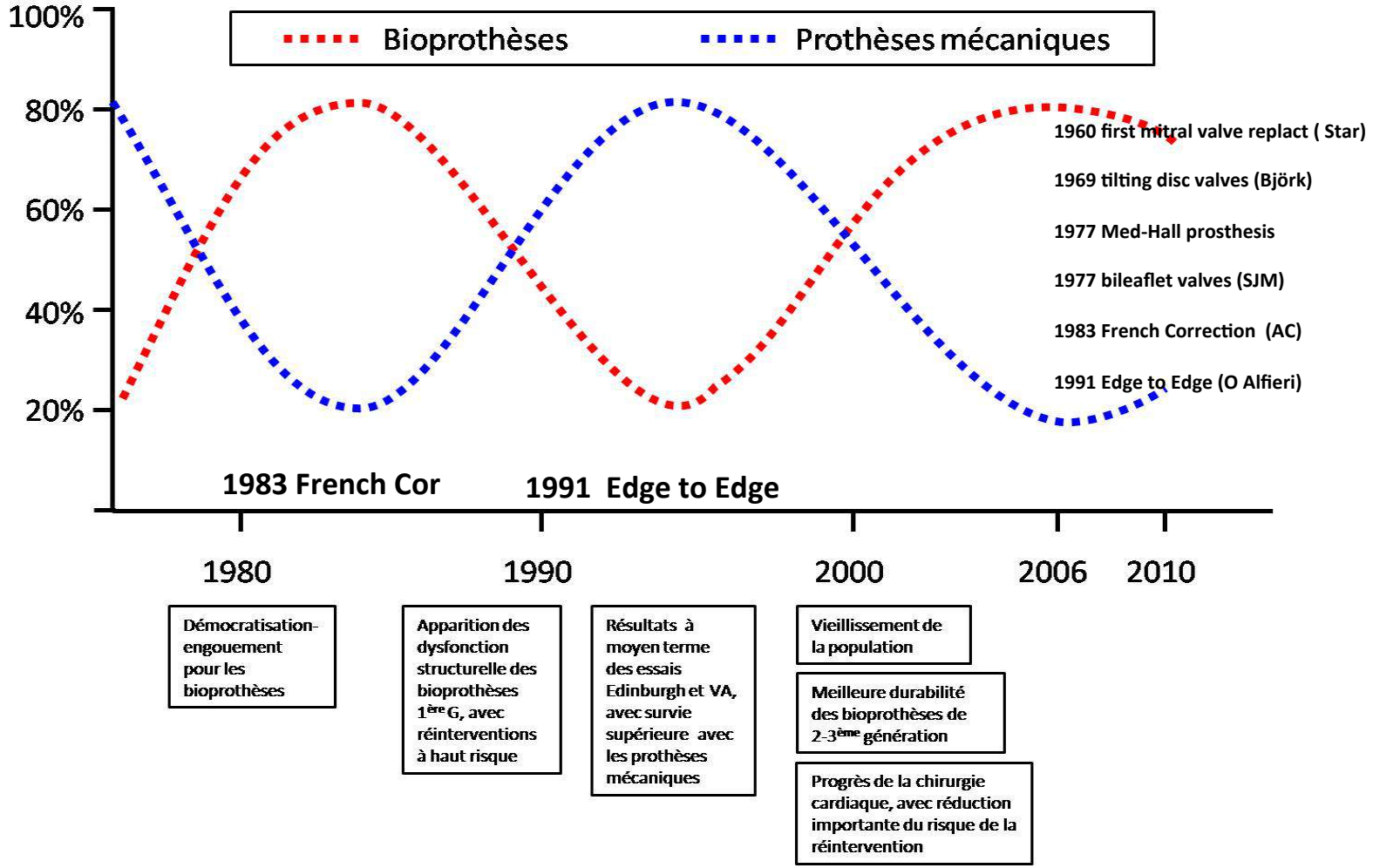
Hospices Civils de Lyon

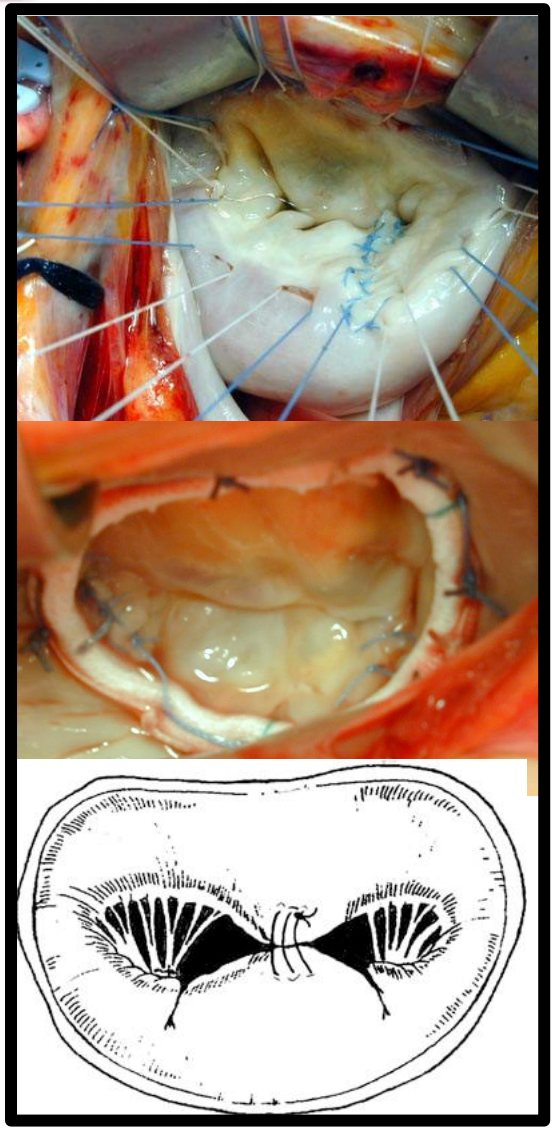
Mitral Valve Surgery : Lessons from the past…

Cardiothoracic and Vascular Surgery Department
Hôpital Louis Pradel
LYON - France

Pourcentage du total de prothèses implantées

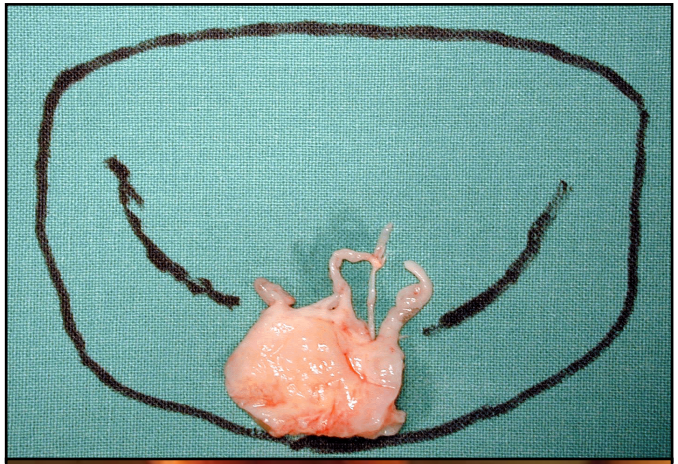


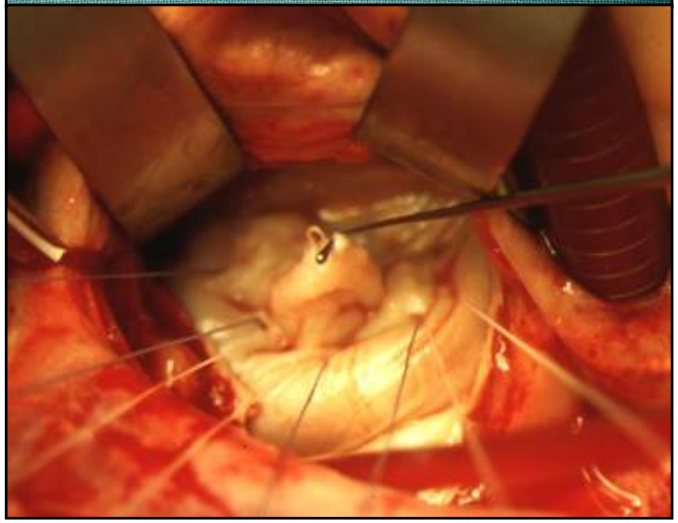

PHILIPS
ITm0.2 IM 0.5
X7-2t/Adulte
CI 23Hz
Battem. 3D VVélev
C4
3D
3D 51%
3D 40dB
JPEG
60 bpm

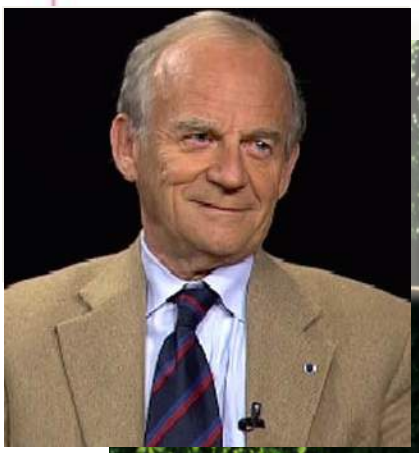


1) Annuloplasty

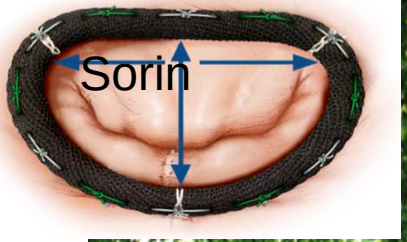
2) Valvular Apparatus

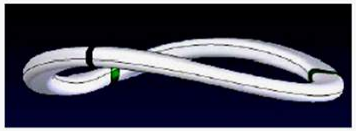






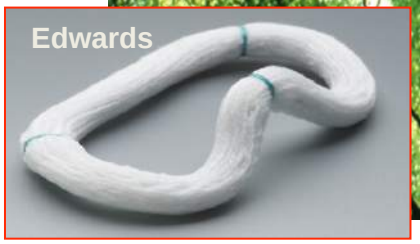
THE POWER OF THE RING.



