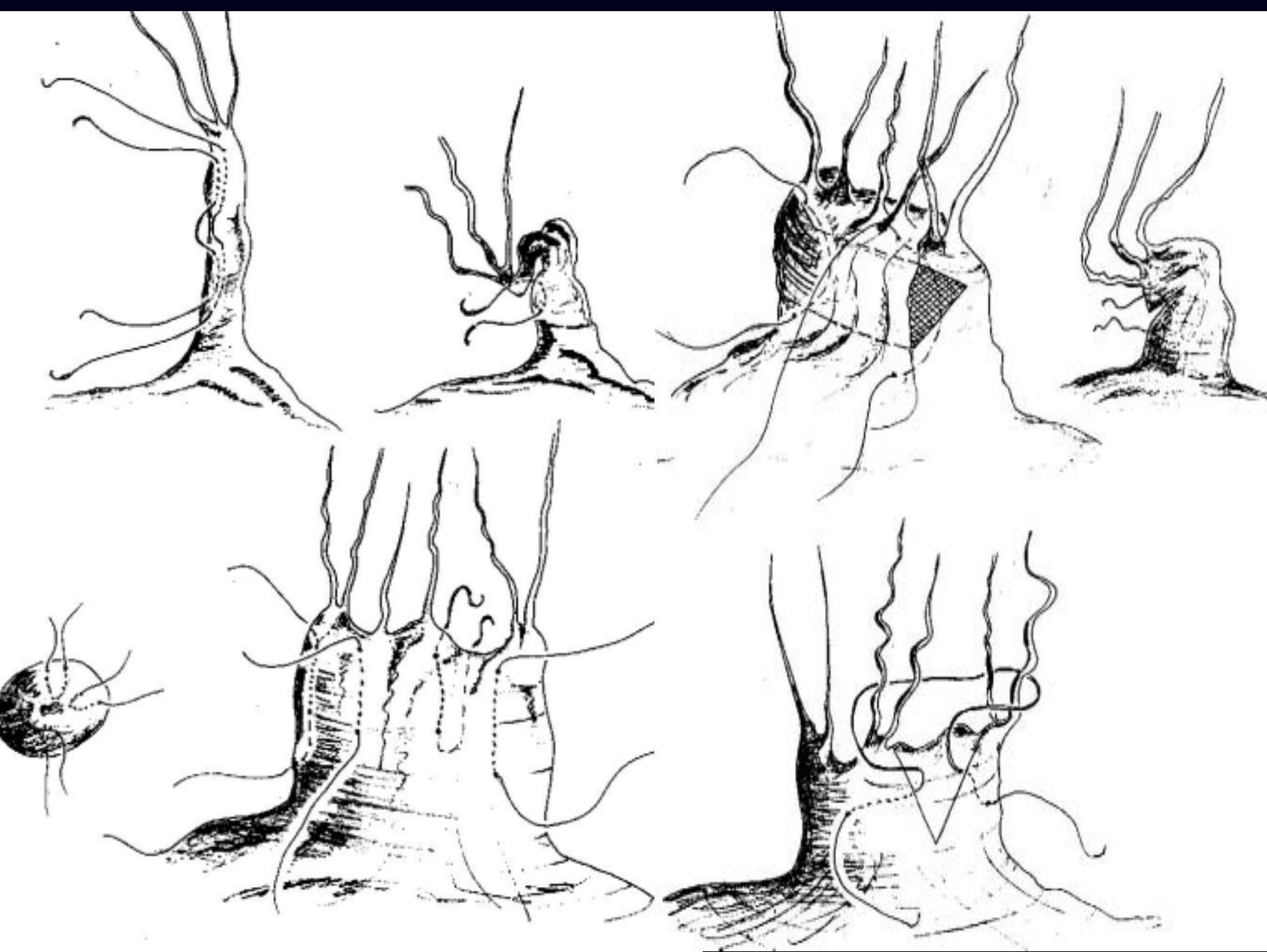


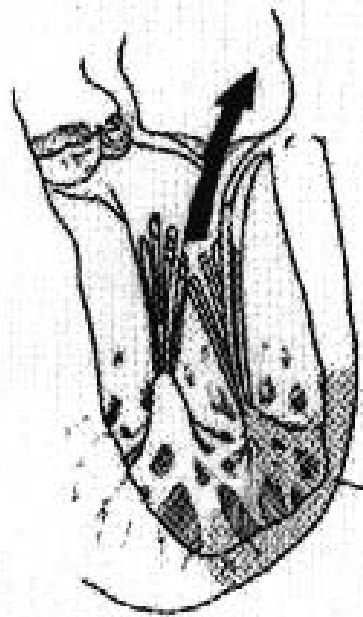
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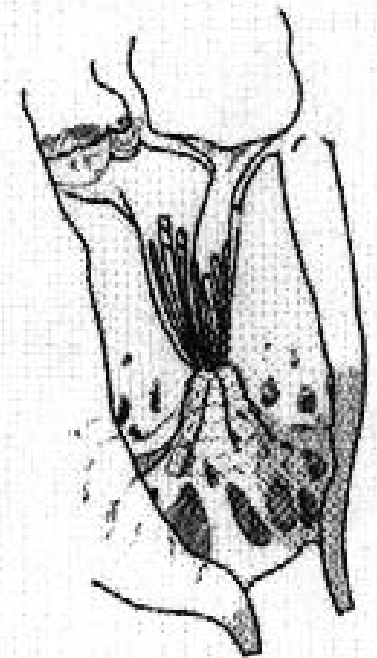
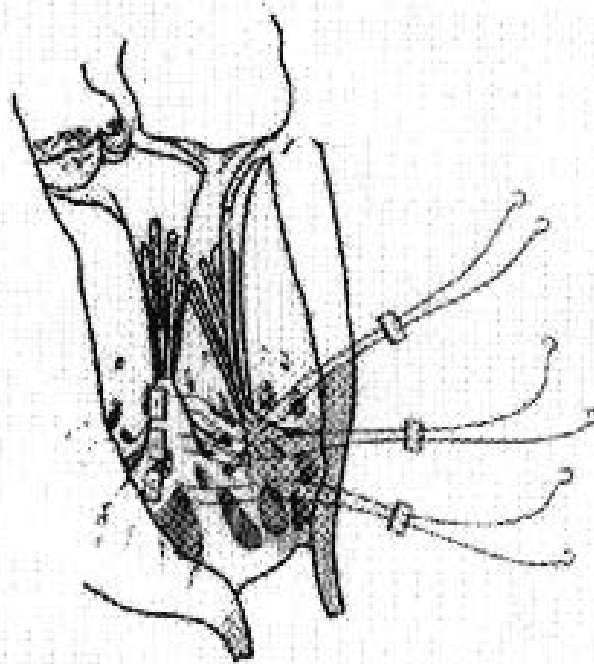
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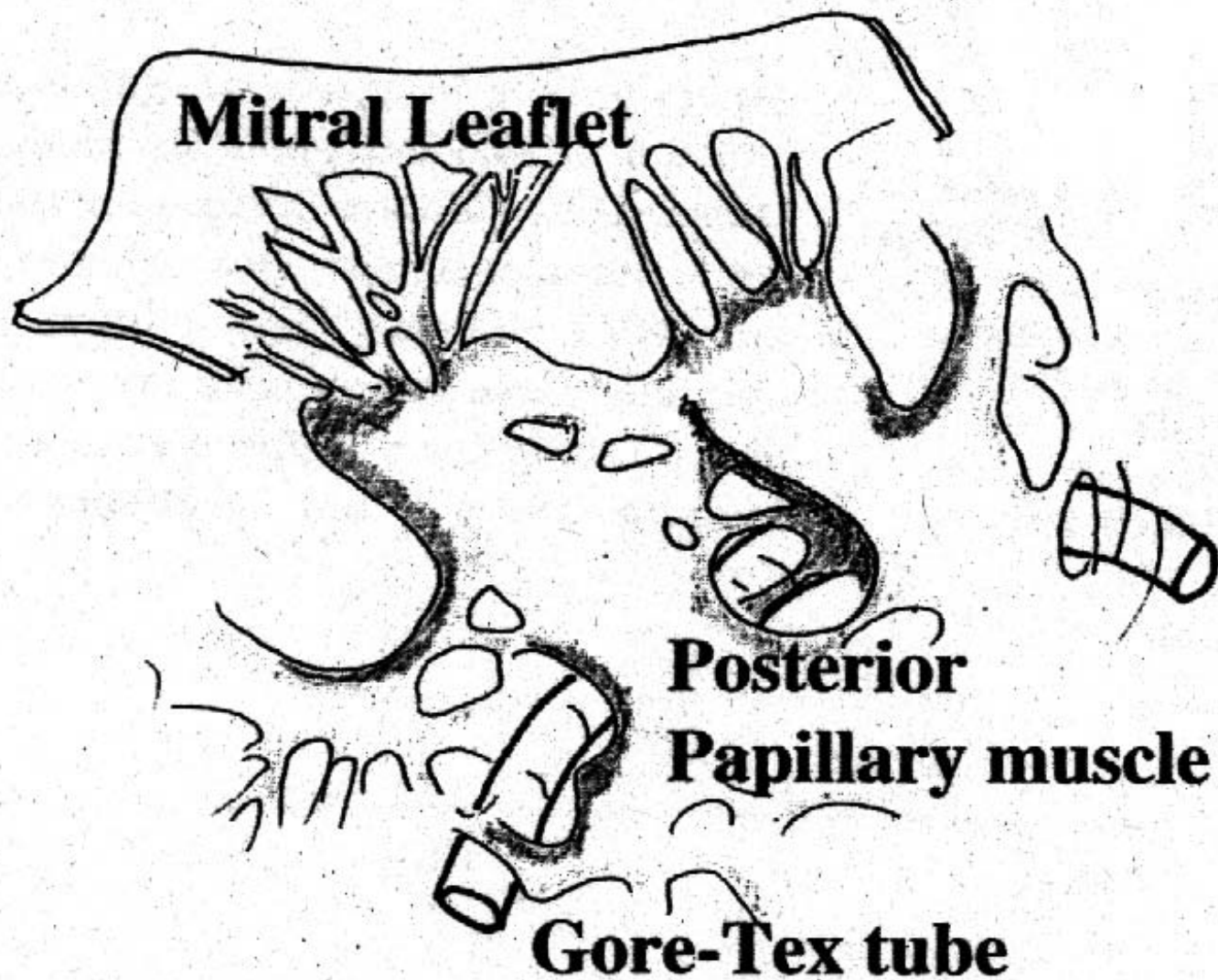


