Technical Feasibility, Safety, and Clinical Outcome of Stenting of Unprotected Left Main Coronary Artery Bifurcation Narrowing

Seung-Jung Park, MD, PhD, FACC

Cardiovascular Center, Asan Medical Center
University of Ulsan, *Seoul, Korea*

***Seung-Jung Park Am J Cardiol* 2002;104:1609-1614**

PCI for LMCA Narrowing

- **Advances in techniques and equipment make it possible to expand the use of angioplasty to unprotected LMCA stenosis.**

***Seung-Jung Park Am J Cardiol* 2002;104:1609-1614**

LMCA Bifurcation Narrowing

- **It has been regarded as absolute contraindication of PCI because the occlusion of side branches could lead to disastrous clinical events.**

***Seung-Jung Park Am J Cardiol* 2002;104:1609-1614**

LMCA Bifurcation Narrowing

- **But, stenting was supposed to be safe and effective treatment in selected group of patients who have normal LV function and lesions confined to distal left main with large reference size.**

***Seung-Jung Park Am J Cardiol* 2002;104:1609-1614**

Purpose

- **This study was performed to evaluate the acute and long-term clinical results of stenting for unprotected LMCA lesions.**

Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

Subjects

- **From Nov 1995 to Nov 2001, 63 consecutive patients with unprotected LMCA bifurcation lesions who underwent stenting with (n=32) or without debulking atherectomy (n=31).**

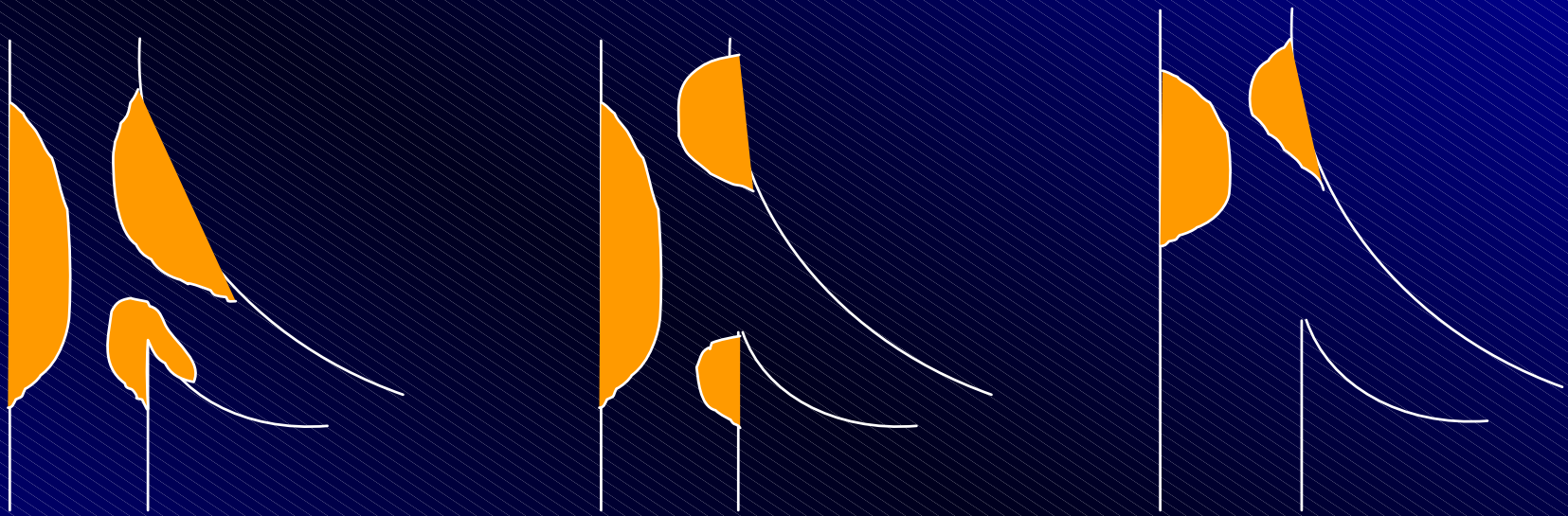
Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

Inclusion Criteria

- Good Candidate for Surgery
  (Diameter stenosis ≥ 50% involving both a LMCA and/or the ostium of LAD or LCX with Objective Ischemia)
- Normal LV function

Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

Bifurcation Types



Type 1 Type 2 Type 3

Lefevre T. Cathet Cardiovasc Intervent 2000;49:274-83

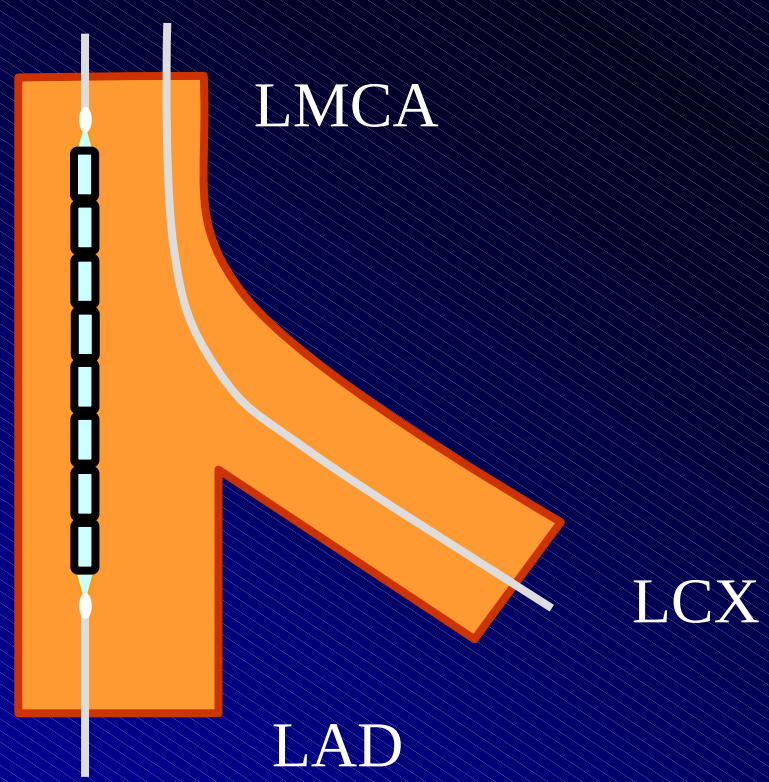
PCI Strategy for Bifurcation lesion

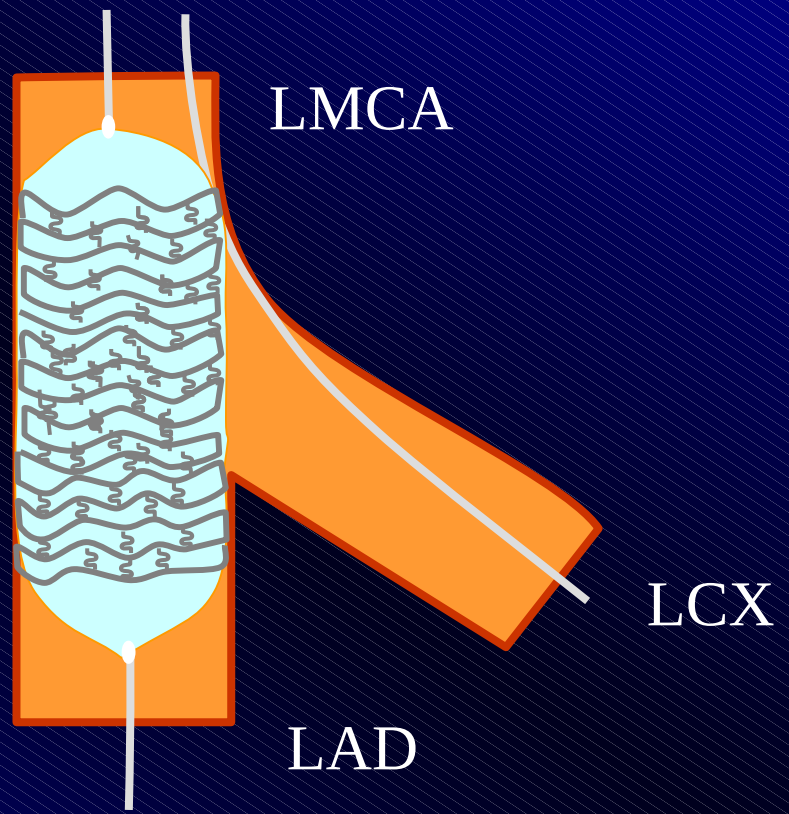
- Stenting with or without debulking
- Stenting cross over LCX with optional kissing balloon inflation
- T(Y)-stent technique
- Kissing stent technique
- Bifurcation stent (SLK-View stent)

Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

Stenting Cross Over

Tube stenting cross over LCX with optional kissing balloon dilatation

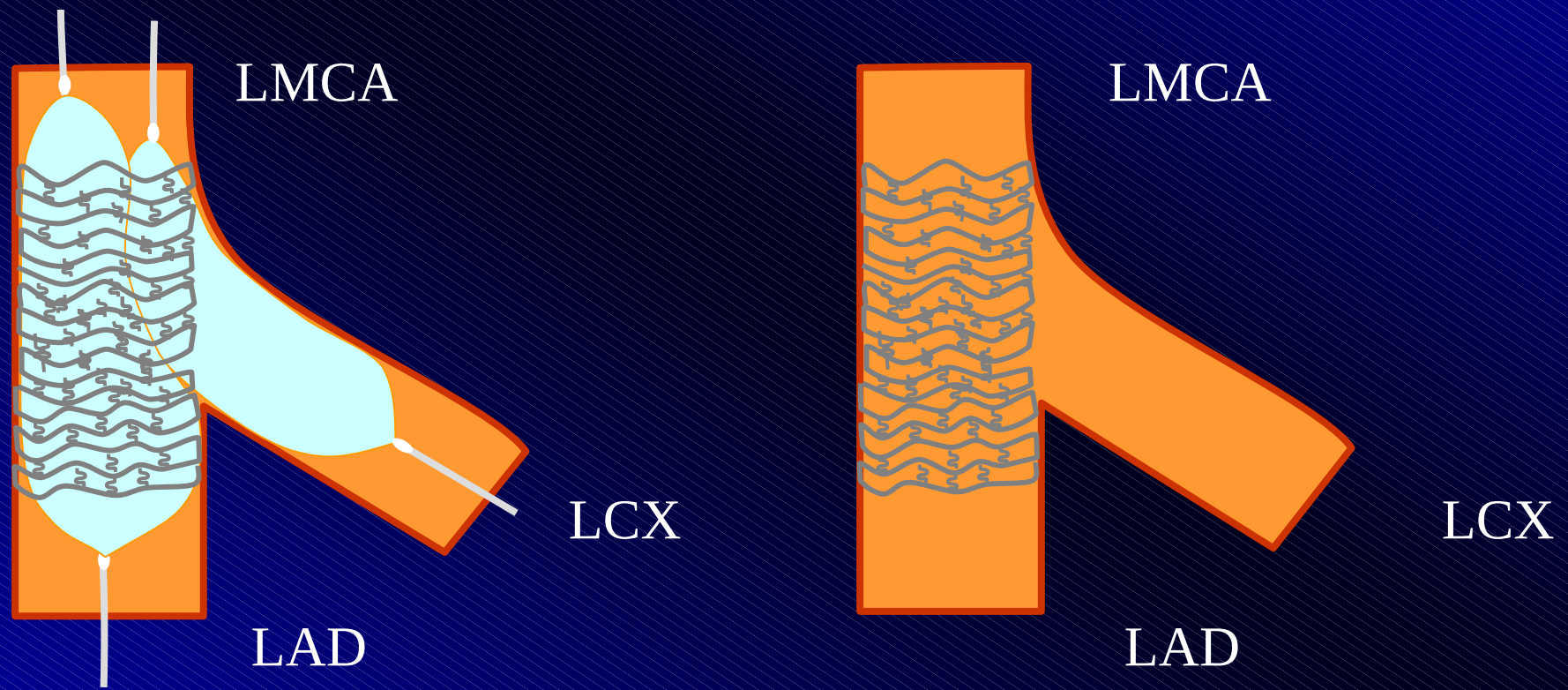




Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

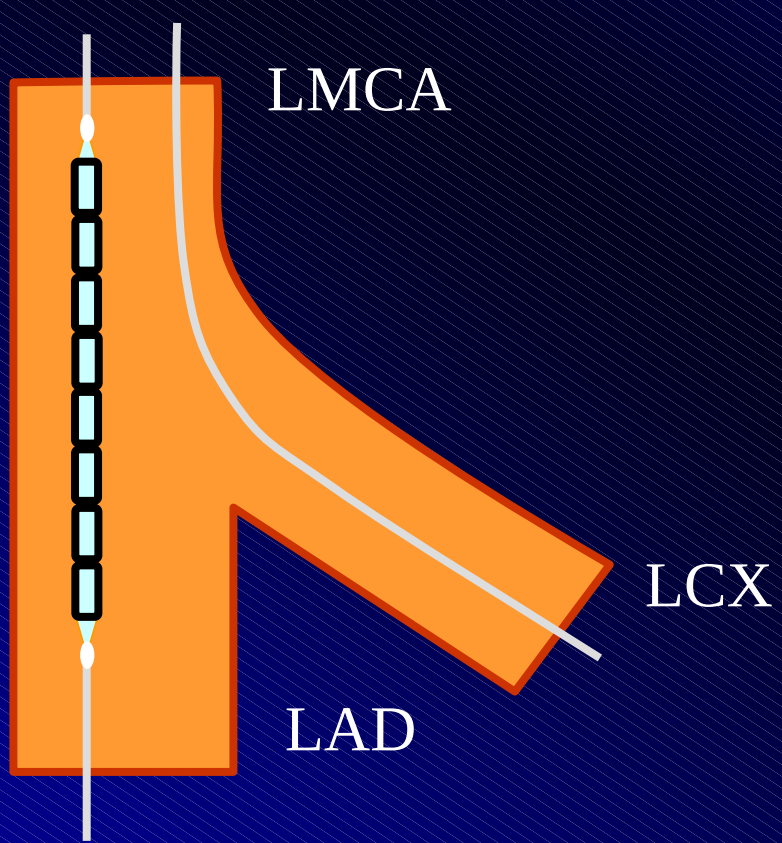
Stenting Cross Over

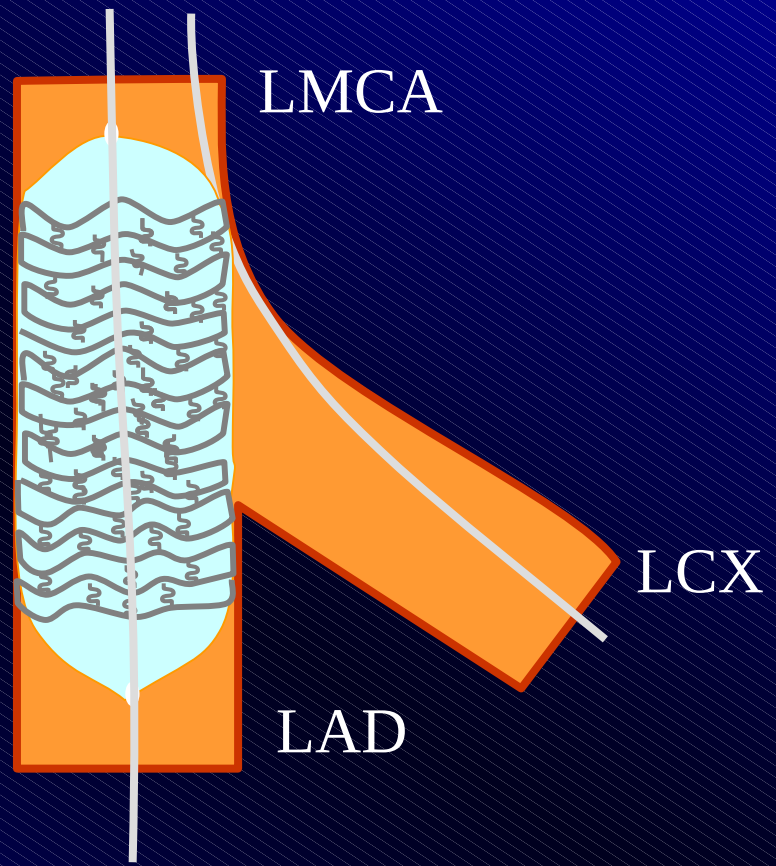
Tube stenting cross over LCX with optional kissing balloon dilatation



Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

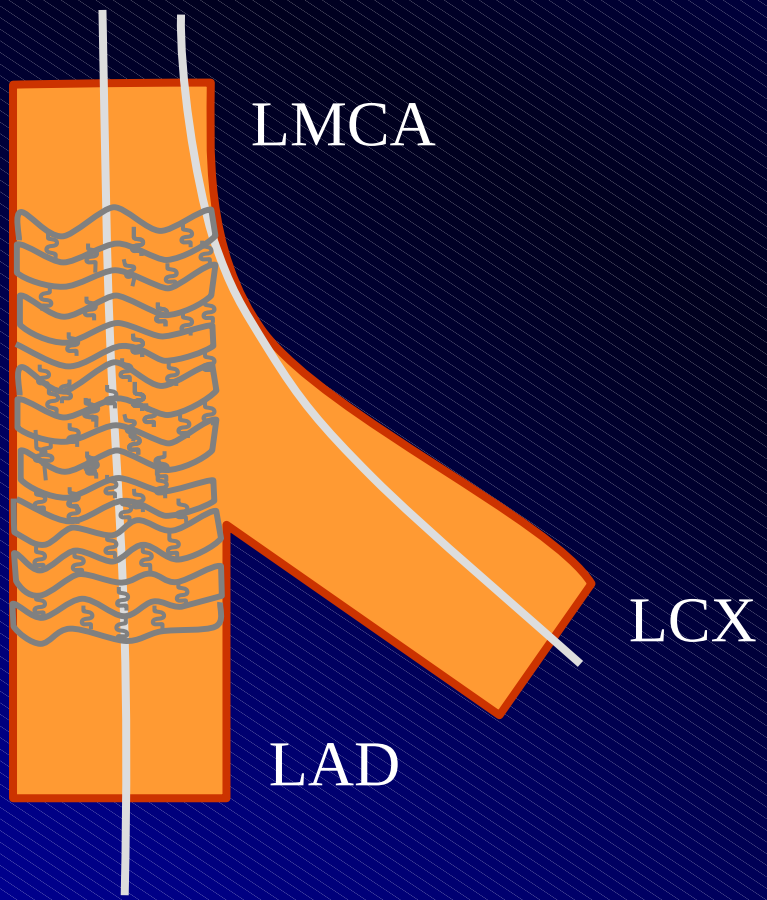
T Stenting

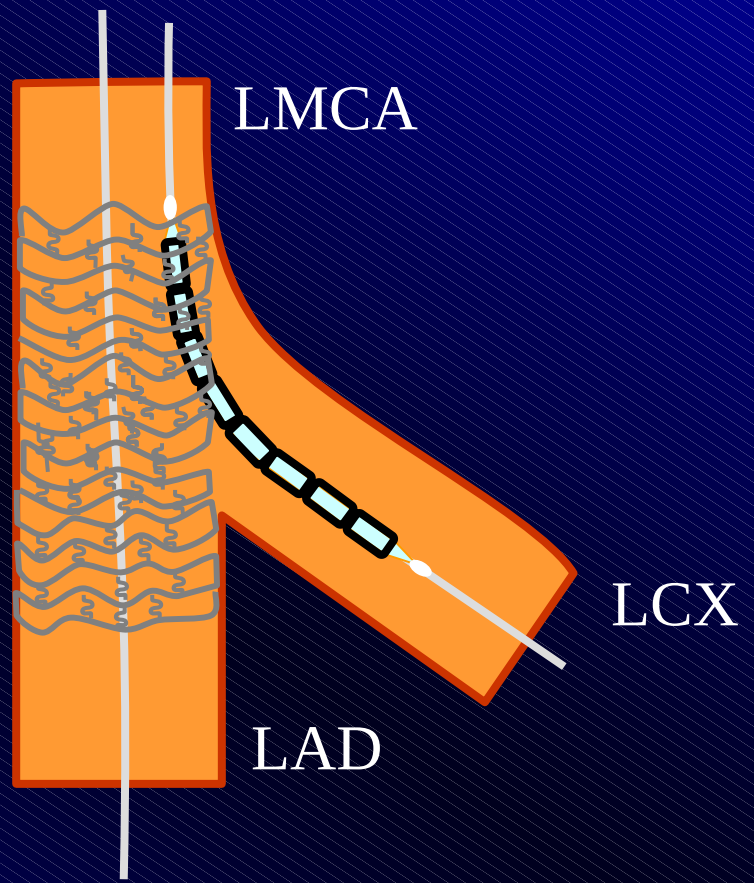




Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

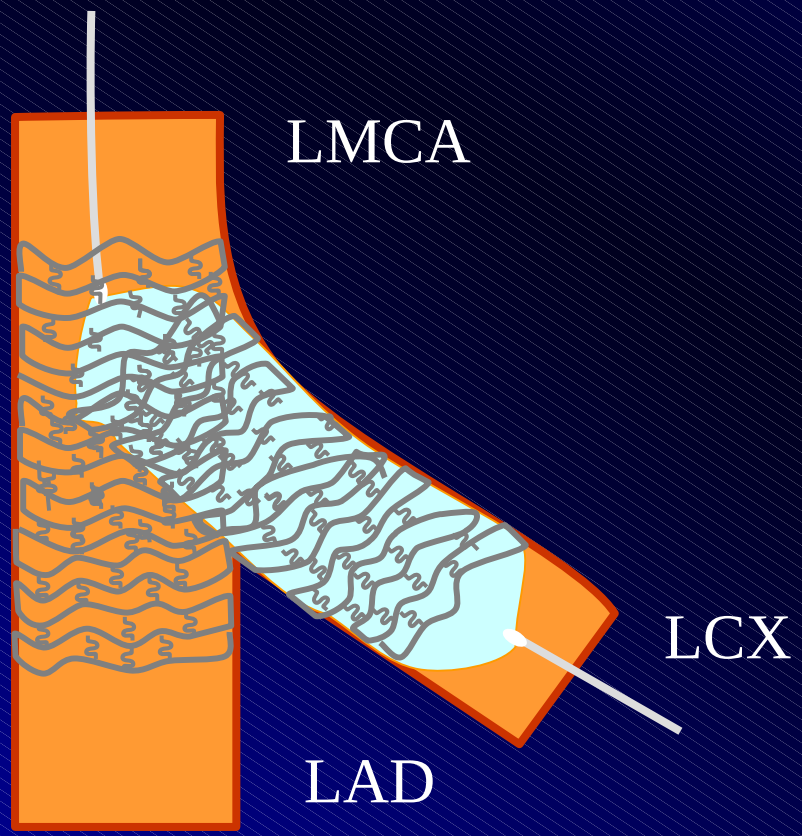
T Stenting

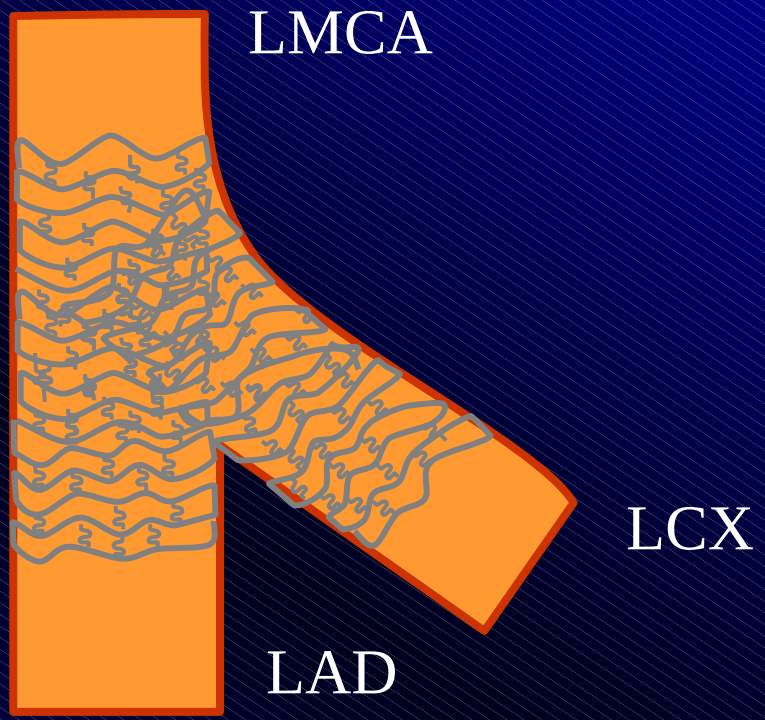




Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

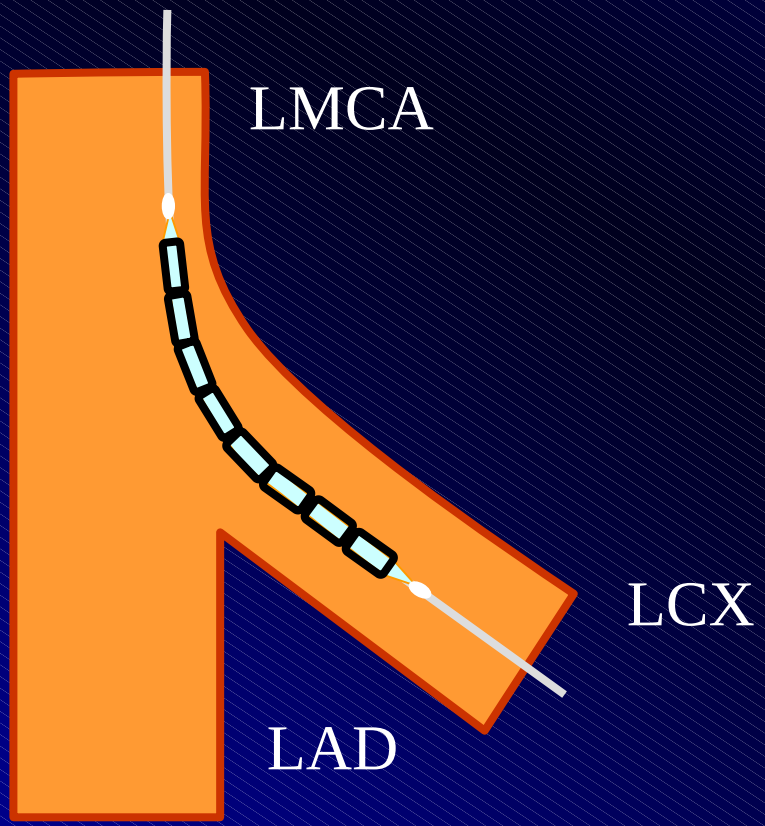
T Stenting

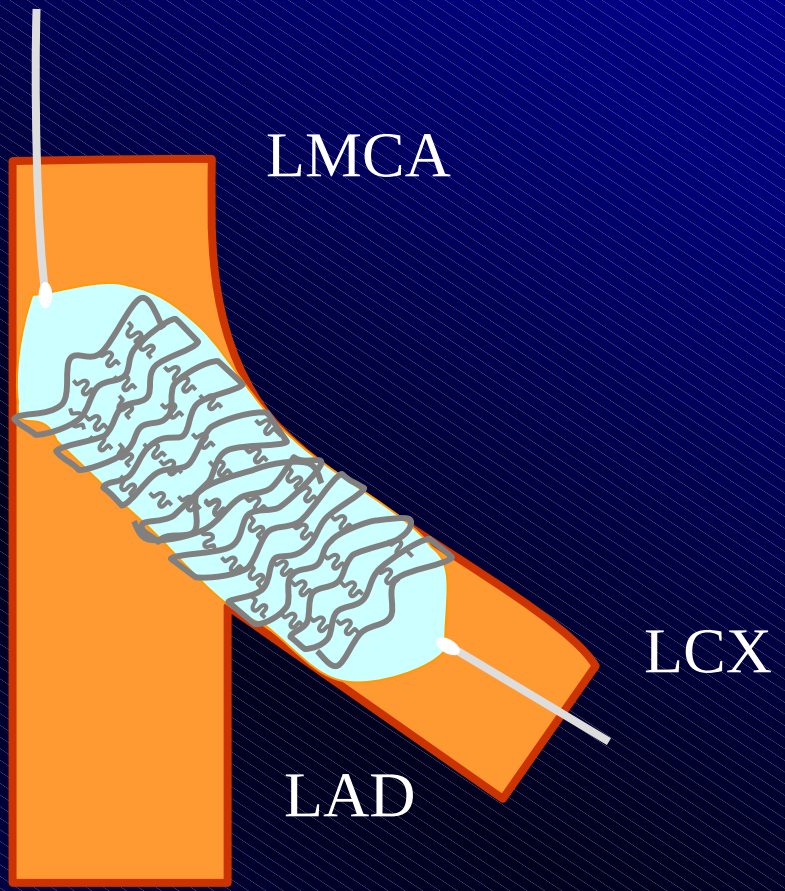




Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

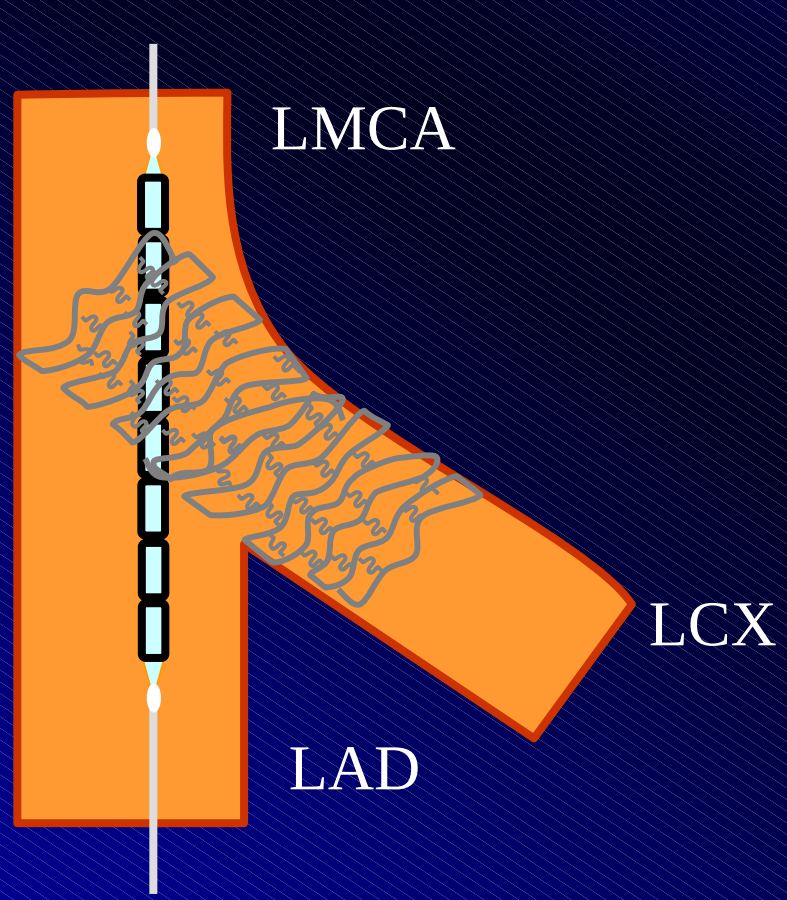
Y (Culotte) Stenting

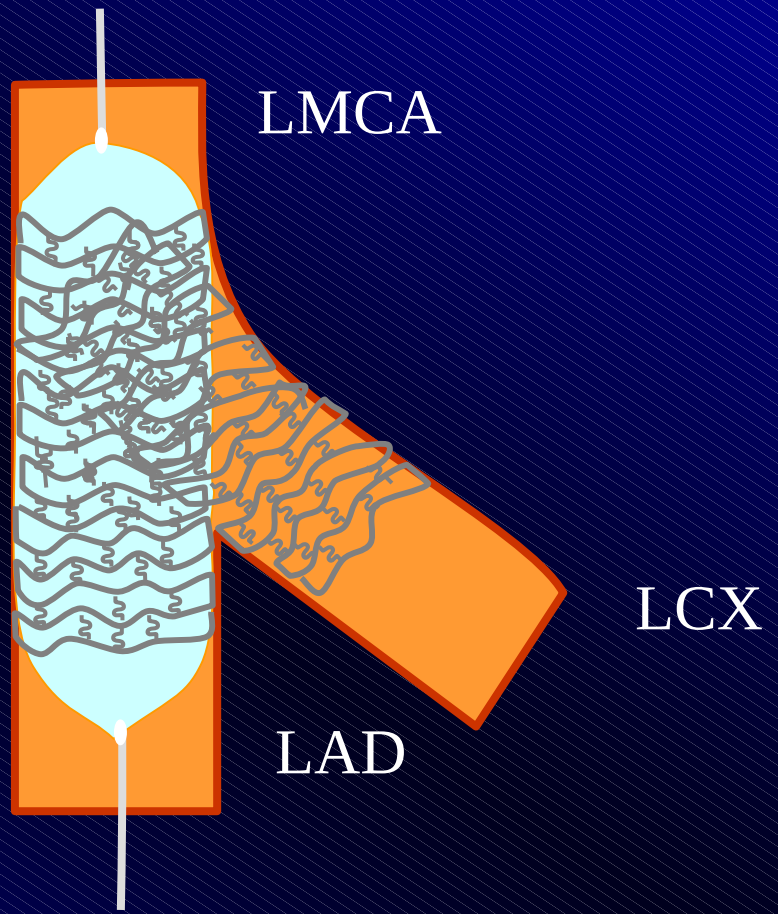




Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