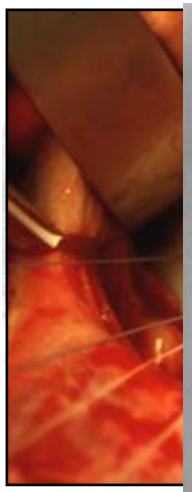


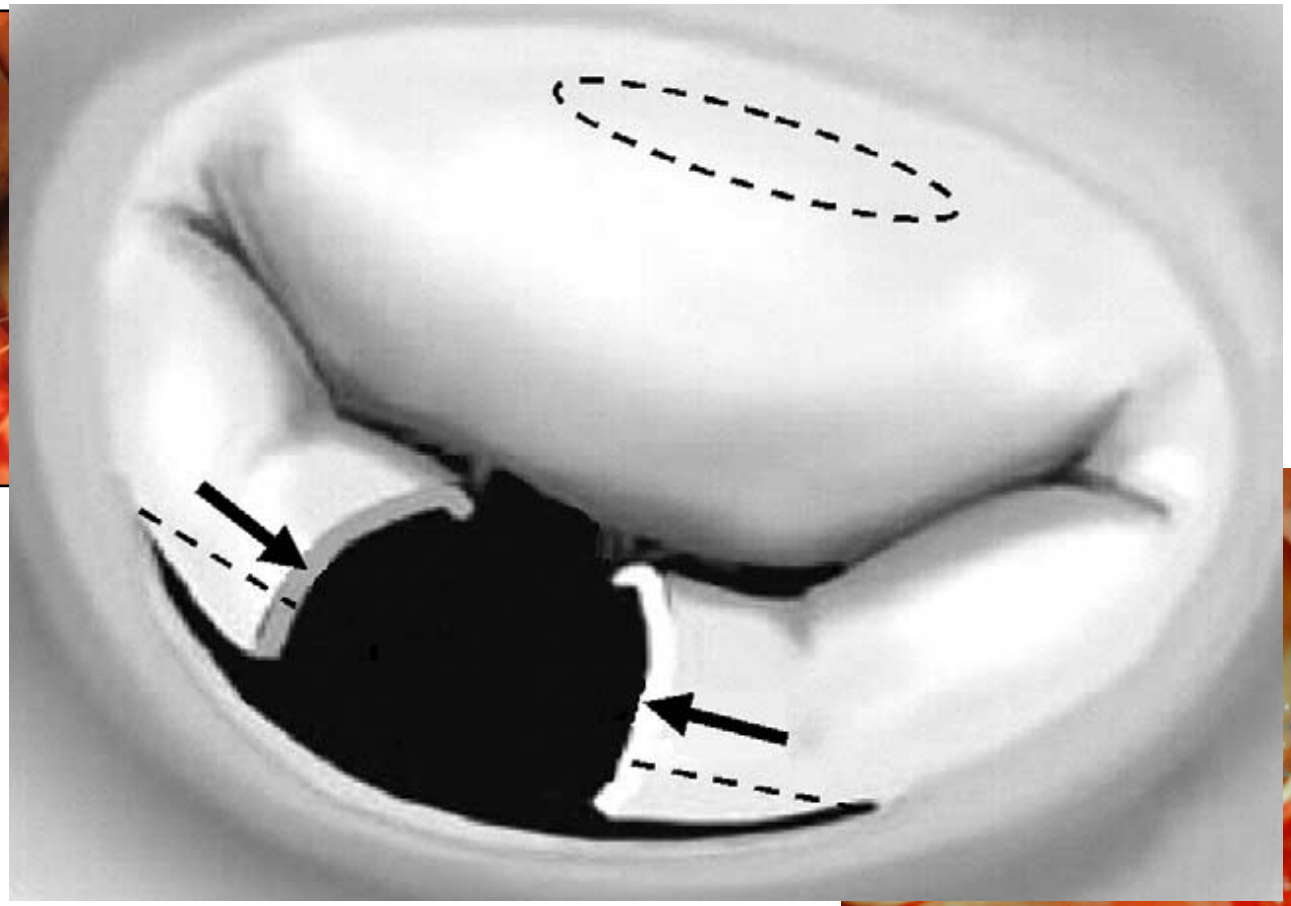
St. Jude Medical® Rigid Saddle Ring

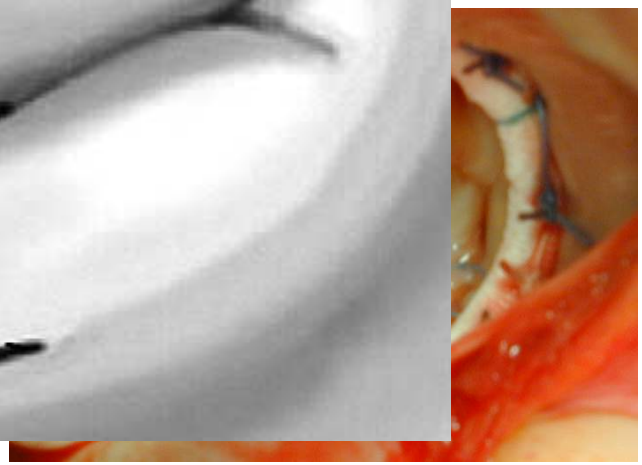
ST. JUDE MEDICAL



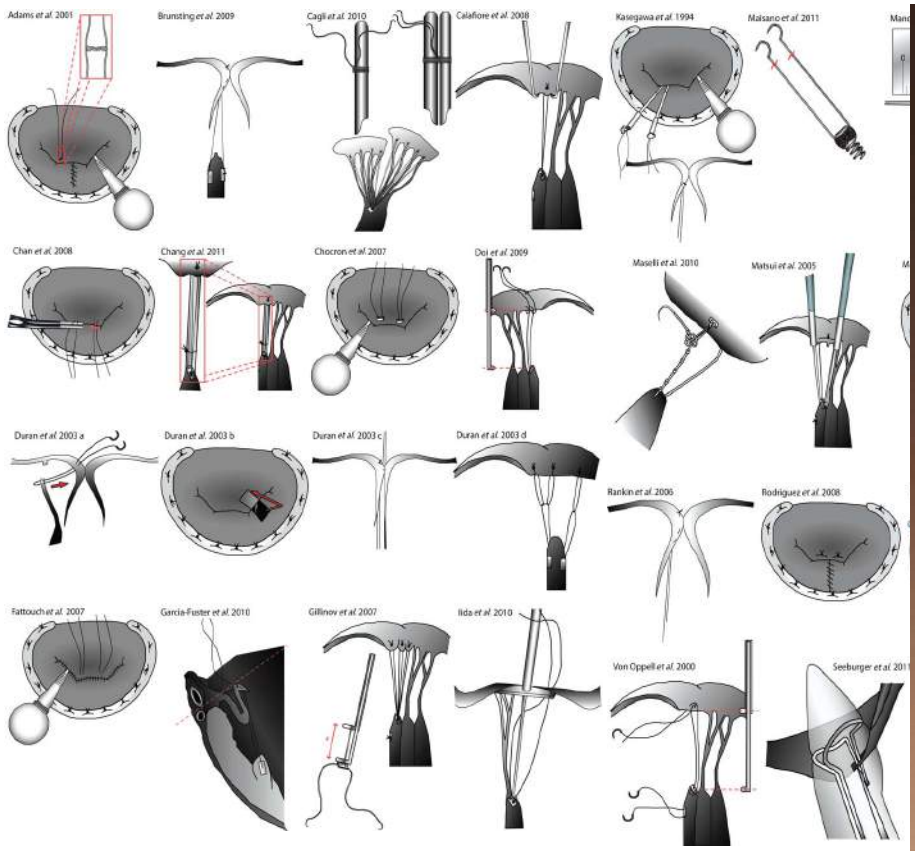
French Correction : Quadrangular resection (since 1983)

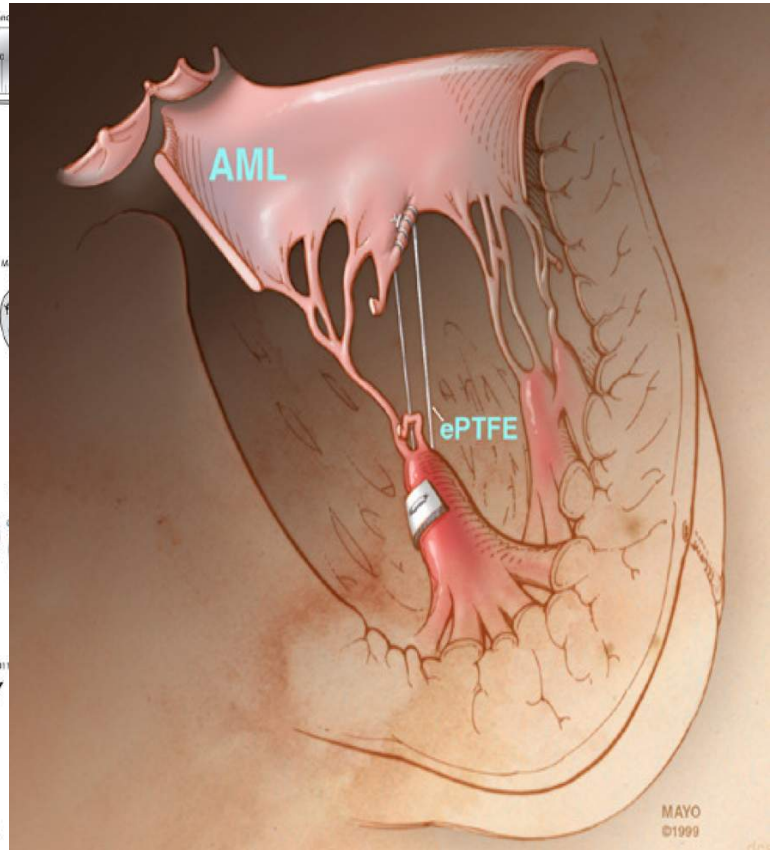






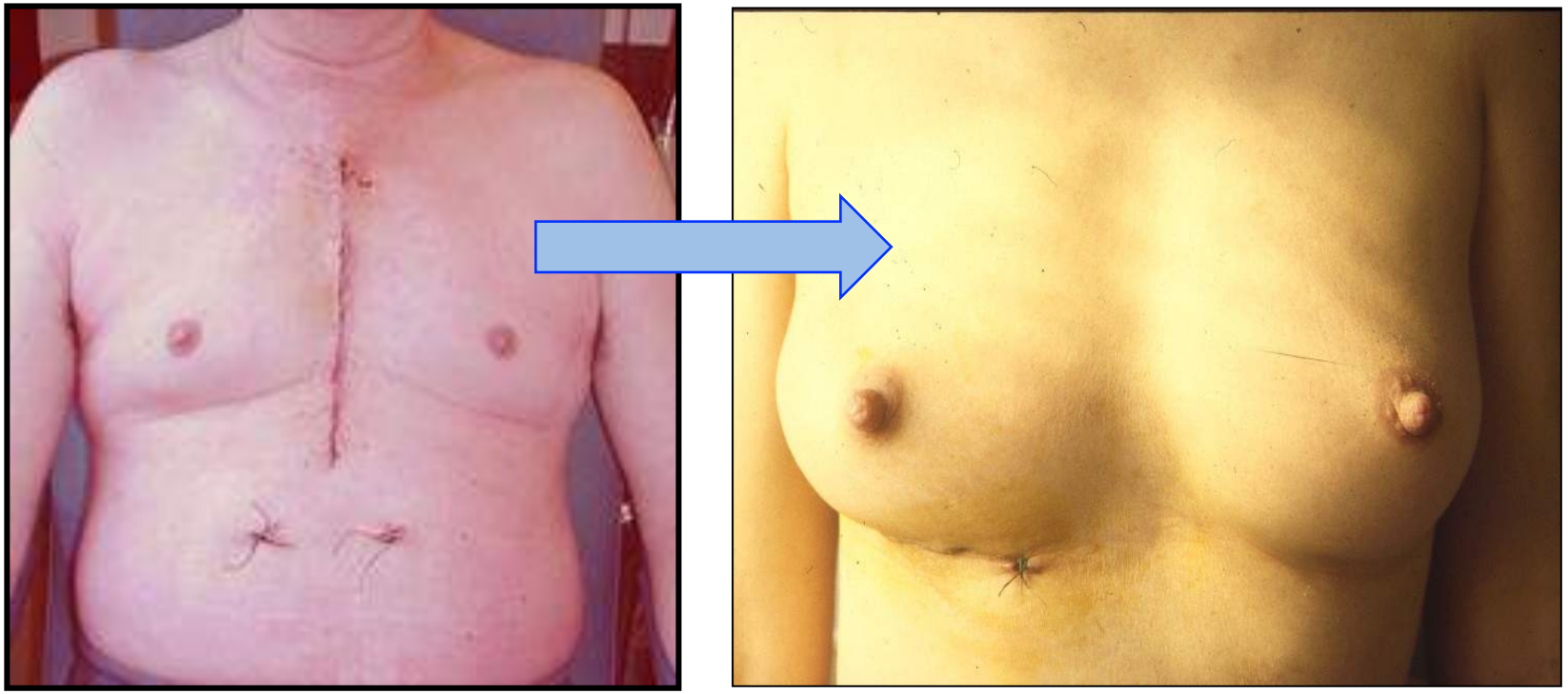
« *Artificial chordae for degenerative mitral valve disease*
I Michael et al. Interactive CVTS . 15 (2012) 1019–1032 »