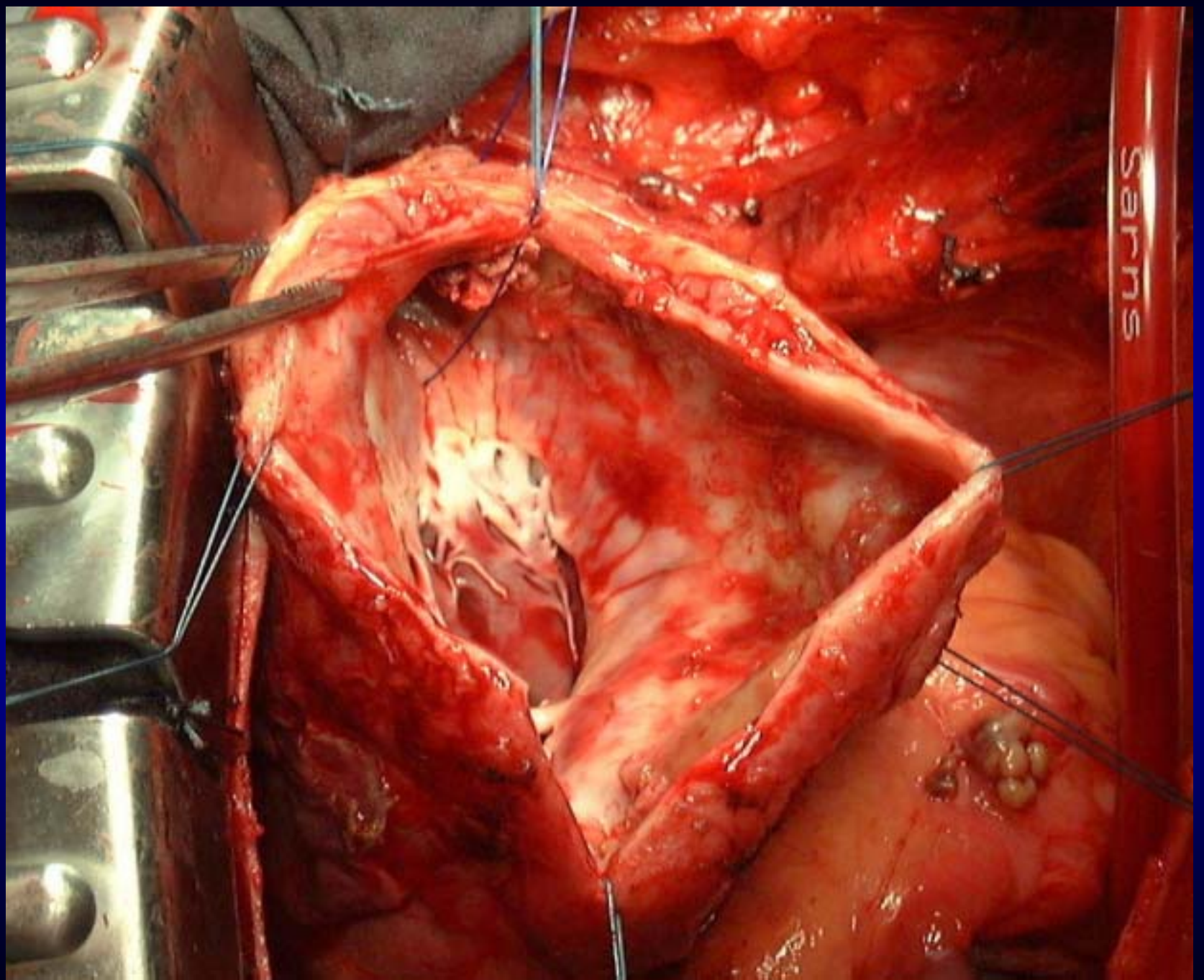


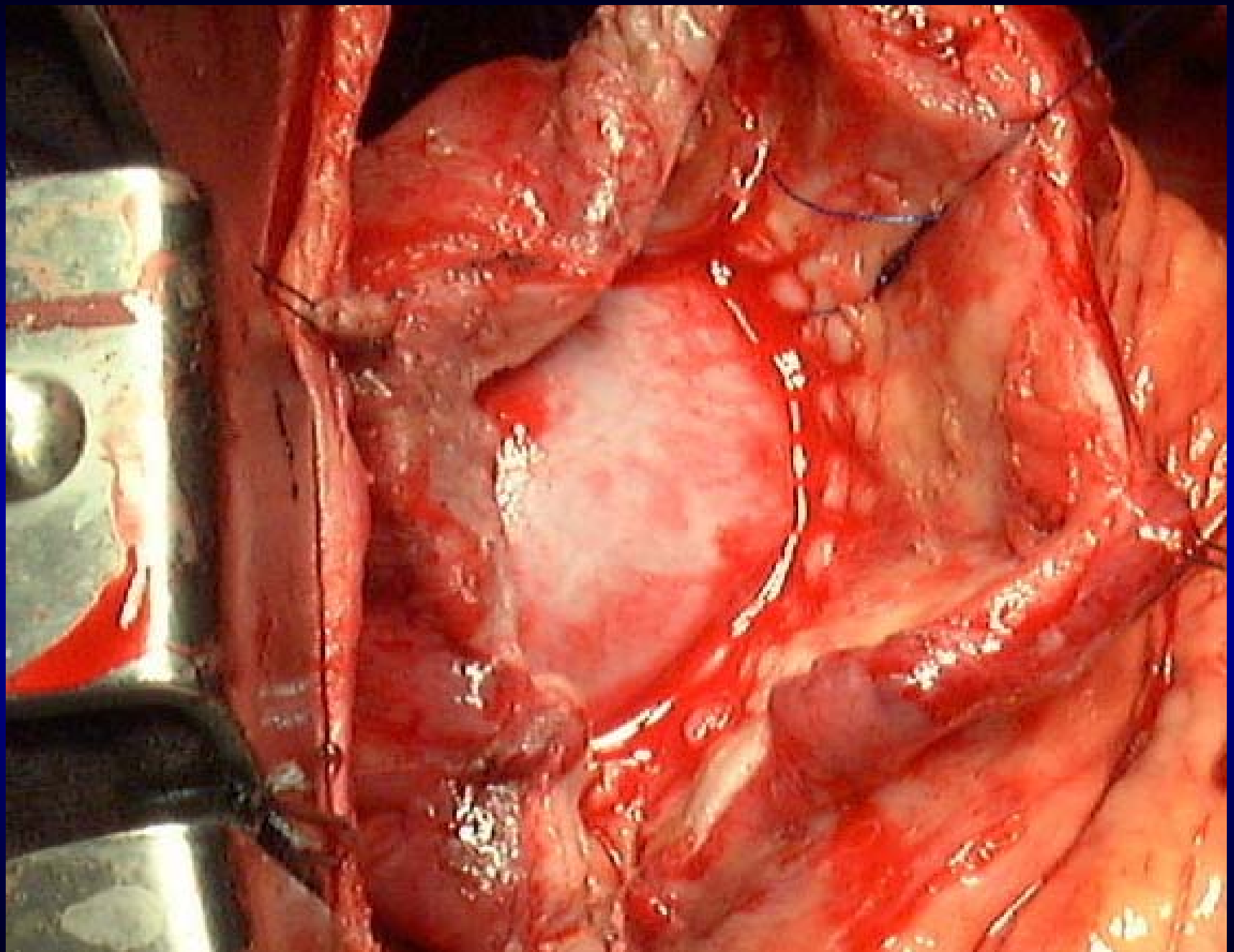
**Myocardial
infarction**



Tanemoto Ann Thorac Cardiovasc Surg 2005; 11:228-31





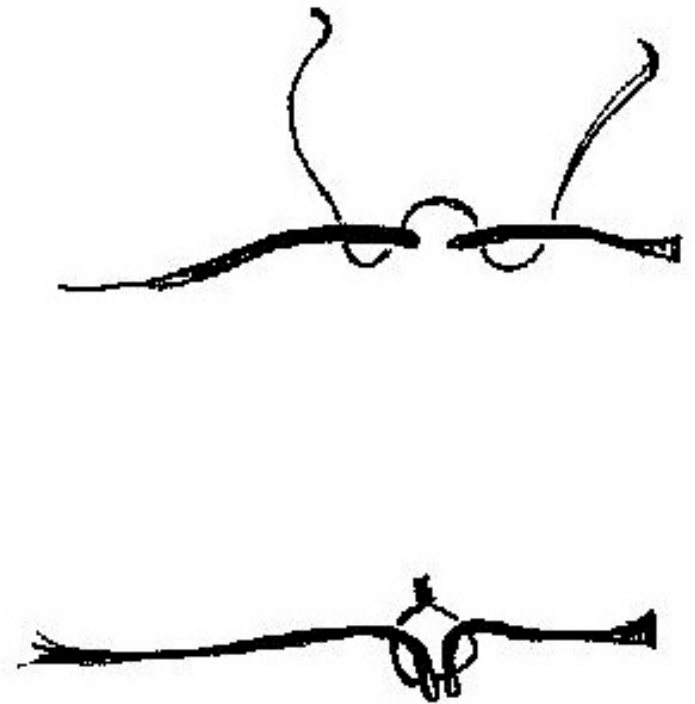
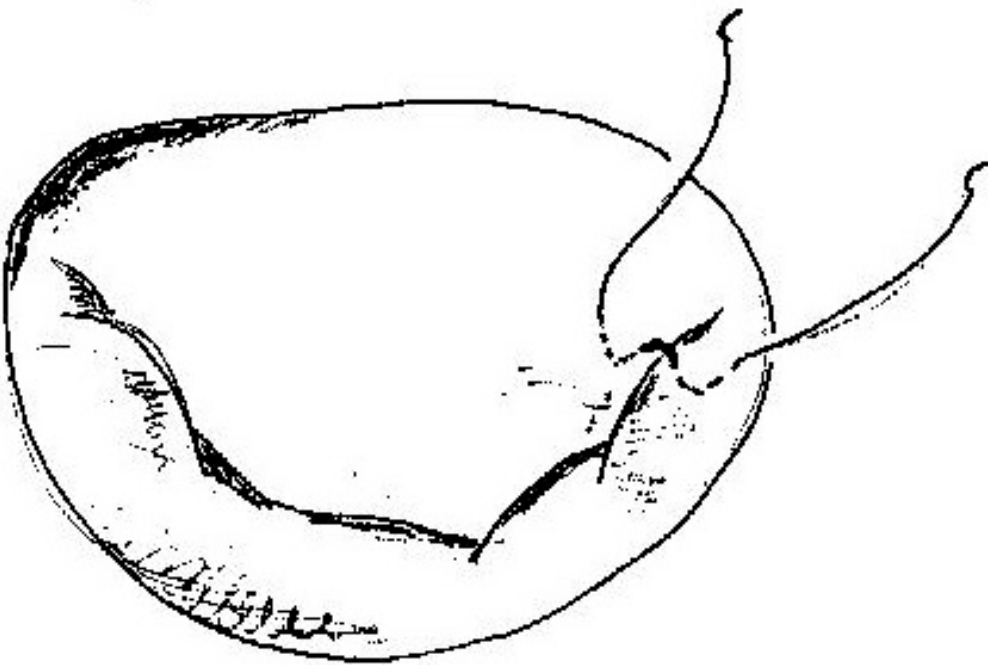