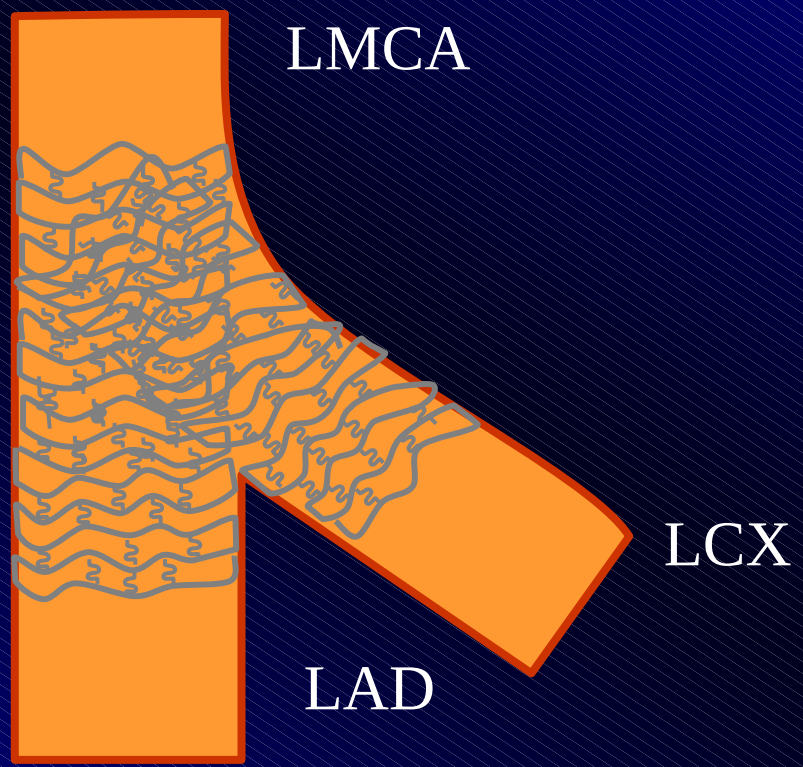
Y (Culotte) Stenting





Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

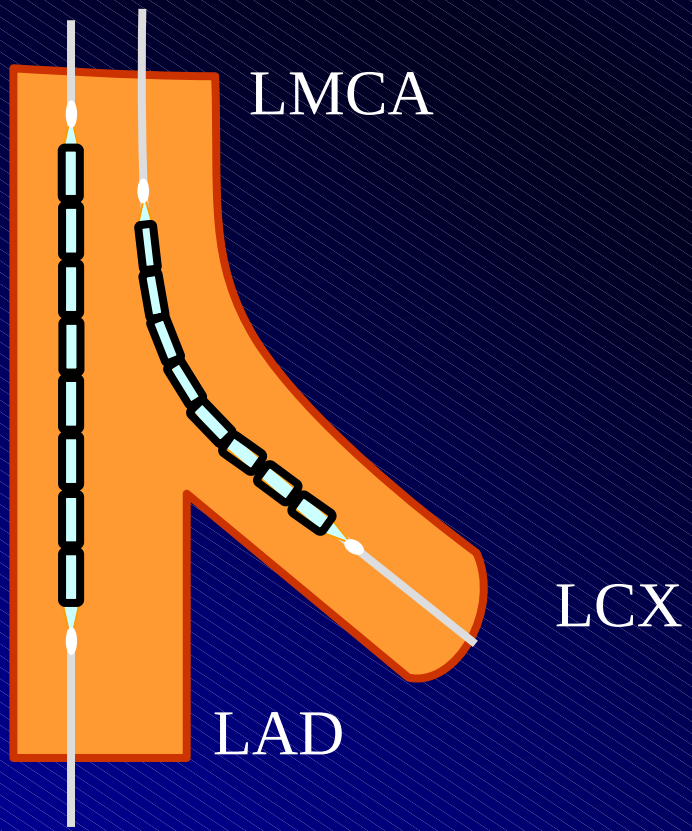
Y (Culotte) Stenting

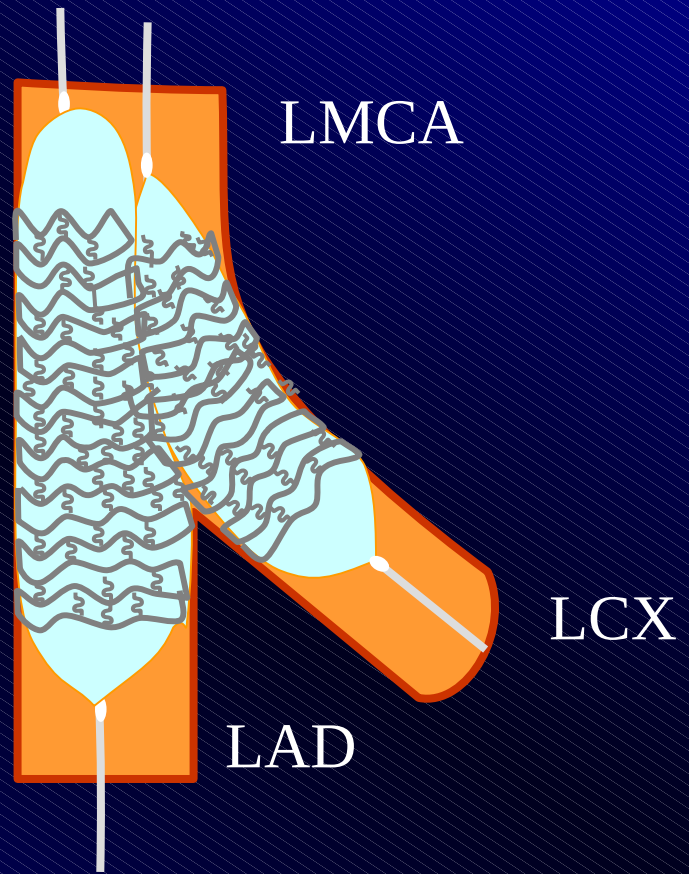


Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

Kissing Stenting

Kissing stents with optional stent on the Main

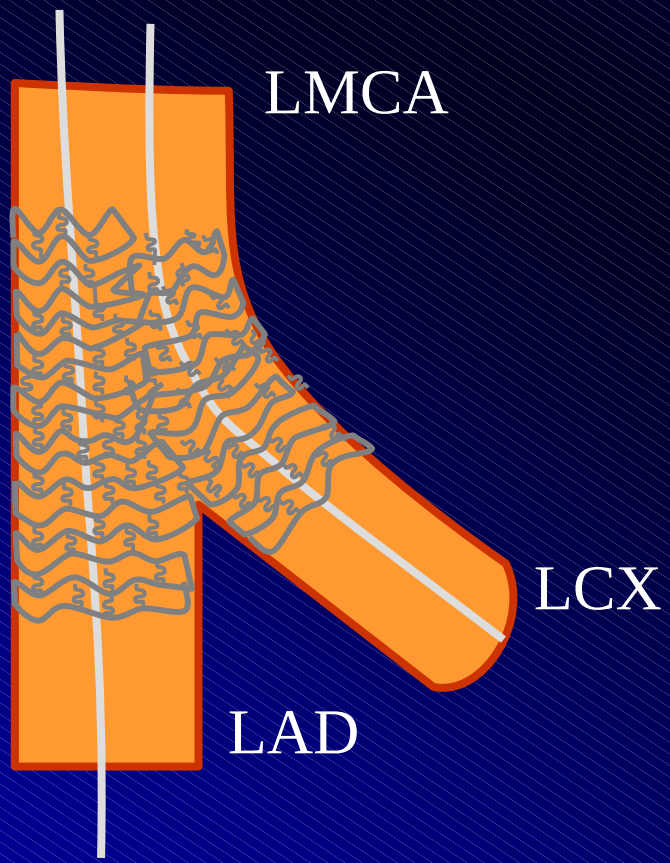


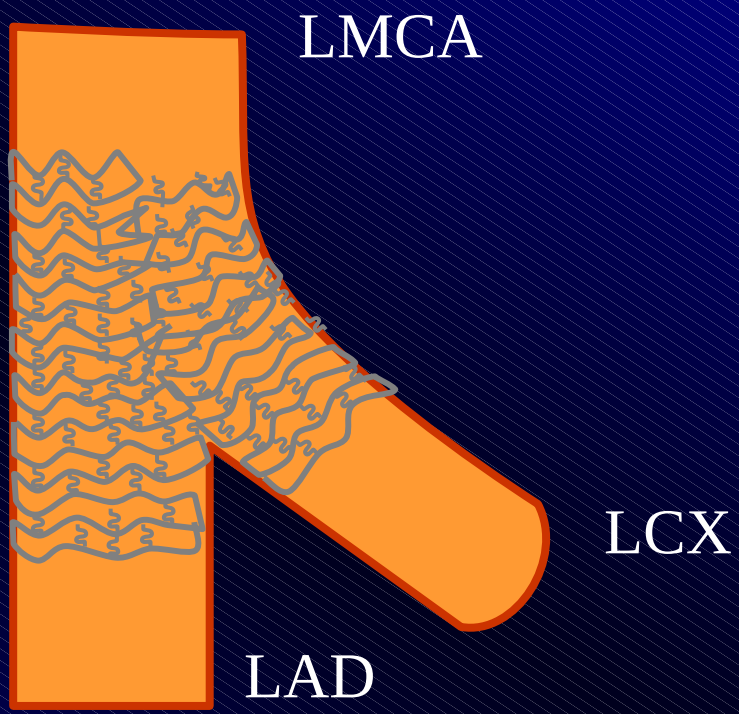


Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

Kissing Stenting

Kissing stents with optional stent on the Main

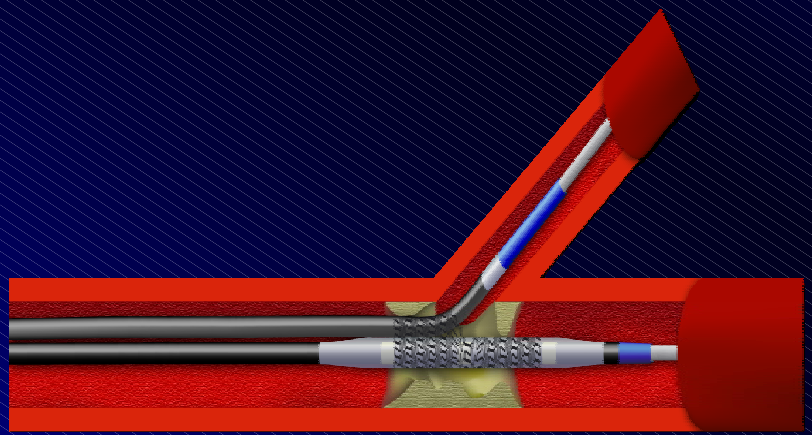


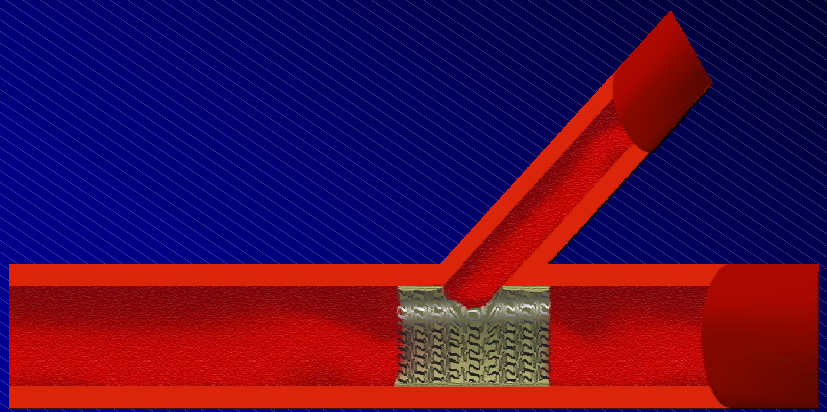


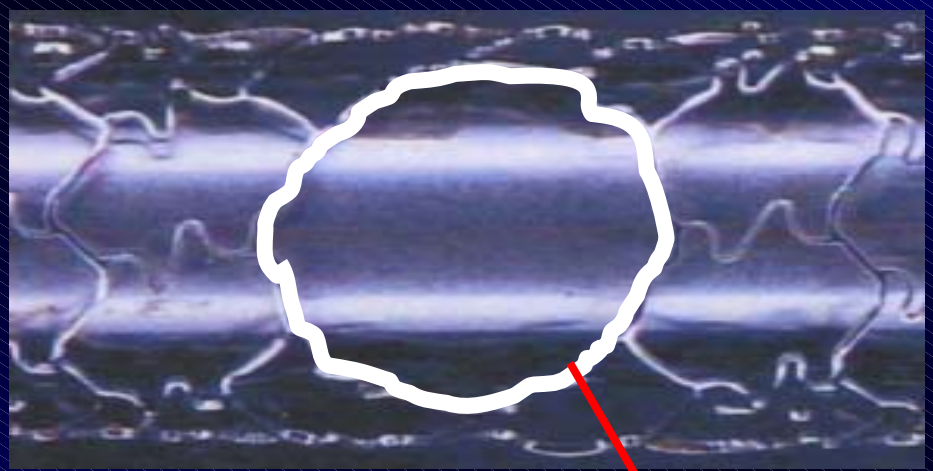
Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

Bifurcation Stent

SLK-View Stent







Side hole

Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

Initial Outcomes

Procedural Success Rate: **100 %**

In-Hospital Clinical Complications

Death	0%
Stent thrombosis	0%
Q wave myocardial infarction	0%
Emergency CABG	0%

Seung-Jung Park Am J Cardiol 2002;104:1609-1614

Clinical Characteristics

Age	58 ± 10
Male / women	53 / 10
Systemic hypertension	20 (33%)
Diabetes mellitus	14 (22%)
Total cholesterol > 200mg/dL	28 (44%)
Current smoker	31 (49%)
Unstable angina pectoris	41 (65%)

Seung-Jung Park Am J Cardiol 2002;104:1609-1614

Angiographic Characteristics

Extent of coronary disease	
Left main only	53 / 10
left main and RCA	20 (33%)
Bifurcation types	
Type 1	27 (43%)
Type 2	29 (46%)
Type 3	7 (11%)

Seung-Jung Park Am J Cardiol 2002;104:1609-1614

Angiographic Characteristics

(mm)	Parent vessel	Side branch
Reference artery		
Proximal	4.4 ± 0.7	
Distal	3.8 ± 0.6	3.0 ± 0.8
Mean	3.3 ± 0.7	
MLD		
Baseline	1.1 ± 0.5	2.0 ± 1.0
Final	4.1 ± 0.7	2.7 ± 0.8
Follow-up	2.8 ± 1.0	1.9 ± 0.9

Seung-Jung Park Am J Cardiol 2002;104:1609-1614

Angiographic Characteristics

(%)	Parent vessel	Side branch
Diameter stenosis		
Baseline	70.9 ± 12.7	33.8 ± 27.6
Final	-8.6 ± 15.8	9.9 ± 19.5
Follow-up	26.4 ± 25.9	36.9 ± 26.5