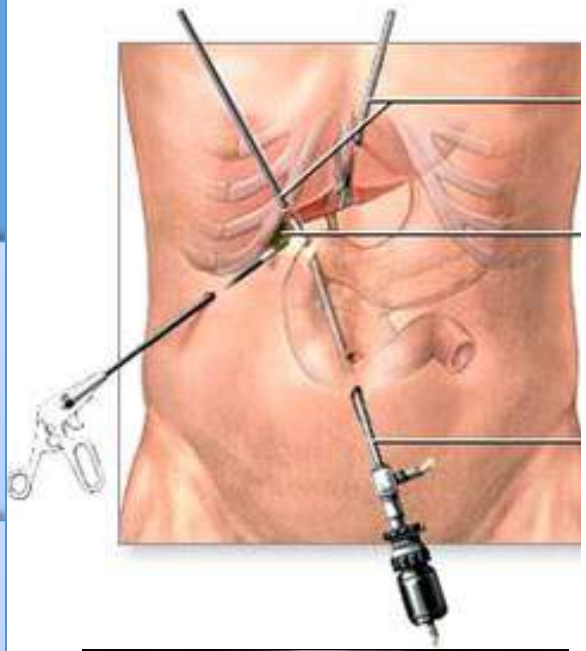


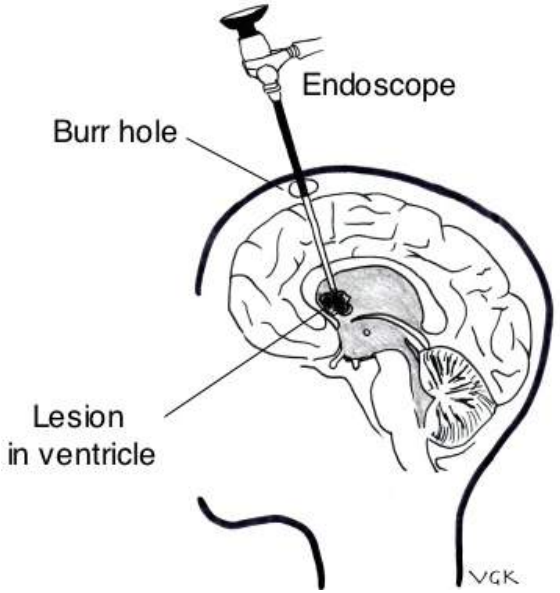


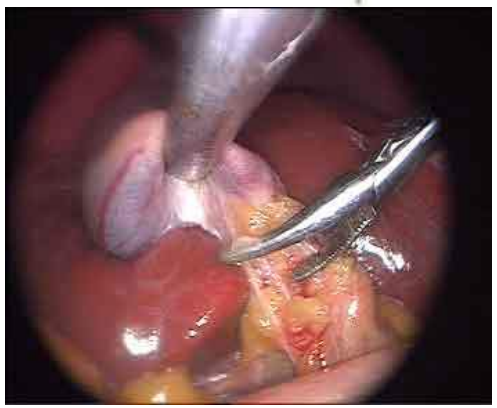
Anti-anatomic Repair (since 1991)

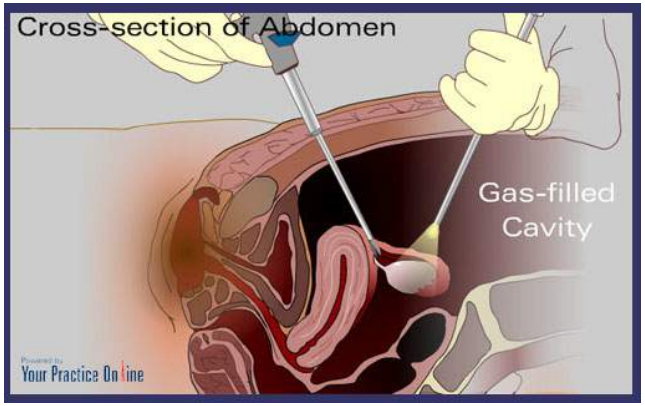
Minimmaly Invasive (since 1996)






Endoscope
Burr hole
Lesion
in ventricle
VGK




Cross-section of Abdomen
Gas-filled
Cavity
Your Practice Online

Very long term results (more than 20 years…)

Broussais-HEGP Paris ***"Braunberger E,…Carpentier A. Circulation 2001"***

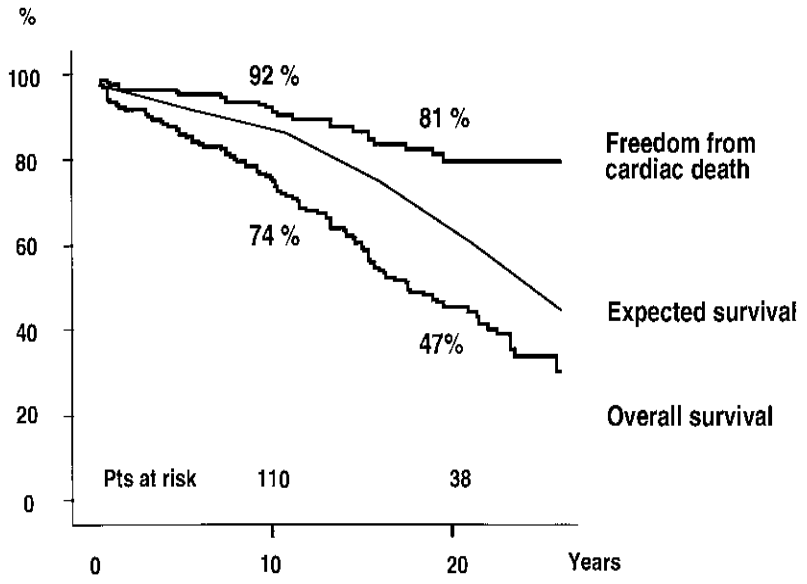


Figure 1. Rates at 10 and 20 years for freedom from cardiac death, expected survival, and overall survival.

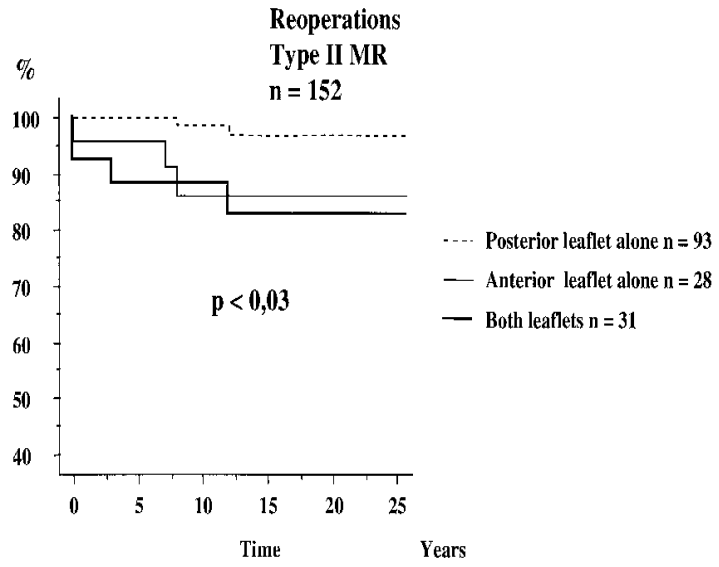


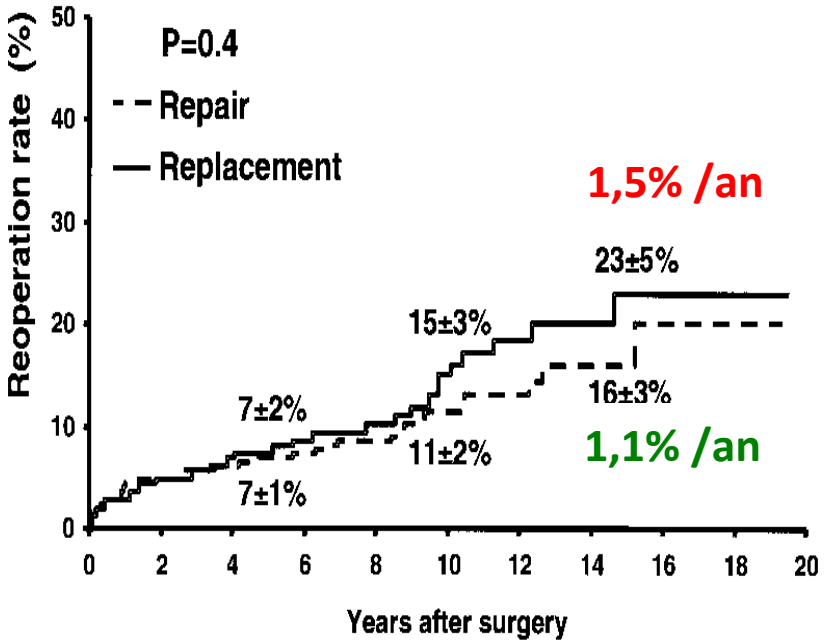
Figure 3. Reoperations according to leaflet prolapse. MR indicates mitral regurgitation.

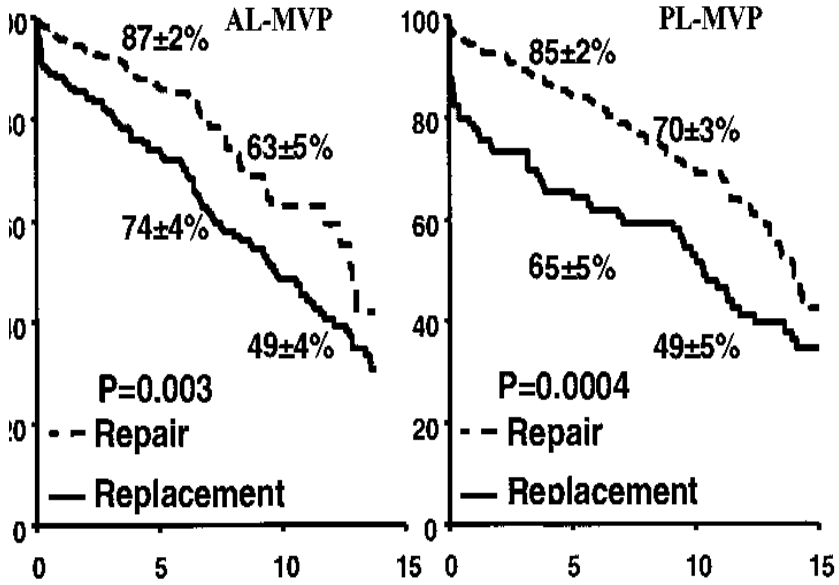
Very Long-Term Survival and Durability of Mitral Valve Repair for Mitral Valve Prolapse

Dania Mohty, MD; Thomas A. Orszulak, MD; Hartzell V. Schaff, MD; Jean-Francois Avierinos, MD; Jamil A. Tajik, MD; Maurice Enriquez-Sarano, MD

Circulation. 2001;104 [suppl I]:I-1-I-7

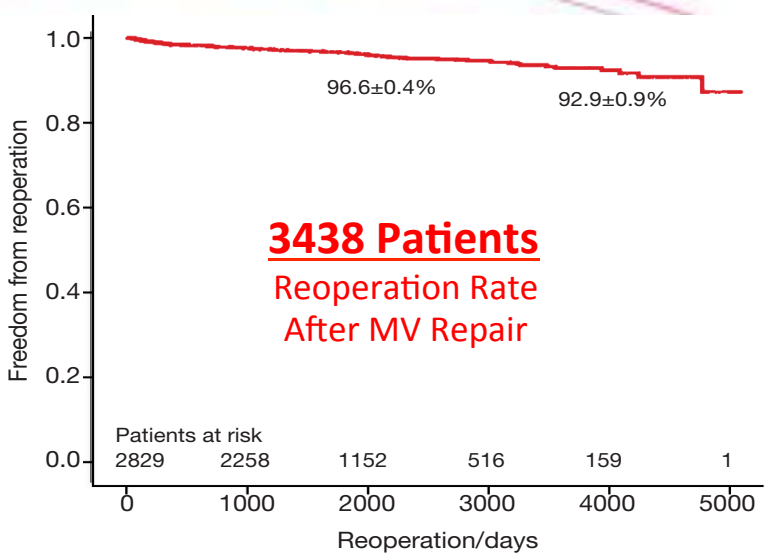
679 Repairs / 238 Replac.