Prolassi commissurali

Sono quelli più facilmente correggibili:

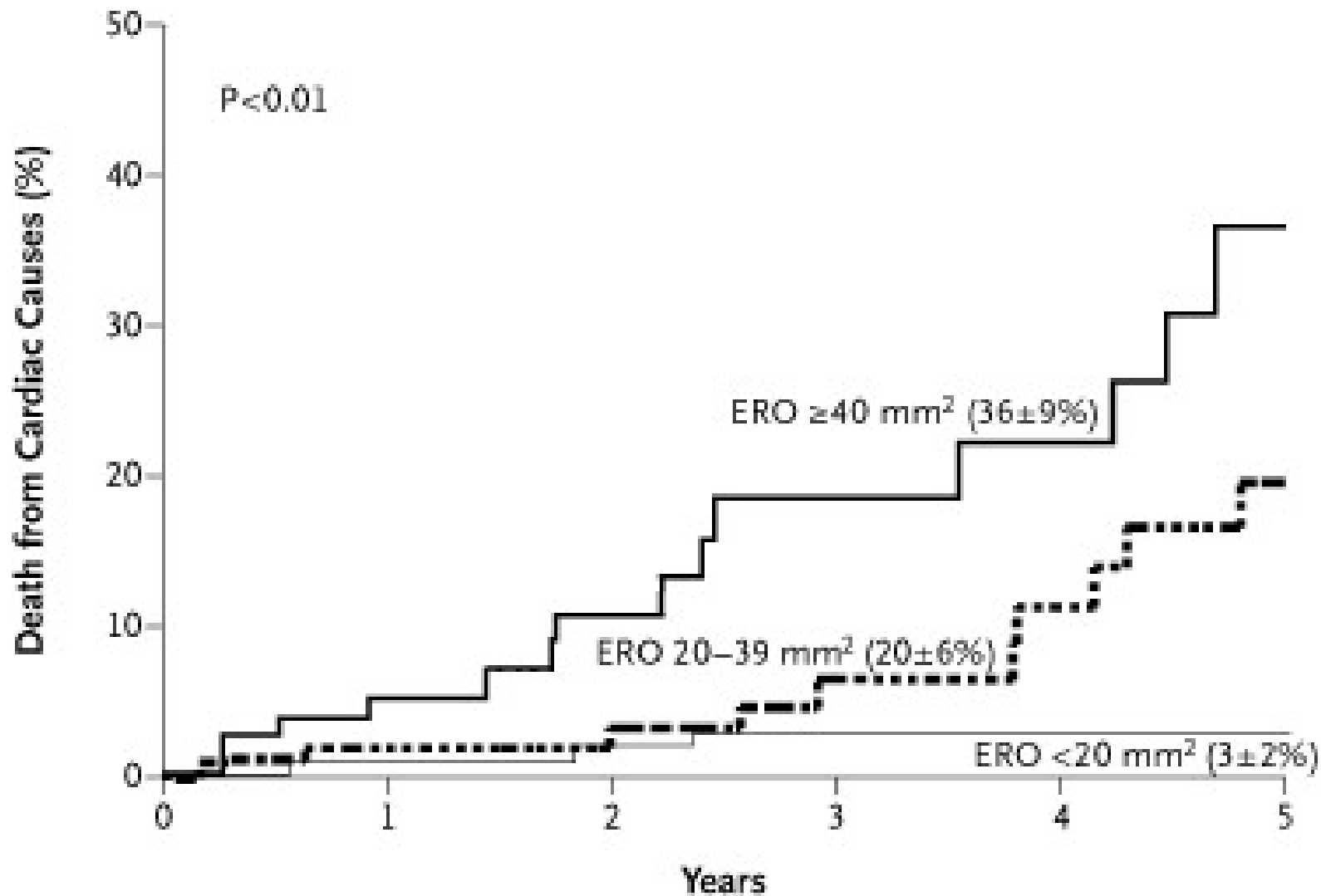
- plicatura commissurale
- edge to edge commissurale (orifizio unico)
- plicatura del papillare (porzione coinvolta)
- “suture magique”