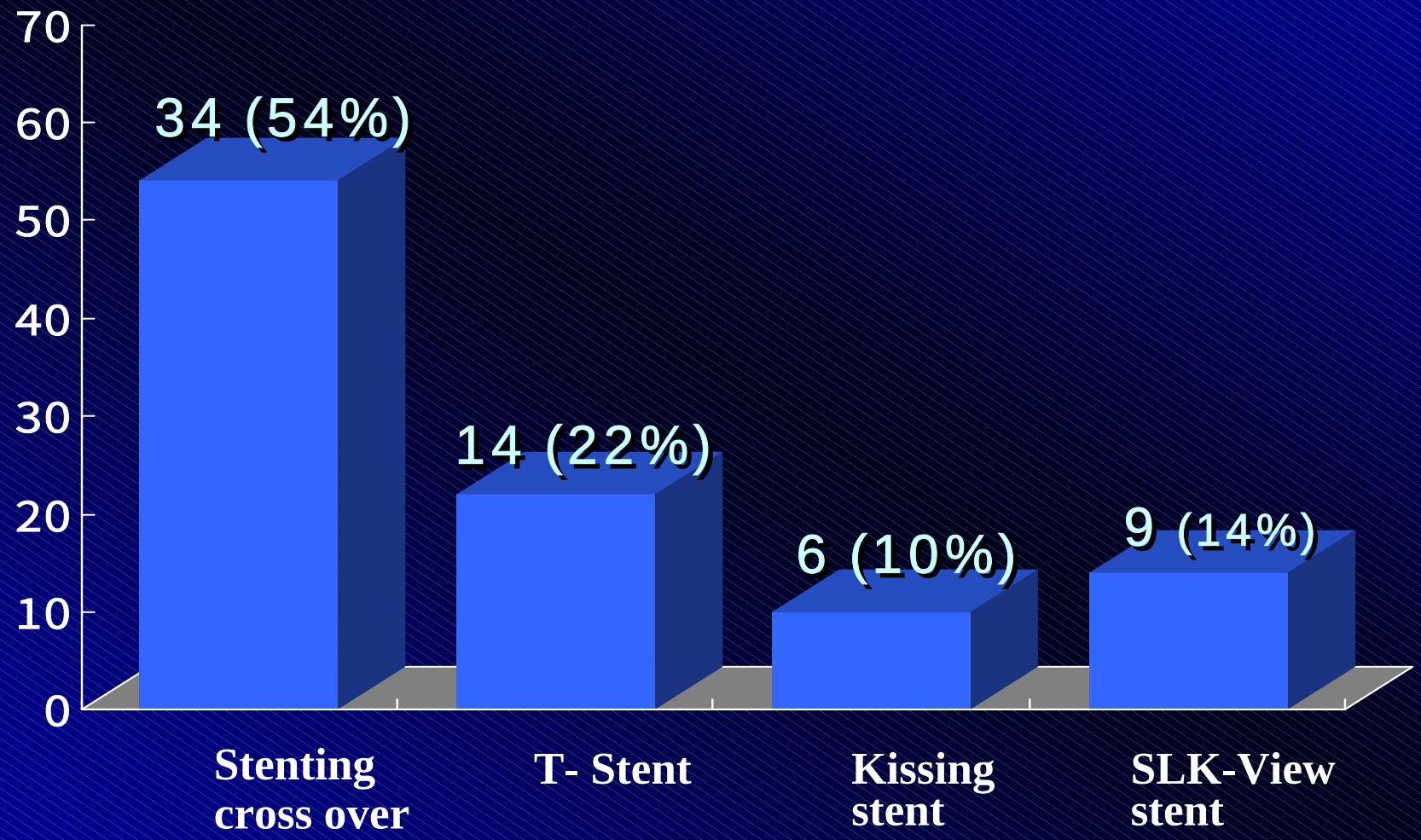
Seung-Jung Park Am J Cardiol 2002;104:1609-1614

Procedural Data

	Parent vessel	Side branch
Maximum pressure (atm)	15.0 ± 2.5	
Stent use	63 (100%)	22 (35%)
Debulking procedure	32 (51%)	6 (10%)

Seung-Jung Park Am J Cardiol 2002;104:1609-1614

Different Technique



Seung-Jung Park Am J Cardiol 2002;104:1609-1614

Angiographic Restenosis

6-Month follow-up rate :
86% (43 / 50 eligible patients)

Parent vessel only : 14%
Side branch only : 9%
Both restenosis : 5%
Overall restenosis : 28%

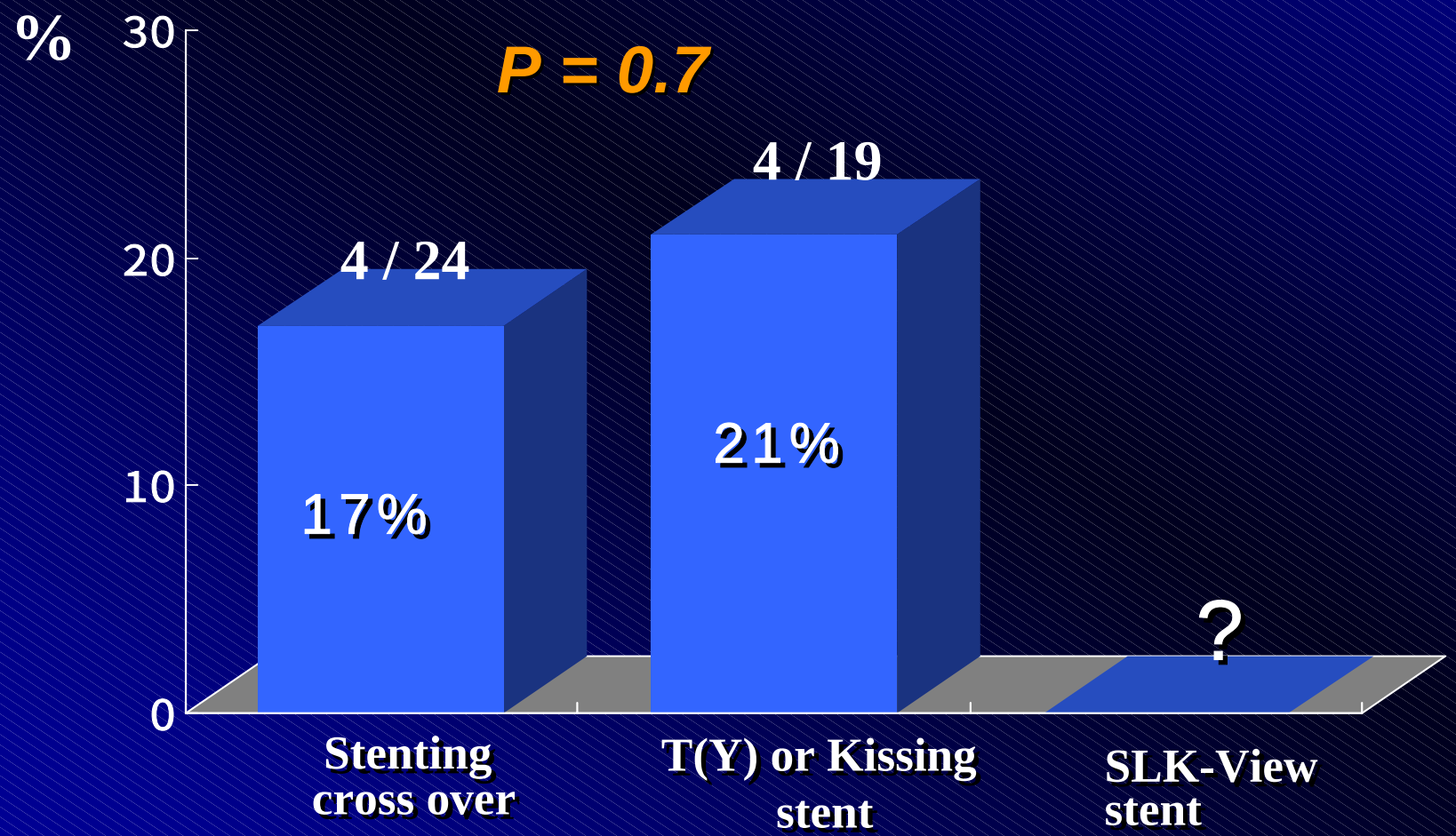
Seung-Jung Park Am J Cardiol **2002;104:1609-1614**

Predictors of Restenosis

	Restenosis (n=8)	No restenosis (n=35)	p
Reference vs (mm)	3.4 ± 0.6	3.9 ± 0.6	0.032
MLD (mm)			
Baseline	1.0 ± 0.8	1.1 ± 0.5	0.96
Final	3.9 ± 0.7	4.3 ± 0.7	0.23
Bifurcation types			0.56
Type 1	5 (23%)	17 (77%)	
Type 2	3 (18%)	14 (82%)	
Type 3	0	4 (100%)	