Long Term Results of MIS

"Minimally invasive mitral valve surgery:
<u>The Leipzig experience</u>
Piroze M... F Mohr.
Ann Cardiothorac Surg 2013;2(6):744-750"



Preoperative variables	
Age in years	60.3±13
Male	1,733 (61.3)
Body-mass index (kg/m^2)	25.6±3.9
Preoperative cerebrovascular accident	90 (3.2)
Left ventricular ejection fraction (%)	56.8±18.9
Prior cardiac surgery	152 (5.4)
Active endocarditis	36 (1.3)
Timing of surgery	
Elective	2,632 (93)
Urgent/emergent	197 (7)
Log EuroSCORE (%)	4.9±6

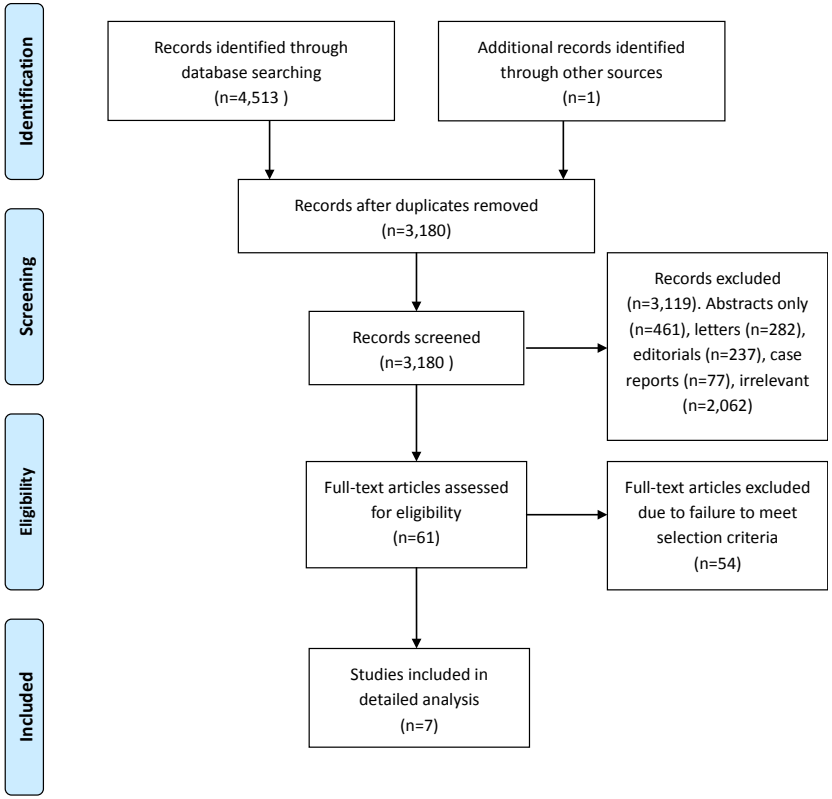
Outcomes	n (%)
30-day mortality	23 (0.8)
Low output syndrome	31 (1.1)
Failed mitral valve repair	45 (1.6)
Re-exploration for bleeding	198 (7)
Myocardial infarction	18 (0.6)
Sepsis	24 (0.8)
Stroke	57 (2)
Postoperative new dialysis	87 (3.1)
Postoperative symptomatic neuropsychotic syndrome	71 (2.5)
Hospital stay, days	12.2±9.4

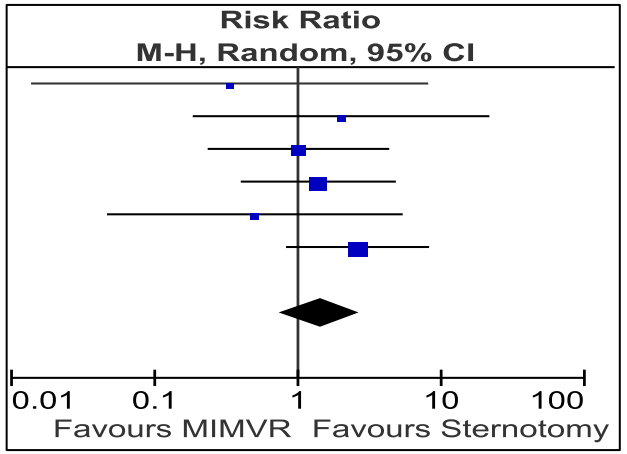
A meta-analysis of minimally invasive versus conventional mitral valve repair for patients with degenerative mitral disease

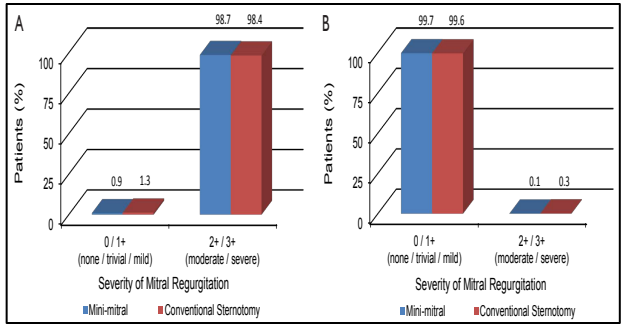
Christopher Cao[1], Sunil Gupta[1], David Chandrakumar[1], Thomas A. Nienaber[1], Praveen Indraratna[1], Su C. Ang[1], Kevin Phan[1,2], Tristan D. Yan[1,2]

Ann Cardiothorac Surg 2013;2(6):693-703

[1]The Collaborative Research (CORE) Group, Macquarie University, Sydney, Australia; [2]The Royal Prince Alfred Hospital, Sydney University, Sydney, Australia

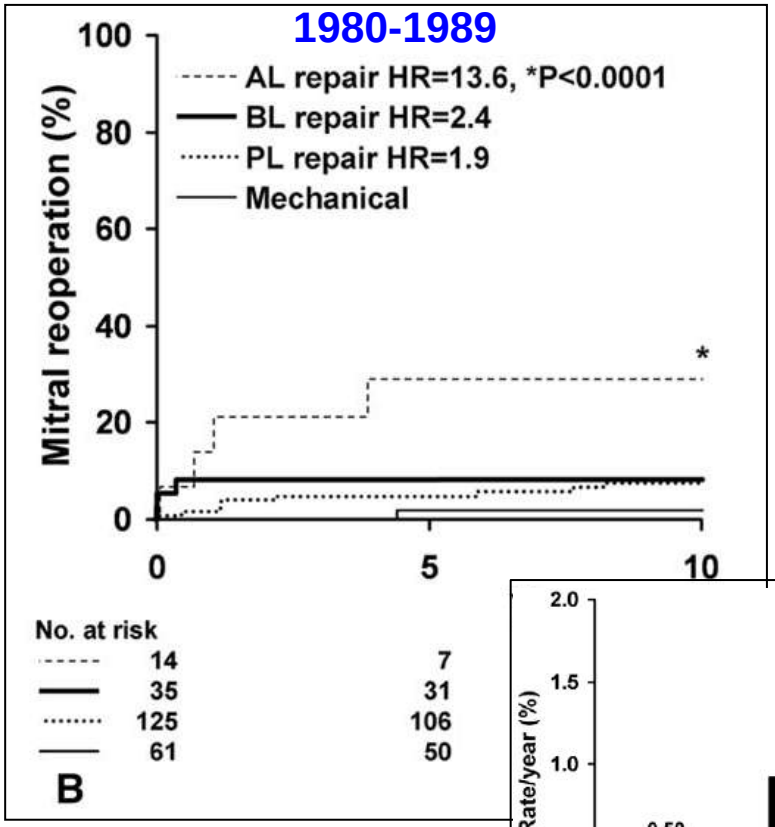


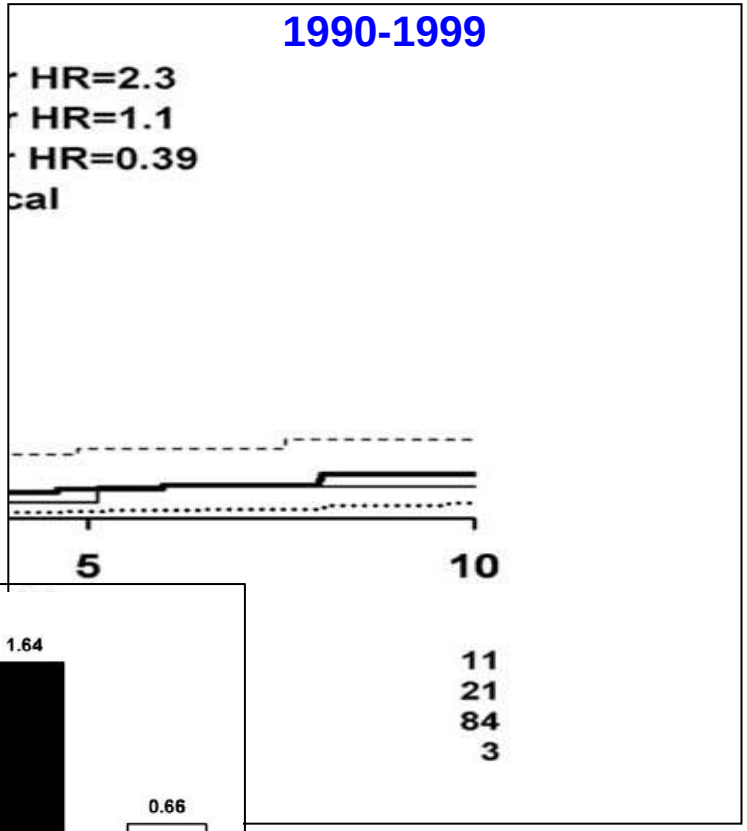


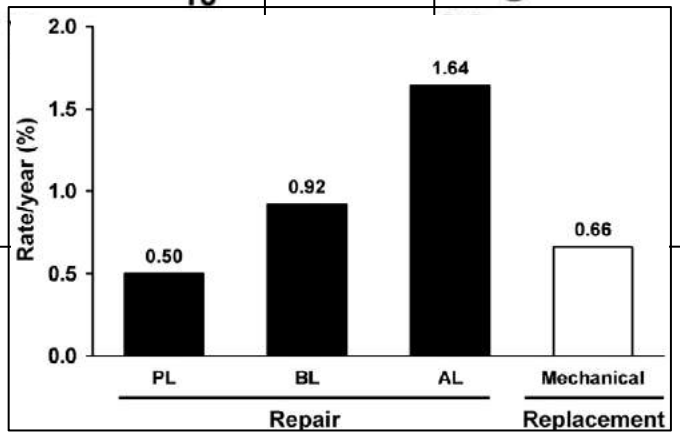


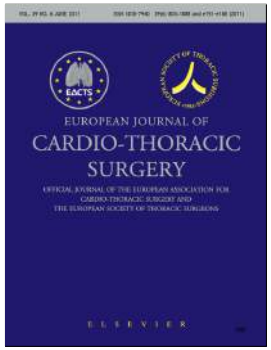
Dystrophic MR : *Survival advantage and improved durability …*

« Suri MR et al. Ann Thorac Surg 2006;82:819–27 »









Mitral valve surgery in octogenarians: should we fight for repair ?

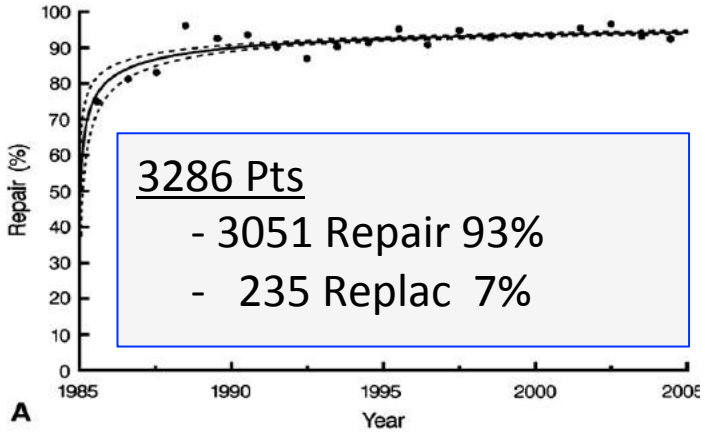
EJCTS 39 (2011) 875—880 J. Nloga…. JF Obadia.