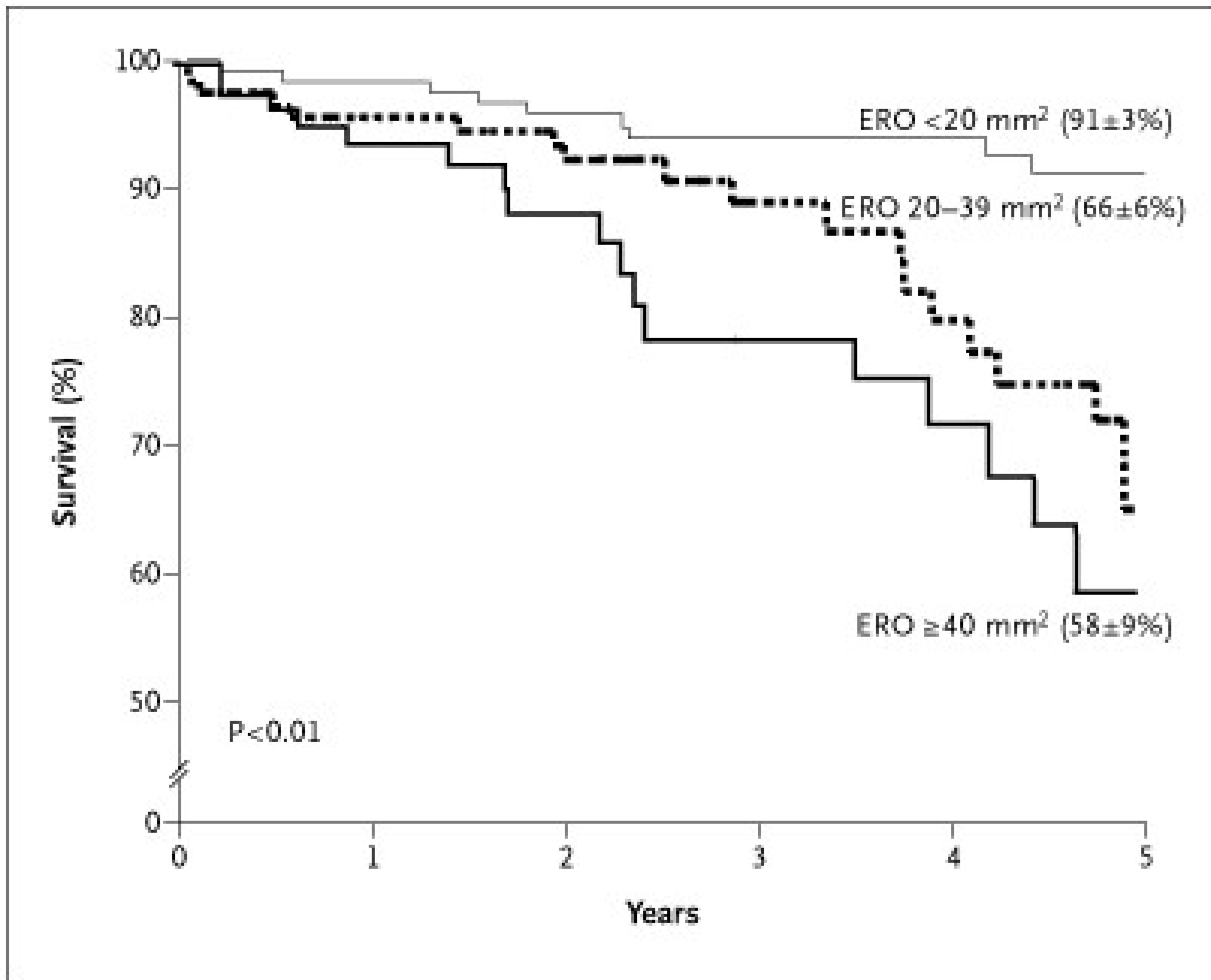
“magic suture”



Considerazioni conclusive

- stabilità della riparazione
- plastica mitralica e disfunzione VS





Recurrence of Mitral Valve Regurgitation After Mitral Valve Repair in Degenerative Valve Disease

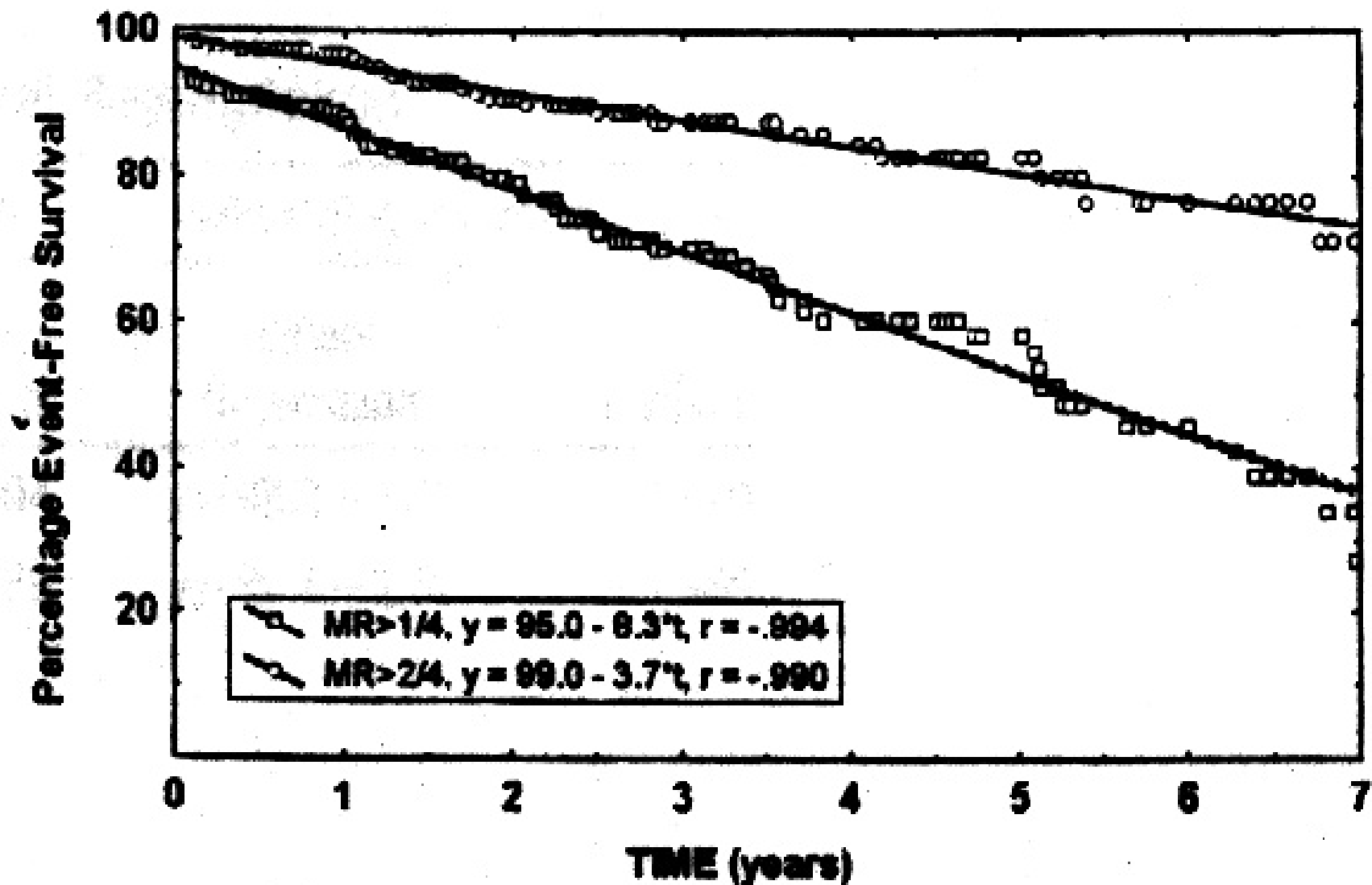
Willem Flameng, MD, PhD; Paul Herijgers, MD, PhD; Kris Bogaerts, MSc

Background—Durability assessment of mitral valve repair for degenerative valve incompetence is actually limited to reoperation as the primary indicator, with valve-related risk factors for late death as a secondary indicator. We assessed serial echocardiographic follow-up of valve function as an indicator of the durability of mitral valve repair.