Seung-Jung Park Am J Cardiol 2002;104:1609-1614

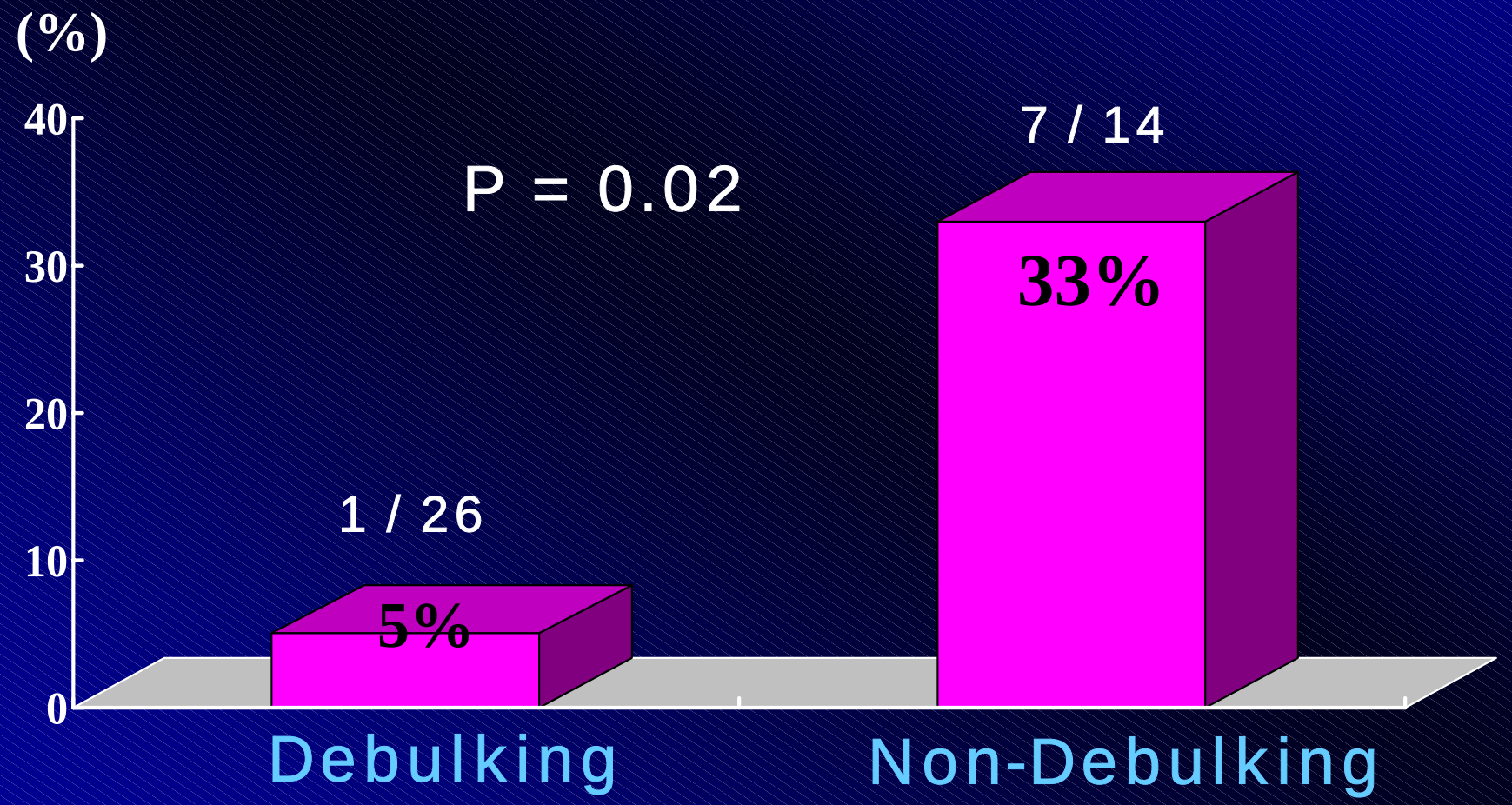
6 month Angiographic Restenosis



Seung-Jung Park Am J Cardiol 2002;104:1609-1614

Effect of Debulking

Restenosis Rate of Parent Vessel



Seung-Jung Park Am J Cardiol 2002;104:1609-1614

Protective Factor of Restenosis

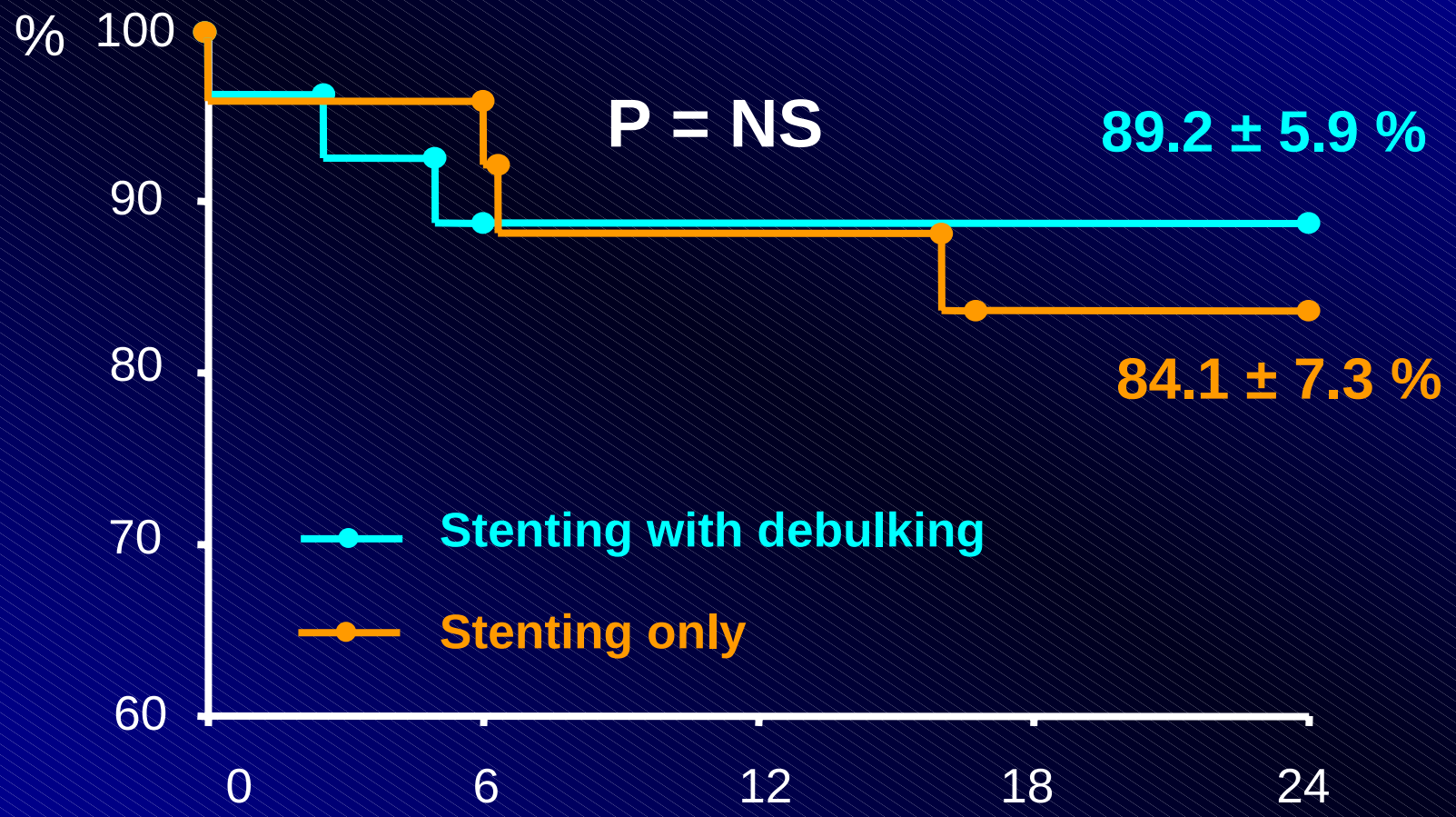
By multivariate analysis

Debulking procedure

Odds ratio ; 0.10
95% CI ; 0.01 to 0.91
P =0.04

***Seung-Jung Park Am J Cardiol* 2002;104:1609-1614**

Two-year MACE-Free Survival



Seung-Jung Park Am J Cardiol 2002;104:1609-1614

Conclusions

- **Stenting with or without debulking atherectomy is technically feasible and may be an effective strategy for treatment of unprotected LMCA bifurcation lesions.**
- **Furthermore, debulking atherectomy before stenting might reduce the late restenosis, providing new insight in the approach.**