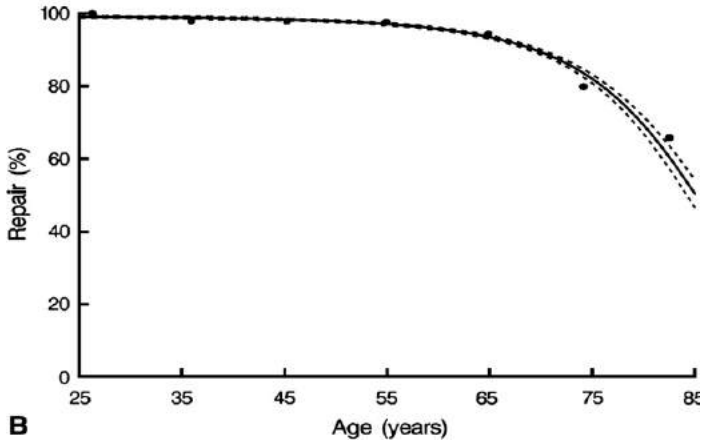
Table 4. Previous published studies for elderly mitral surgery.

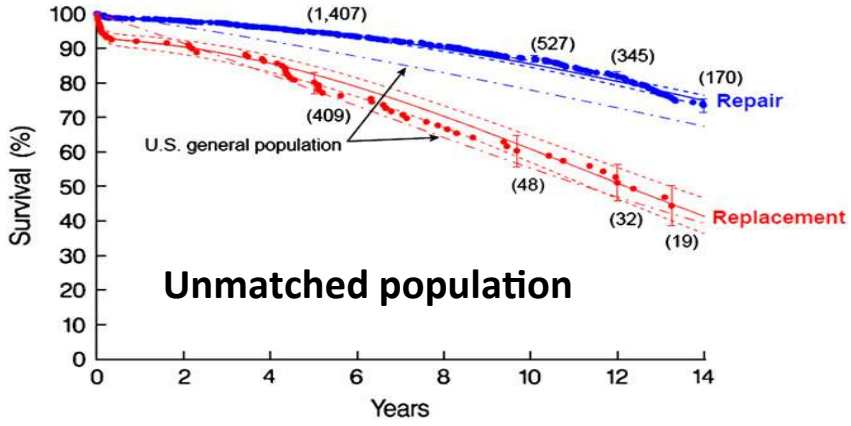
Authors, year [ref.]	No. of patients	Age of population	Type of surgery	Mortality	Conclusions
Ailawadi et al., 2008 [12]	117	≥75 years	Repair versus replacement	7.1% versus 23.4%	Mitral repair associated with lower mortality
Thourani et al., 2003 [9]	1250	≥55 years		10-year survival: 62% versus 46% $p < 0.0001$	Mitral repair increases 10-year survival
Nagendran et al., 2005 [15]	58	≥80 years	Repair versus replacement	15%	
Detaint et al., 2006 [19]	284	≥75 years	Mitral surgery	5-year survival: 57 ± 3%	
Gogbashian et al., 2006 [20]	292	≥70 years	Repair versus replacement	5-year survival: 81% versus 63%	
Lyon present study	129	≥80 years	Repair versus replacement	5-year survival: 62.1% versus 46.5%	Mitral replacement increases operative and late mortality

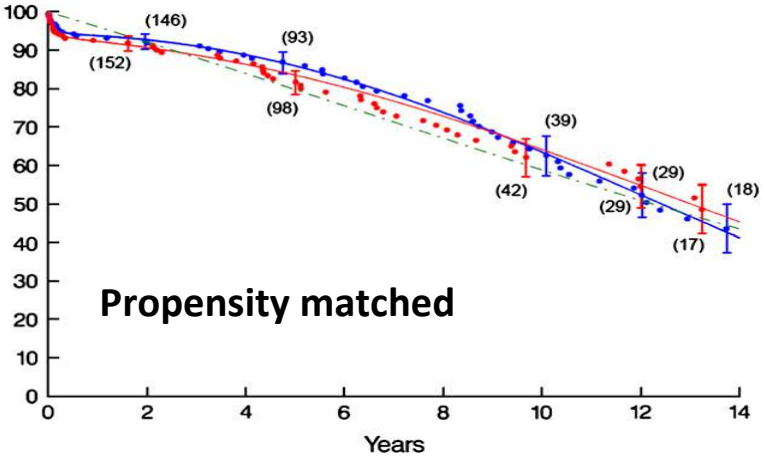
Valve repair versus valve replacement for degenerative mitral valve disease *J Thorac Cardiovasc Surg 2008;135:885-93*

A. Marc Gillinov, MD,[a] Eugene H. Blackstone, MD,[a,b] Edward R. Nowicki, MD,[a] Worawong Slisatkorn, MD,[a]









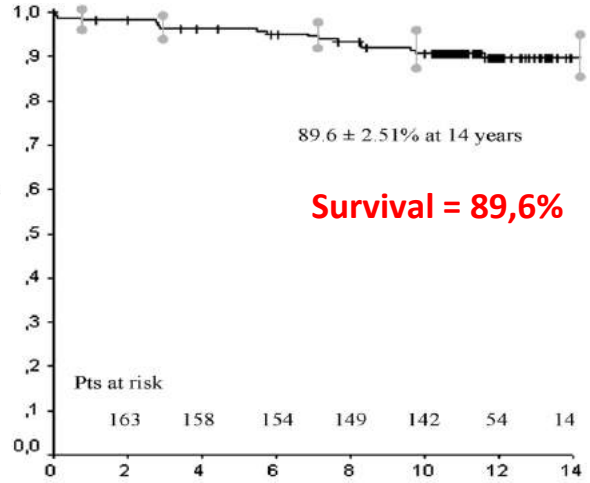
Very long-term results (up to 17 years) with the double-orifice mitral valve repair combined with ring annuloplasty for degenerative mitral regurgitation

J Thorac Cardiovasc Surg 2012;144:1019-26

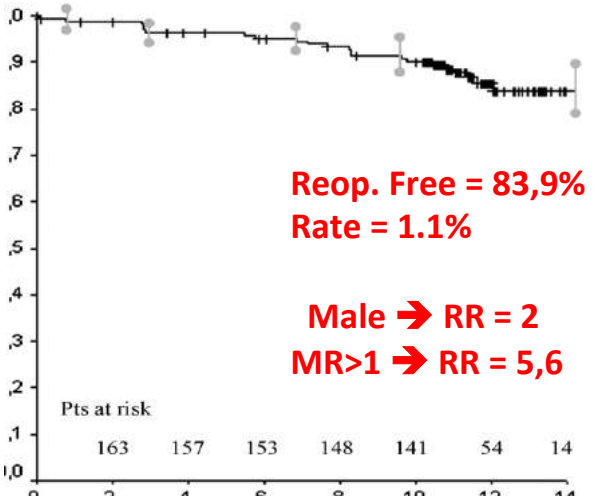
Michele De Bonis, MD,[a] Elisabetta Lapenna, MD,[a] Roberto Lorusso, MD, PhD,[b] Nicola Buzzati, MD,[a] Sandro Gelsomino, MD, PhD,[c] Maurizio Taramasso, MD,[a] Enrico Vizzardi, MD,[d] and Ottavio Alfieri, MD[a]

TABLE 1. Baseline characteristics of the patients and operative data

No. of patients	**174 Pts**
Age, y	53.2 ± 12.8
Male sex, n (%)	113 (64.9)
NYHA class, n (%)	
I	48 (27.5)
II	76 (43.6)
III	50 (28.7)
Atrial fibrillation at presentation, n (%)	30 (17.2)
Mechanism of MR, n (%)	
Flail/prolapse of both leaflets	128 (73.5)
Flail/prolapse of the anterior leaflet	36 (20.6)
Flail/prolapse of the posterior leaflet	10 (5.7)
Ejection fraction, %	59 ± 7.5
Ring used for mitral annuloplasty, n (%)	
Seguin St. Jude Medical	140 (80.4)
Carpentier-Edwards classic	34 (19.5)



Survival = 89,6%

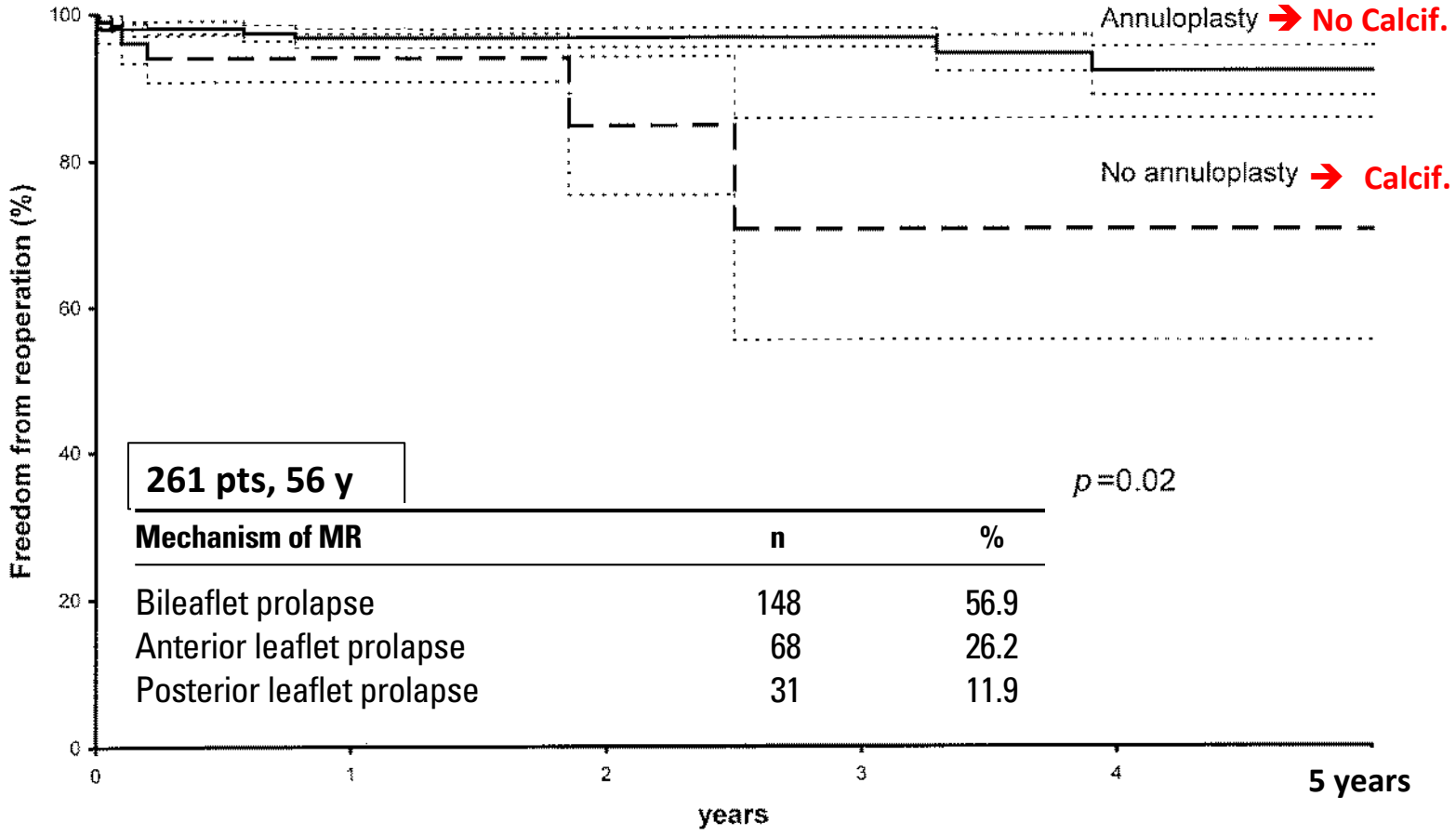


Reop. Free = 83,9%
Rate = 1.1%

Male → RR = 2
MR>1 → RR = 5,6

The double-orifice technique in mitral valve repair: A simple solution for complex problems. *J Thorac Cardiovasc Surg 2001;122:674-81*