Methods and Results—In 242 patients who had undergone mitral valve repair for degenerative valve incompetence, echocardiographic follow-up of valve function, rate of reoperation, survival, and clinical outcome was studied. At 8 years after repair, clinical outcome was excellent, survival was $90.9 \pm 3.2\%$, freedom from reoperation was $94.2 \pm 2.3\%$, and freedom from anticoagulation bleeding and thromboembolic events was $90.4 \pm 2.7\%$. However, freedom from non-trivial mitral regurgitation ($>1/4$) was $94.3 \pm 1.6\%$ at 1 month, $58.6 \pm 4.9\%$ at 5 years, and $27.2 \pm 8.6\%$ at 7 years. Freedom from severe mitral regurgitation ($>2/4$) was $98.3 \pm 0.9\%$ at 1 month, $82.8 \pm 3.8\%$ at 5 years and $71.1 \pm 7.4\%$ at 7 years. The linearized recurrence rate of non-trivial mitral regurgitation ($>1/4$) was 8.3% per year and of severe mitral regurgitation ($>2/4$) was 3.7% per year. Inadequate surgical techniques (chordal shortening, no use of annuloplasty ring or sliding plasty) could only partially explain recurrence of regurgitation. In selected patients who did not have these risk factors, linearized recurrence rates were 6.9% per year and 2.5% per year, respectively.

Conclusion—The durability of a successful mitral reconstruction for degenerative mitral valve disease is not constant, and this should be taken into account when asymptomatic patients are offered early mitral valve repair. (*Circulation*. 2003; 107:1609-1613.)

Key Words: echocardiography ■ mitral valve ■ follow-up studies ■ valvuloplasty

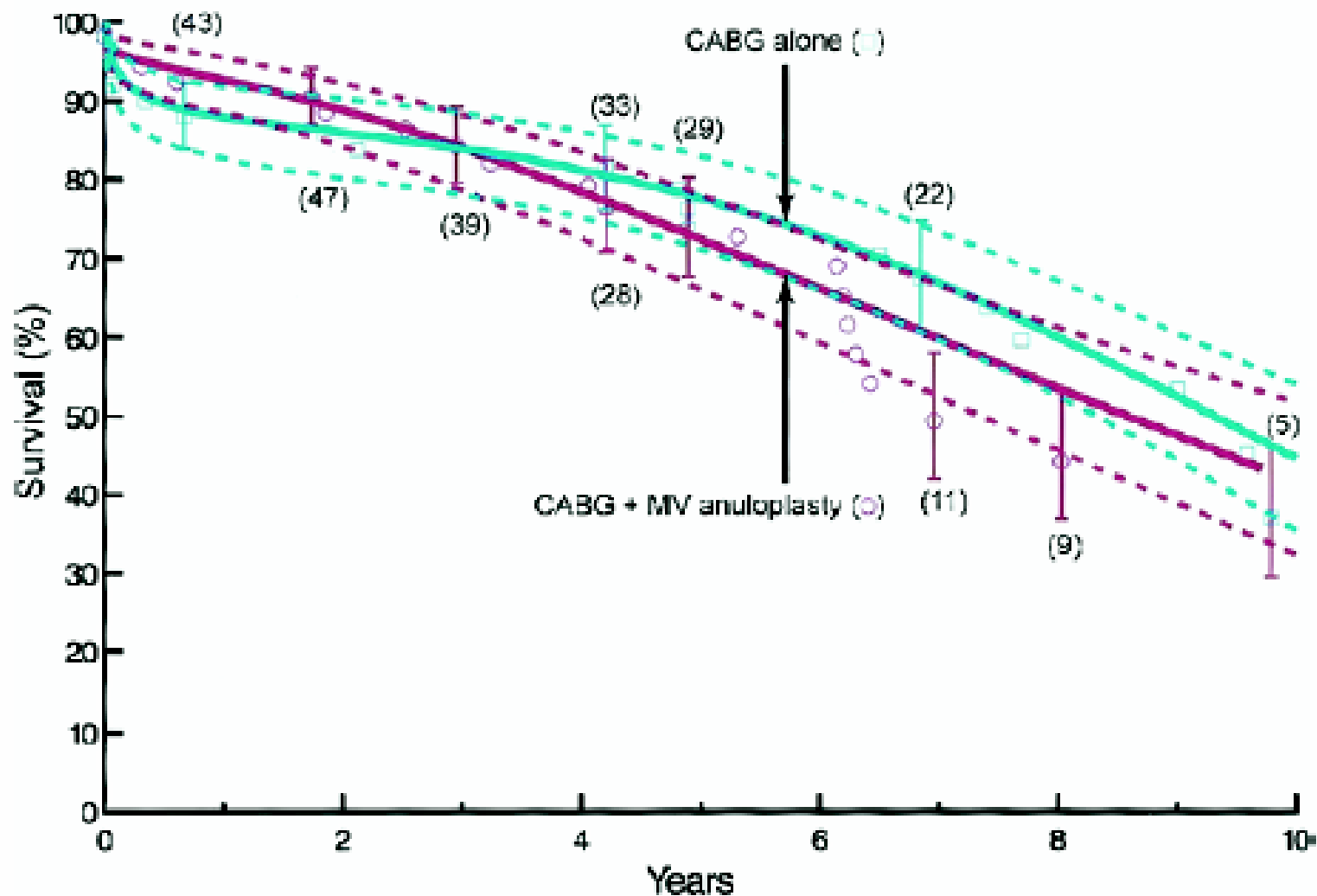


Impact of Mitral Valve Annuloplasty Combined With Revascularization in Patients With Functional Ischemic Mitral Regurgitation

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Although CABG + MV annuloplasty reduces postoperative MR and improves early symptoms compared with CABG alone, it does not improve long-term functional status or survival in patients with severe functional ischemic MR. The MV annuloplasty in this setting, without addressing fundamental ventricular pathology, is insufficient to improve long-term clinical outcomes. (J Am Coll Cardiol 2007;49:2191-201) © 2007 by the American College of Cardiology Foundation

B**Figure 1**

Survival After CABG Either Alone or With Concomitant MV Annuloplasty for Functional Ischemic MR

Impact of Mitral Valve Annuloplasty on Mortality Risk in Patients With Mitral Regurgitation and Left Ventricular Systolic Dysfunction

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CONCLUSIONS

In this analysis, there is no clearly demonstrable mortality benefit conferred by MVA for significant MR with severe LV dysfunction. A prospective randomized control trial is warranted for further study of mortality with MVA in this population. (J Am Coll Cardiol 2005;45:381-7) © 2005 by the American College of Cardiology Foundation

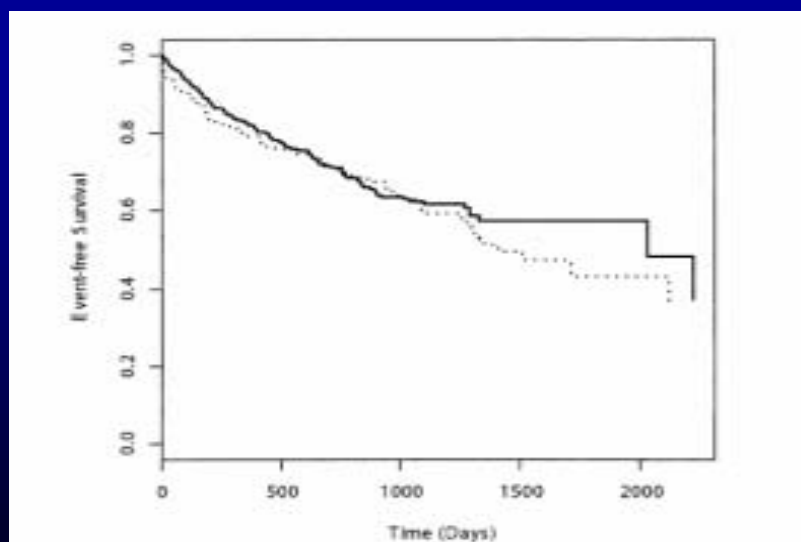


Figure 1. Event-free survival for non-mitral-valve annuloplasty (MVA)