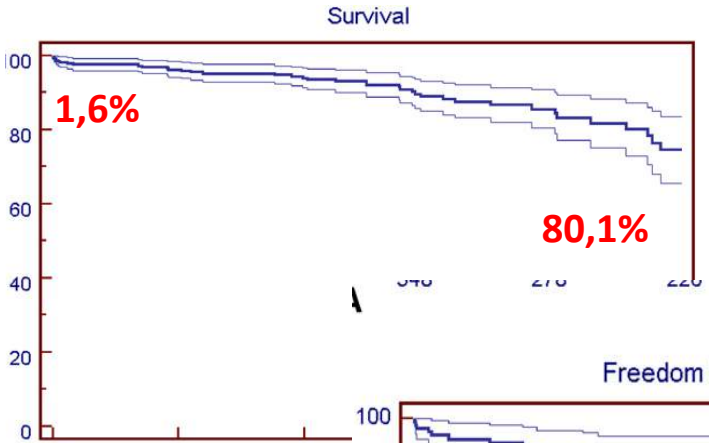
Ottavio Alfieri, MD Francesco Maisano, MD Michele De Bonis, MD



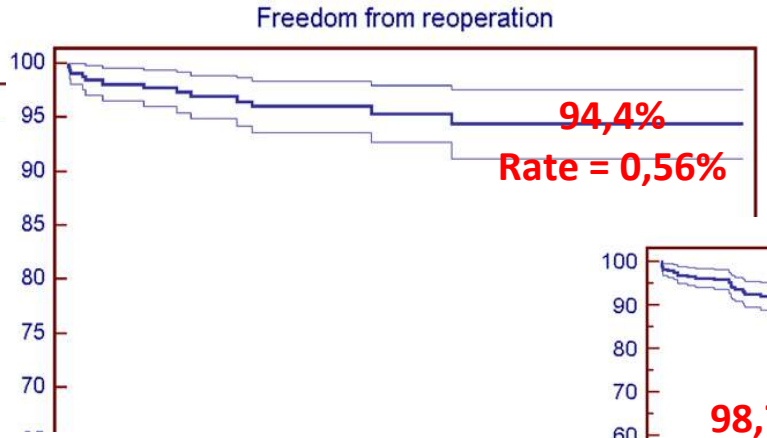
Durability of mitral valve repair in Barlow disease versus fibroelastic deficiency

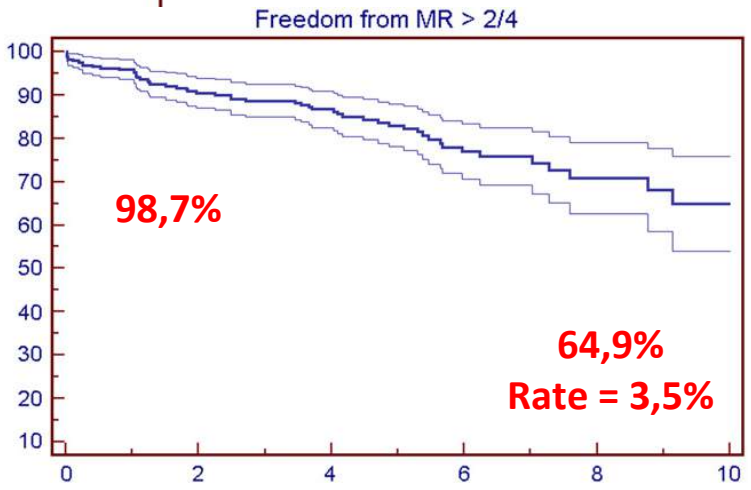
Willem Flameng, MD, PhD,[a] Bart Meuris, MD, PhD,[a] Paul Herijgers, MD, PhD,[a] and Marie-Christine Herregods, MD, PhD[b]

J Thorac Cardiovasc Surg 2008;135:274-82



6,25 x more Grade III/IV Than Reop.



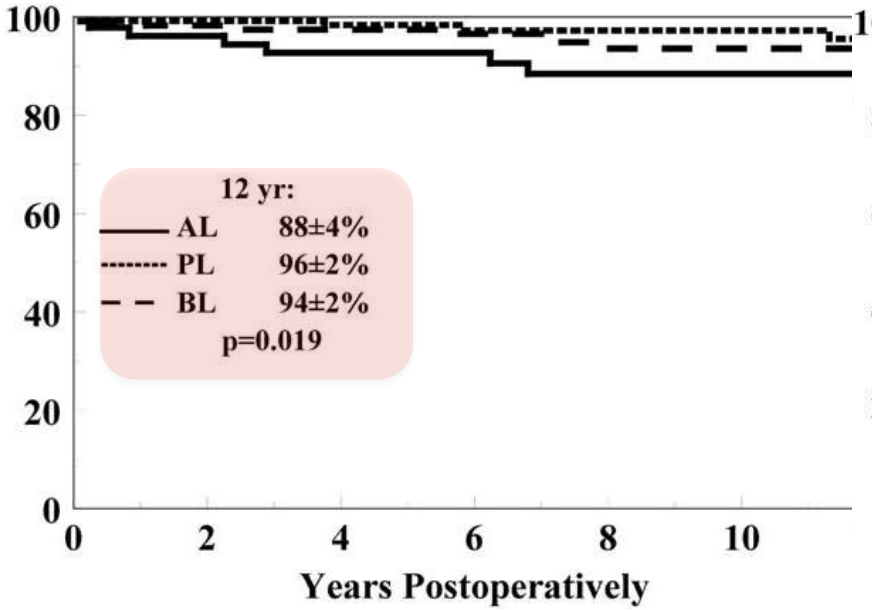


348 Pts ➔ 64 years old

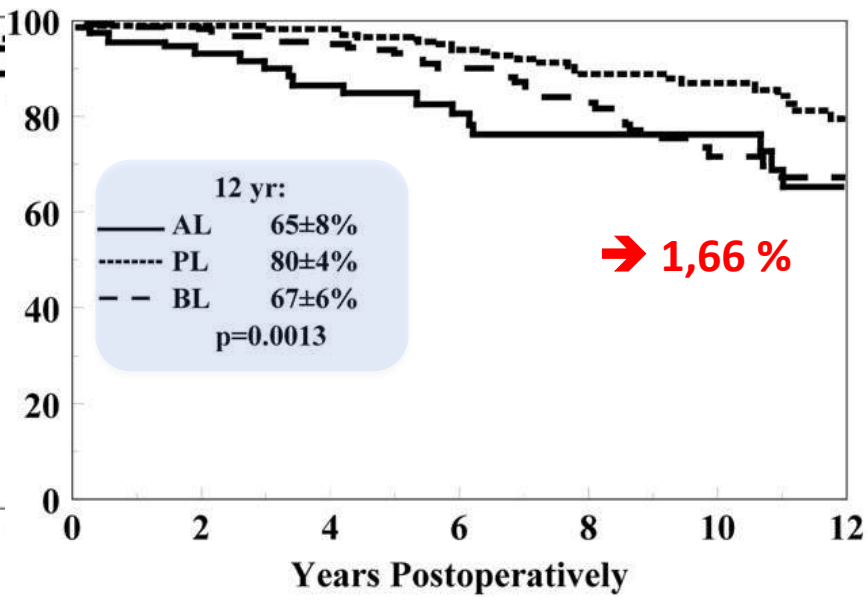
A comparison of outcomes of MVR for degenerative disease…

Toronto *« T David et al. J Thorac Cardiovasc Surg 2005;130:1242-9 »*

Freedom from re-operation



Freedom from MR > Grade II



- AL prolapse ➔ 7 years younger but more coronary, aortic, worse EF
- Rates of reoperation underscore the rates of failure of MVR

- **A comparison of outcomes of MVR for degenerative disease…**
  Toronto "***T David et al. Circulation 2013***"

Outcomes	1 year (95% CI)	5 years (95% CI)	10 years (95% CI)	15 years (95% CI)	20 years (95% CI)
*Competing risk**	100%	100%	100%	100%	100%
Valve-related death	0.3 (0.2-0.6)	1.7 (1.1-2.6)	3.7 (2.6-5.1)	6.7 (4.9-8.9)	11.3 (8.0-15.7)
Cardiac death (non-valve)	0.3 (0.2-0.5)	1.3 (0.8-2.1)	2.8 (1.9-4.2)	5.0 (3.6-7.0)	7.8 (5.2-11.7)
Non-cardiac death	0.4 (0.2-0.8)	2.6 (1.8-3.8)	7.4 (5.9-9.3)	14.8 (12.3-17.8)	23.7 (18.9-29.2)
Reoperation**	0.9 (0.7-1.3)	2.7 (1.9-3.6)	4.1 (3.0-5.6)	5.1 (3.8-7.0)	5.9 (4.3-8.0)
Alive & reoperation-free**	98.1 (97.2-98.7)	91.7 (88.2-94.2)	82.1 (76.5-86.5)	68.5 (61.2-75.0)	51.9 (43.0-60.6)
Freedom other outcomes					
All-cause mortality	98.9 (98.7-99.1)	94.1 (93.3-94.8)	85.8 (84.5-86.9)	72.5 (80.7-74.3)	54.8 (51.8-57.8)
Mitral reoperation	99.1 (98.7-99.3)	97.3 (96.4-98.1)	95.9 (94.4-97.0)	94.9 (93.0-96.2)	94.1 (92.0-95.7)
Mitral regurgitation					
Severe	99.6 (99.4-99.8)	97.9 (97.4-98.3)	95.5 (94.8-96.2)	93.1 (91.9-94.2)	90.7 (88.9-92.2)
Moderate/severe	99.3 (99.2-99.5)	96.3 (95.6-96.8)	90.4 (89.3-91.4)	81.3 (79.5-83.0)	69.2 (65.8-72.5)
Endocarditis	no event	99.4 (98.9-99.5)	99.0 (98.5-99.3)	98.5 (97.8-99.0)	98.5 (97.8-99.0)
Thromboembolism	97.9 (97.4-98.3)	94.0 (93.3-94.7)	90.8 (89.7-91.7)	88.1 (86.7-89.3)	85.7 (84.1-87.3)

* These are proportion of patients, freedom = 100 − (proportion of patients)

** Reoperation on the mitral valve

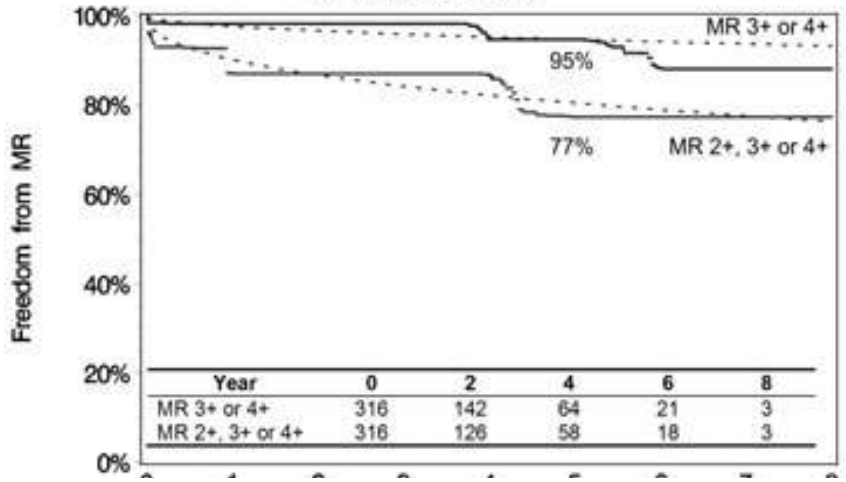
Grade III/IV ➔ 20 % à 15 ans

Late Echocardiographic and Clinical Outcomes after Mitral Valve Repair for Degenerative Disease