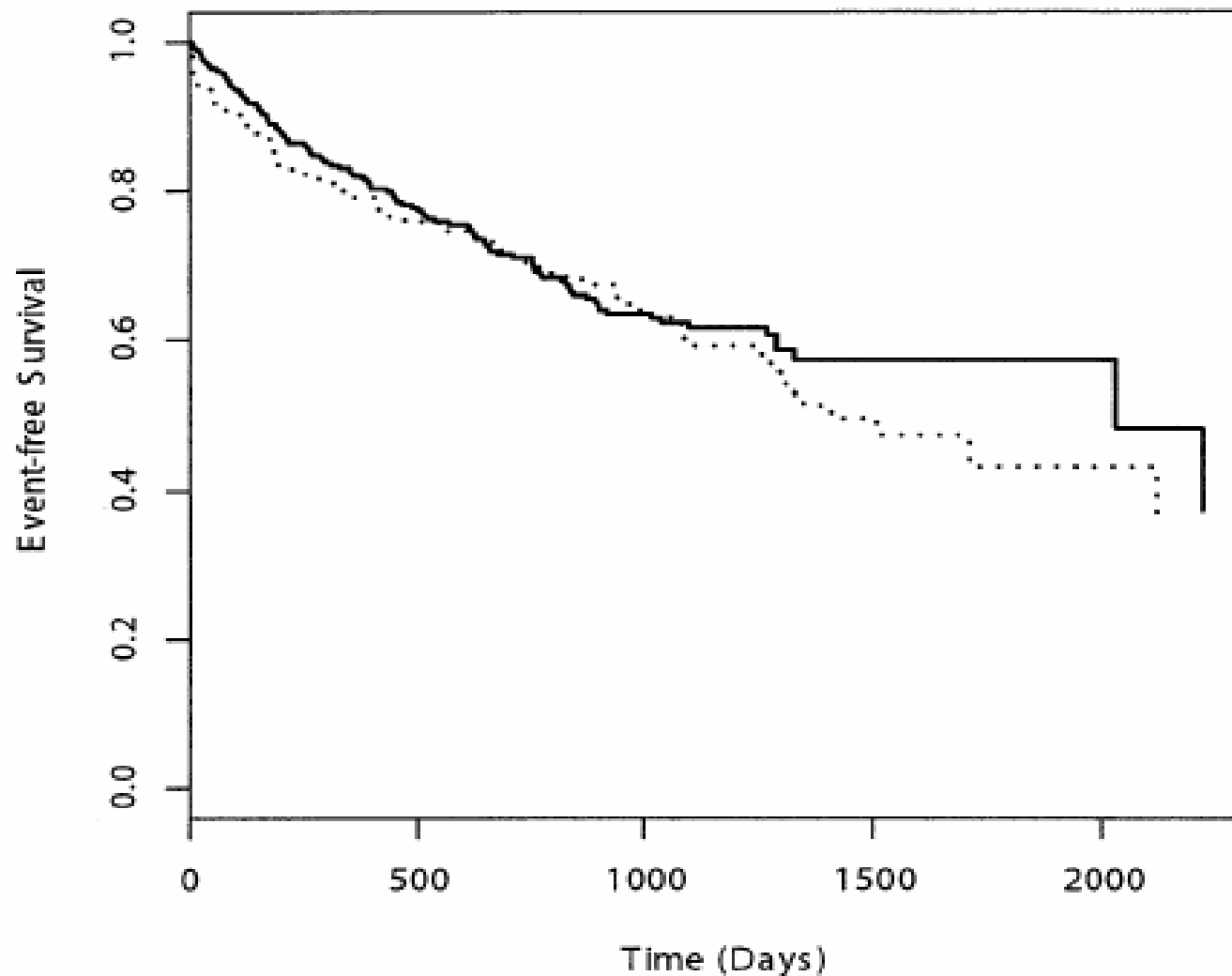


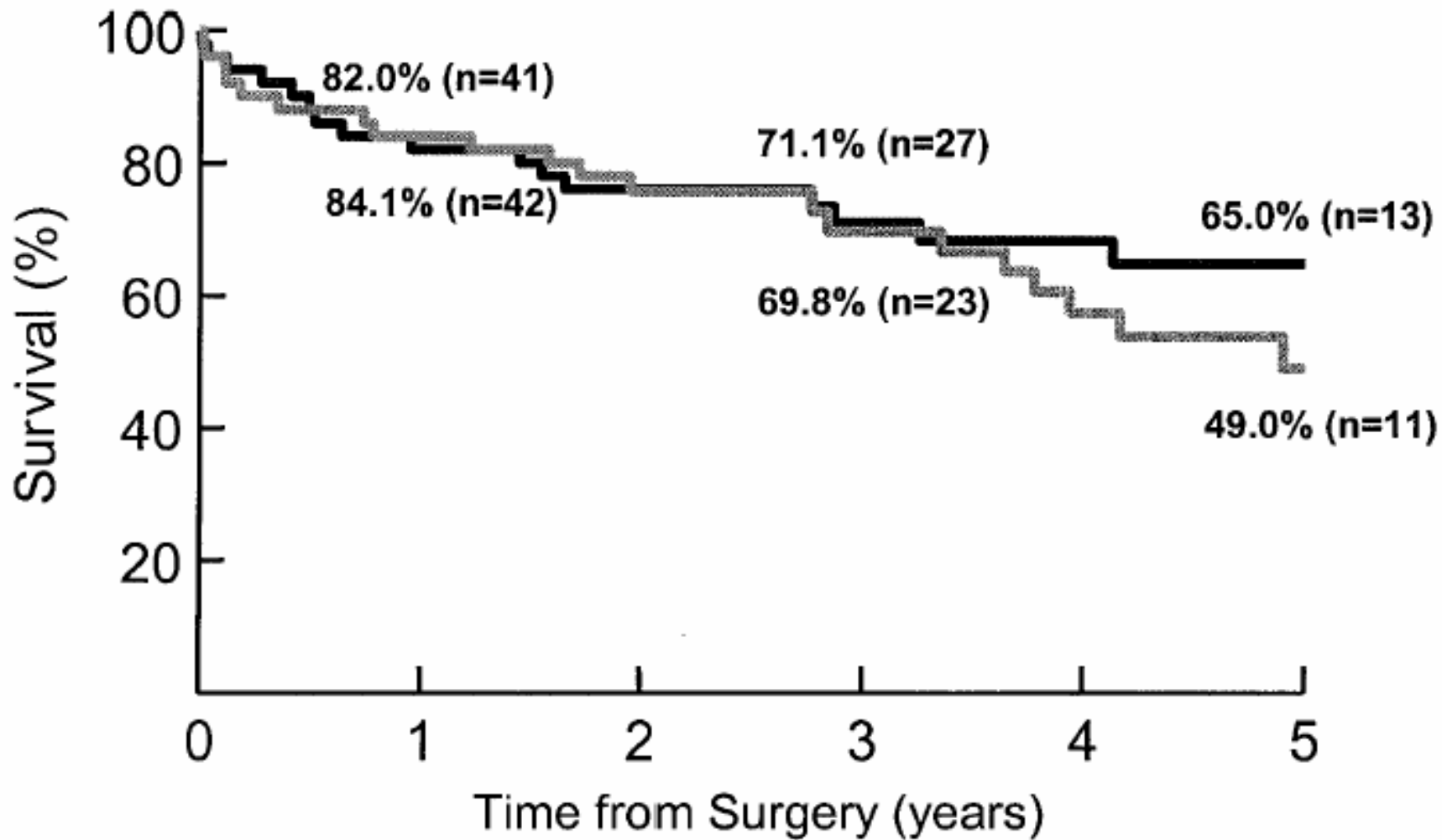
Figure 1. Event-free survival for non-mitral-valve annuloplasty (MVA) group (solid line) and MVA group (dotted line).

Repair of Ischemic Mitral Regurgitation Does Not Increase Mortality or Improve Long-Term Survival in Patients Undergoing Coronary Artery Revascularization: A Propensity Analysis

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Ann Thorac Surg 2004;78:794-9



Ischemic Mitral Regurgitation: Revascularization Alone Versus Revascularization and Mitral Valve Repair

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Background. In this study we compared the surgical management of ischemic mitral regurgitation (IMR) by revascularization alone and by revascularization combined with mitral valve repair.

Methods. We studied 355 patients who underwent revascularization alone ($n = 168$) or revascularization combined with mitral valve repair ($n = 187$) for IMR from March 1994 to September 2003. Preoperative and operative characteristics, postoperative mitral regurgitation severity, operative mortality, and late survival were examined for each surgical group.

Results. No differences were noted between the two groups in age, sex, history of diabetes or hypertension, and number of bypass grafts. The combined surgical group had a lower preoperative left ventricular ejection fraction (0.38 ± 0.14 versus 0.44 ± 0.15), greater severity of IMR, higher frequency of prior myocardial infarction, and longer cross-clamp and pump times ($p < 0.01$). The combined surgical group had a greater reduction in IMR grade (2.7 ± 0.1 grades versus 0.2 ± 0.1 grade), a lower postoperative IMR grade (0.9 ± 0.1 versus 2.3 ± 0.1), and a higher success with

reduction of IMR by two or more grades (89% versus 11%) ($p < 0.001$). In patients with 3+ or 4+ IMR, both groups had similar operative mortality (11.0% in the combined group compared with 4.7% for revascularization alone, $p = 0.11$) and actuarial survival at 5 years ($44\% \pm 5\%$ versus $41\% \pm 7\%$, $p = 0.53$). Independently predictive of higher early mortality (≤ 30 days) by Cox analysis were longer pump time ($p < 0.001$) and older age ($p < 0.02$). Predictive of late mortality (> 30 days) were older age ($p < 0.001$), fewer bypass grafts ($p < 0.01$), and lower ejection fraction ($p < 0.01$). After adjustment for these variables, there was a trend ($p = 0.08$) toward a higher late survival with the combined surgical procedure.

Conclusions. In patients with IMR, combined mitral valve repair and revascularization resulted in less postoperative mitral regurgitation and similar 5-year survival when compared with revascularization alone. Attempts to reduce pump time by using off-pump techniques may reduce early mortality in these high-risk patients.

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Mitral Repair Versus Replacement for Ischemic Mitral Regurgitation

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Background. We compared mitral repair to replacement in patients with chronic ischemic mitral regurgitation (IMR), due to left ventricular dysfunction (LV-IMR) or papillary muscle infarction (PM-IMR).

Methods. Patients with IMR undergoing repair (n = 65) or replacement (n = 137) from 1990 to 2001 were evaluated. There were 87 patients with LV-IMR, and 115 patients with PM-IMR. Patients presenting in cardiogenic shock were excluded. Outcomes were evaluated by Cox survival analysis with propensity score adjustment and bootstrap validation.

Results. Survival at 3, 5, and 9 years was, respectively, 0.94, 0.79, and 0.63 in the repair group, and 0.73, 0.67, and 0.59 in the replacement group. The hazard ratio (HR) of death for mitral repair versus replacement was not constant over the period of follow-up. Repair was associated with better early survival in the PM-IMR group, with an

adjusted HR of 0.25 (95% confidence interval: 0.09 to 0.71) at 1 year. In the LV-IMR group and in patients with PM-IMR with high acuity and comorbidity, there was no significant survival advantage associated with repair. The beneficial effect of repair was not evident at late follow-up in either group. These findings were independent of the surgeon. Need for reoperation was more common after repair than after replacement (14% versus 3%, $p = 0.003$).

Conclusions. Patients with PM-IMR benefit from mitral repair with a significantly better early survival. However, the benefit of repair is not evident at longer follow-up. There was a nonsignificant trend toward greater early survival among patients with LV-IMR who underwent repair.

(Ann Thorac Surg 2005;79:1260-7)
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Il tipo di plastica (accorciamento corde, non anello) influenza l'entità delle recidive.

La correzione conservativa della IM nella disfunzione ventricolare NON migliora la funzione nè la sopravvivenza nel medio-lungo termine.

Nei casi complessi la SVM appare superiore alla plastica.

Quantitative Determinants of the Outcome of Asymptomatic Mitral Regurgitation

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