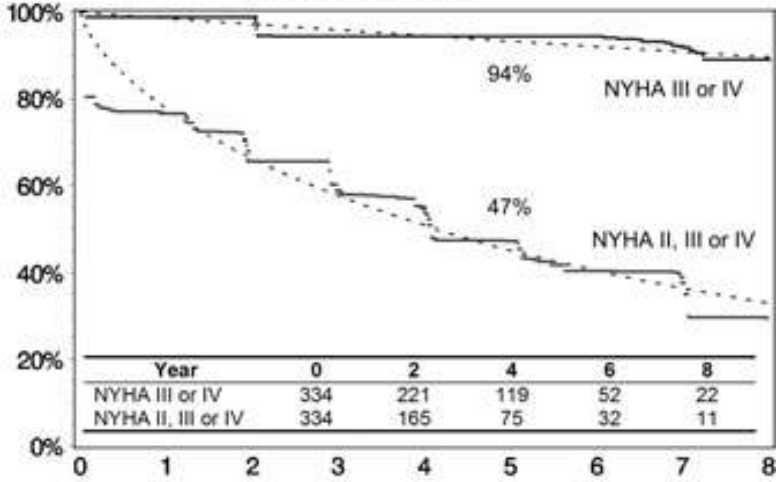
Louis-Mathieu Stevens, M.D., S.M.,* Arsène-Joseph Basmadjian, M.D.,† Denis Bouchard, M.D.,* Ismaïl El-Hamamsy, M.D.,* Philippe Demers, M.D.,* Michel Carrier, M.D.,* Louis P. Perrault, M.D., Ph.D.,* Raymond Cartier, M.D.,* and Michel Pellerin, M.D.*

403 MVR for dystrophic disease

Freedom from mitral regurgitation following mitral valve repair
(Tumbull's algorithm)

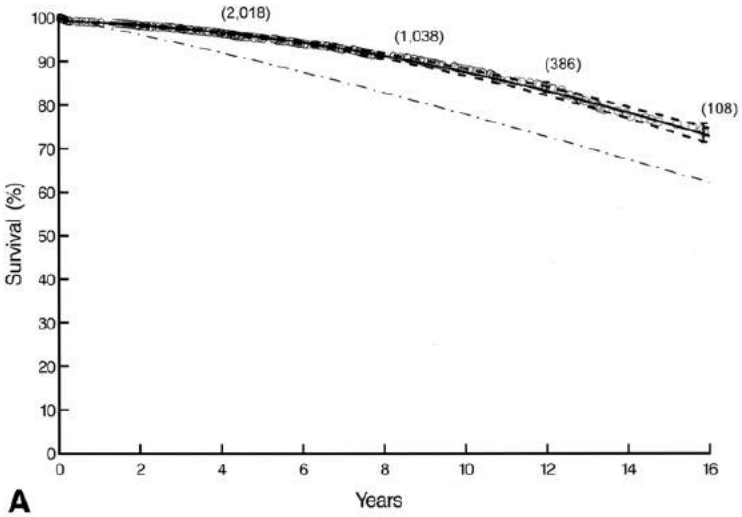


Freedom from dyspnea following mitral valve repair
(Tumbull's algorithm)



Surgical Repair of Posterior Mitral Valve Prolapse: Implications for Guidelines and Percutaneous Repair - *Cleveland Clinic* -

Douglas R. Johnston, MD, A. Marc Gillinov, MD, Eugene H. Blackstone, MD, Brian Griffin, MD, William Stewart, MD, Joseph F. Sabik III, MD, Tomislav Mihaljevic, MD, Lars G. Svensson, MD, PhD, Penny L. Houghtaling, MS, and Bruce W. Lytle, MD



Survival versus Matched population

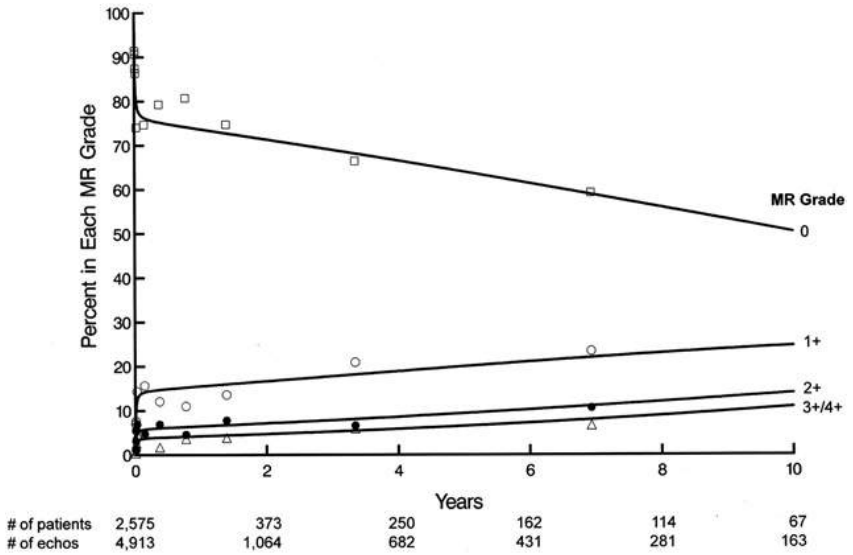
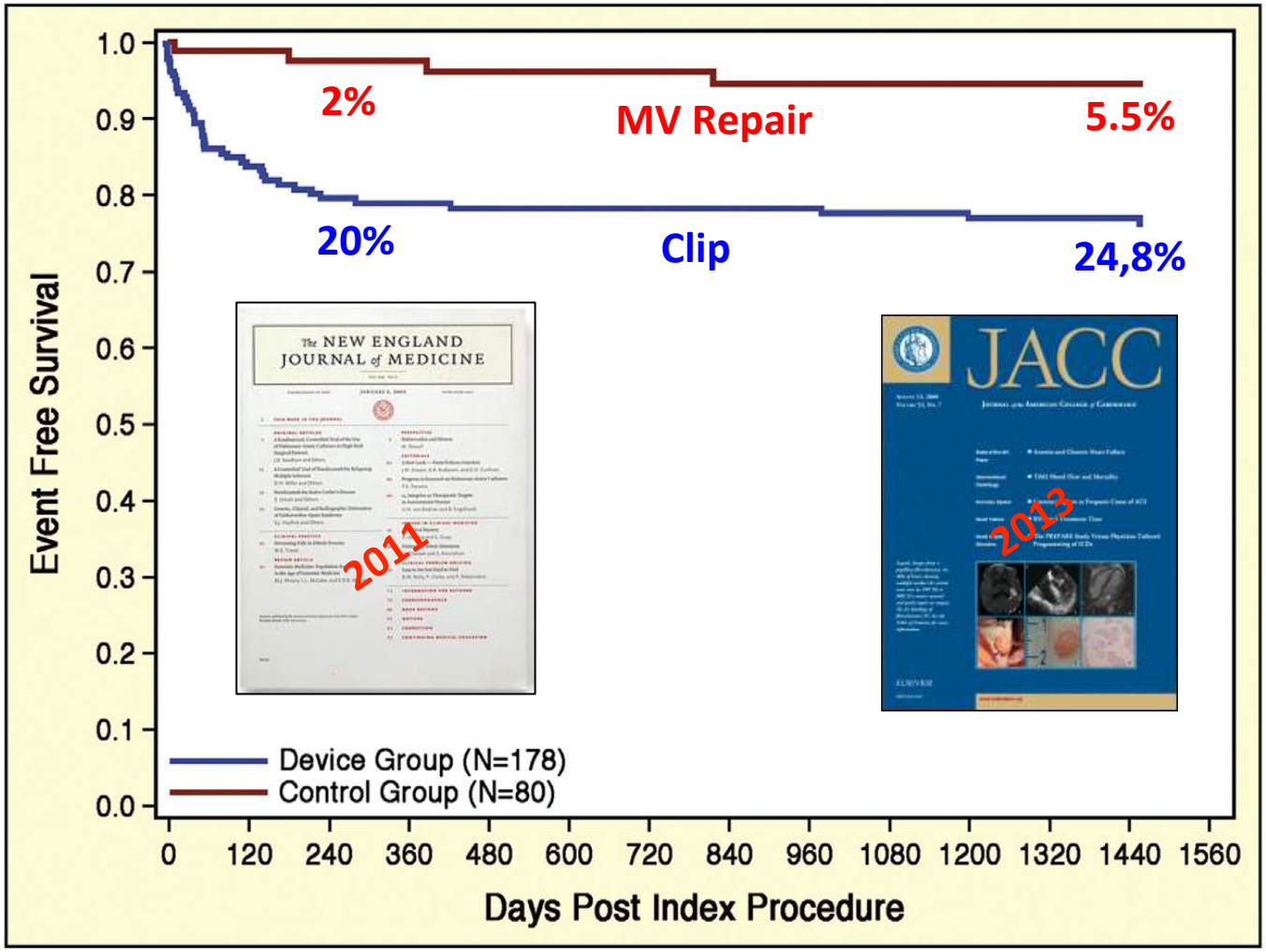


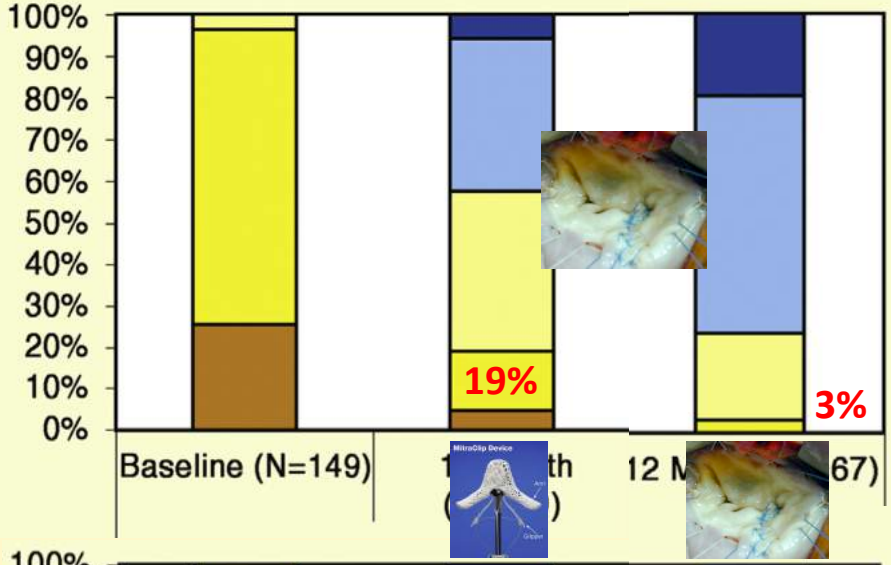
Fig 6. Temporal trend in return of postoperative mitral regurgitation (MR). Squares = no MR, open circles = 1+ MR, closed circles = 2+ MR, triangles = 3+/4+ MR.

EVEREST II *"Reoperation rate at 1 and 4 y"*

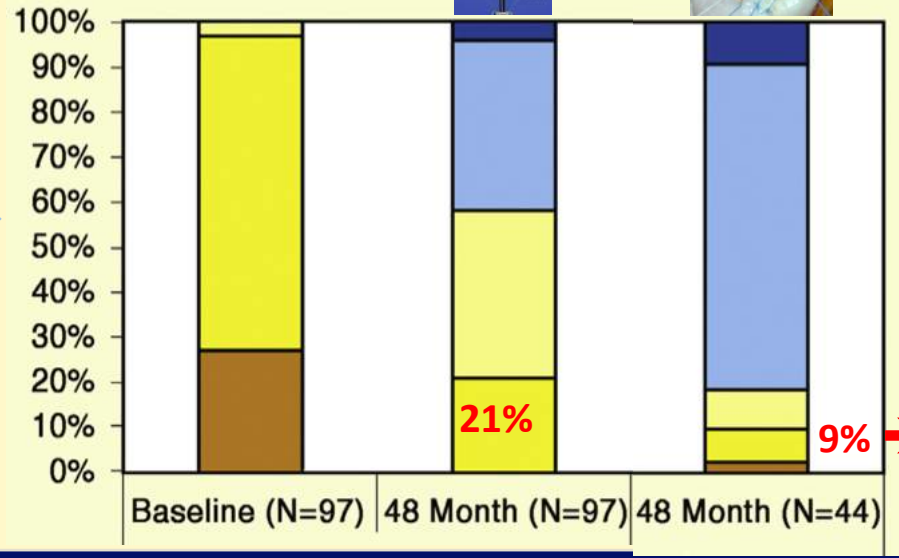


EVEREST II 279 Randomized patients

1 year



4 years



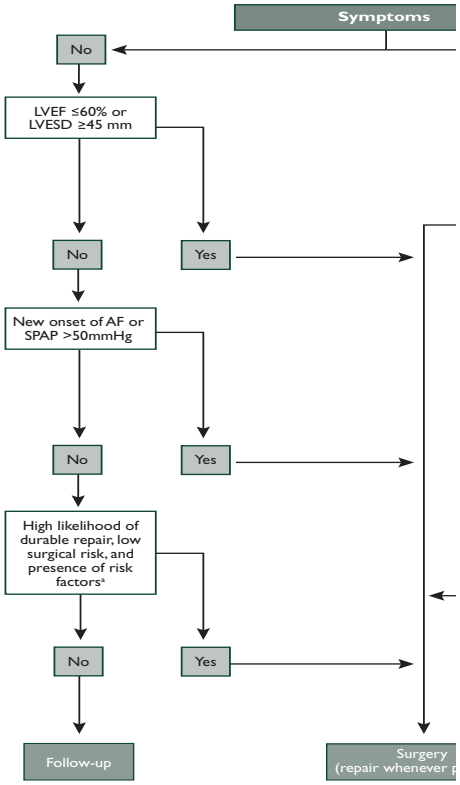
→ 2.3%/years

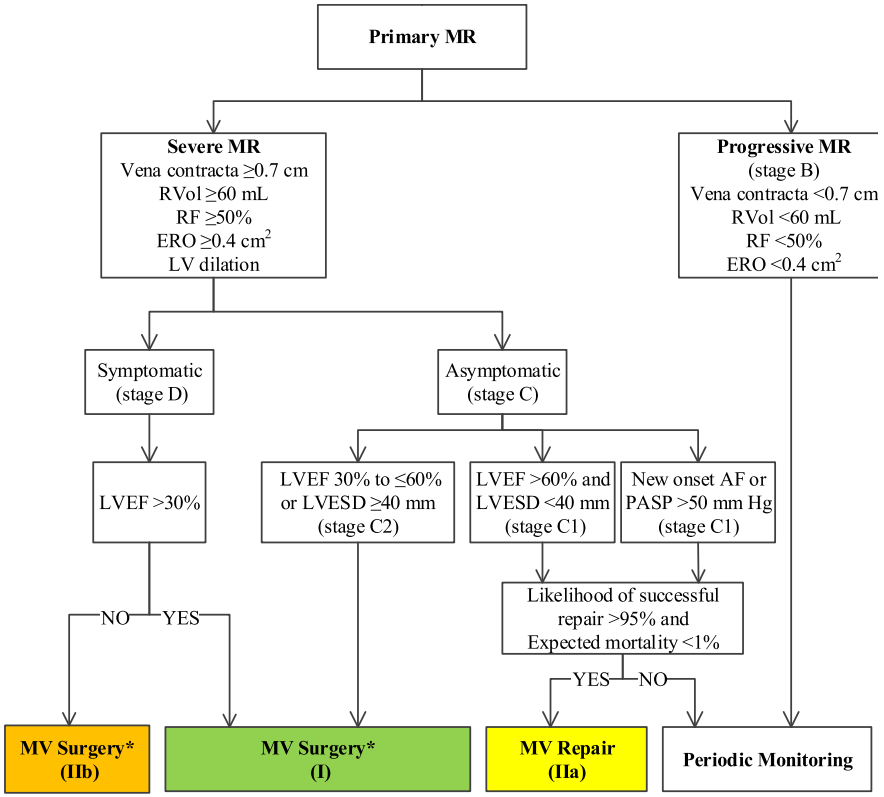
ESC-EACTS 2012

EUROPEAN SOCIETY OF CARDIOLOGY®

2014 AHA/ACC Guideline

1) Asymptomatic Patients : Primary MR





ESC-EACTS 2012

EUROPEAN SOCIETY OF CARDIOLOGY®

2) Low EF : Secondary MR

Table 12 Indications for surgery in severe primary mitral regurgitation

	Class [a]	Level [b]	Ref [c]
Surgery should be considered in patients with severe LV dysfunction (LVEF <30% and/or LVESD >55 mm) refractory to medical therapy with high likelihood of durable repair and low comorbidity.	IIa	C	
Surgery may be considered in patients with severe LV dysfunction (LVEF <30% and/or LVESD >55 mm) refractory to medical therapy with low likelihood of durable repair and low comorbidity.	IIb	C	

Table 13 Indications for mitral valve surgery in chronic secondary mitral regurgitation

	Class [a]	Level [b]
Surgery is indicated in patients with severe MR[c] undergoing CABG, and LVEF >30%.	I	C
Surgery should be considered in patients with moderate MR undergoing CABG.[d]	IIa	C
Surgery should be considered in symptomatic patients with severe MR, LVEF <30%, option for revascularization, and evidence of viability.	IIa	C
Surgery may be considered in patients with severe MR, LVEF >30%, who remain symptomatic despite optimal medical management (including CRT if indicated) and have low comorbidity, when revascularization is not indicated.	IIb	C

2014 AHA/ACC Guideline

2) Low EF : Secondary MR

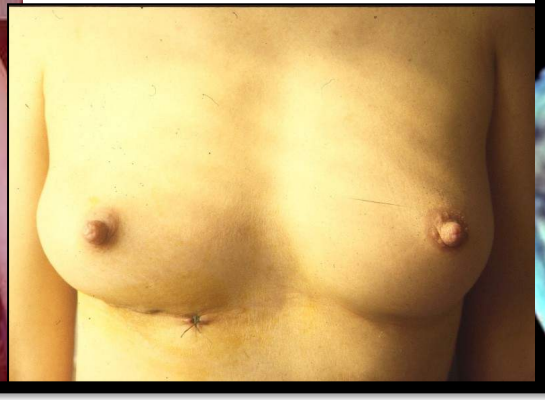
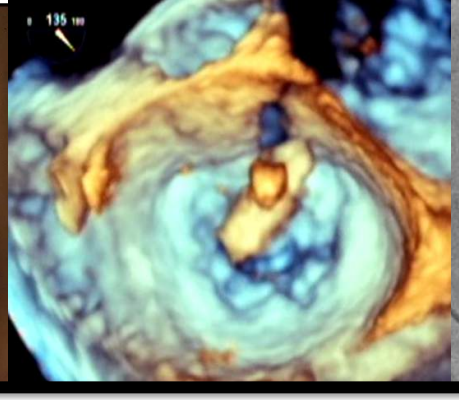
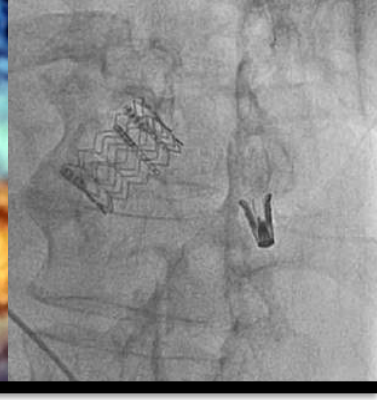
MV surgery may be considered in symptomatic patients with chronic severe **primary** MR and LVEF < 30% (stage D)	IIb	C	N/A
MV surgery may be considered for severely symptomatic patients (NYHA class III/IV) with chronic severe **secondary** MR (stage D)	IIb	B	(439,448-458)
MV repair may be considered for patients with chronic moderate **secondary** MR (stage B) who are undergoing other cardiac surgery	IIb	C	N/A

ESC-EACTS 2012 Recommendations for Low EF

6. 2. 4 Percutaneous Intervention : Experience of a limited number of patients in the Everest trial and from observational studies suggests that percutaneous edge-to-edge mitral valve repair is feasible—at low procedural risk—in patients with secondary MR in the absence of severe tethering and may provide short-term improvement in functional condition and LV function.136,137 These findings have to be confirmed in larger series with longer follow-up and with a rando- mized design. Data on coronary sinus annuloplasty are limited and most initial devices have been withdrawn.158

2014 AHA/ACC Guideline Recommendations for Low EF

IIb	B	(426)	Transcatheter MV repair may be considered for severely symptomatic patients (NYHA class III/IV) with chronic **severe primary MR** (stage D) who have a reasonable life expectancy but a prohibitive surgical risk because of severe comorbidities

Direct Annuloplasty + Respect ➔ less invasive techniques

Dystrophy is an ongoing process ➔ Several steps treatment

Wider range ➔ Less symptomatic and sickest patients

Global approach ➔ Heart Team

Logo and images BACKUP

Société Française de Cardiologie

EACTS

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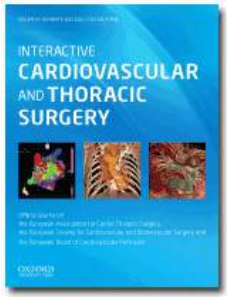

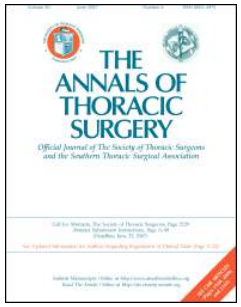

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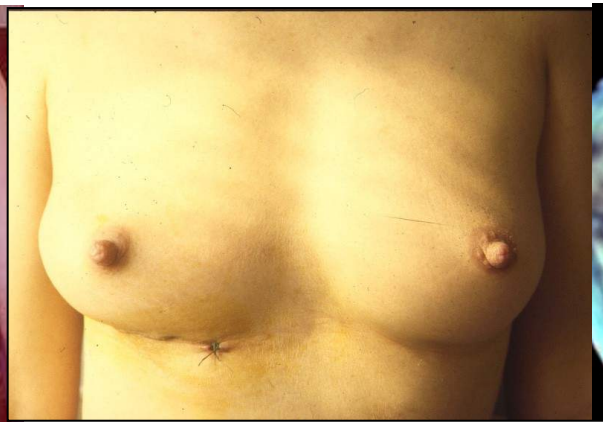
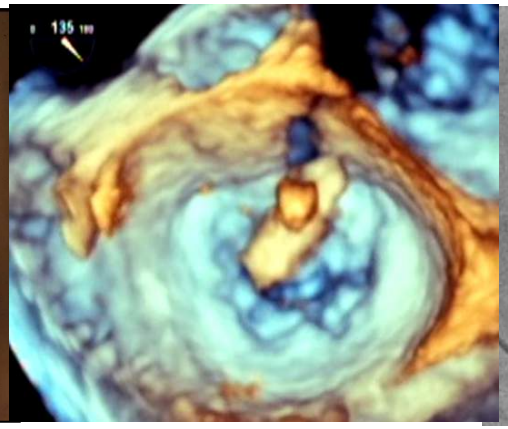

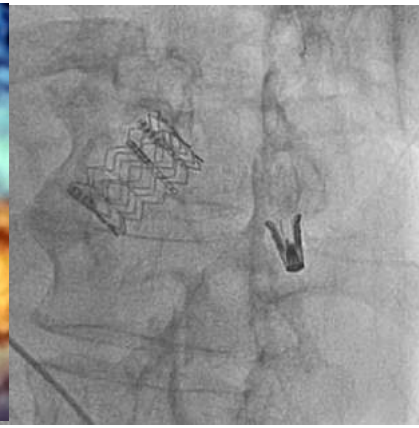

- **<u>Frequence</u> : Repair is "probably" better than Replacement**
- **<u>Survival rate</u> : excellent and close to reference population**
- **<u>Redo valve repair</u> : is rare 0.5 to 1.5 % / year (Re-repair > replacement)**
- **<u>Redo MR > grade II</u> : is under estimated 2 to 3 % / year**
- **<u>Follow up</u> : There is no "safe" period after which a patient can be deemed free of risk of repair failure ➔ Need for continued echocardiographic surveillance**